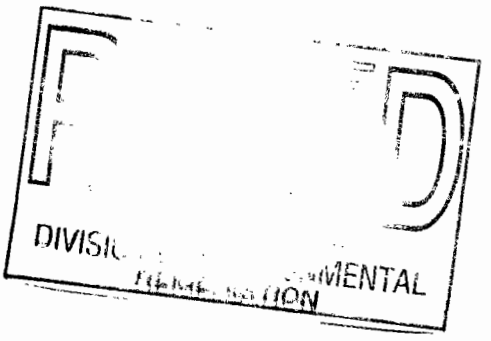
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KEYSPAN

KeySpan Corporation
Environmental Asset Management
One Metro Tech Center
15th Floor
Brooklyn, NY 11201

July 1, 2004
982482-1-1007



Mr. Amen M. Omorogbe, P.E.
Project (Engineer) Manager
New York State Department of Environmental Conservation
Bureau of Construction Services
Division of Environmental Remediation
Bureau of Western Remedial Action, 11th Floor
625 Broadway
Albany, New York 12233-7017

Re: Final Remedial Investigation Report
Clifton Former Manufactured Gas Plant (MGP) Site
Operable Unit–1 (OU-1)
Staten Island, New York
Site Number: 2-43-023

Dear Mr. Omorogbe:

KeySpan Corporation is pleased to provide you with the Final Remedial Investigation Report for Operable Unit –1 at the Clifton, Former Manufactured Gas Plant Site located in Staten Island, New York. The report was prepared by GEI Consultants, Inc. As you requested, a printed version and a compact disc of the report are provided. A copy of the report has also been forwarded to the document repositories.

If you have any questions or require any additional information, please contact me at (718) 403-3053 or by email at tbell@keyspanenergy.com.

Sincerely,

KeySpan Corporation
Tracey Bell
Manager
Environmental Asset Management

DBT:amm
Enclosures
c: R. Schick – NYSDEC (1 copy)
D. Desnoyes – NYSDEC (1 copy)
T. Kunkel – NYSDEC Region 2 (1 copy)
S. Selmer – NYSDOH (2 copies)

J. Carroll – Staten Island Community Board 1 (1 Copy)
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L. Liebs – KeySpan (1 CD)
D. Riccobono – KeySpan (1 CD)
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D.Terry – GEI (1 Copy and 1 CD)
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DIVISION OF ENVIRONMENTAL REMEDIATION

Final Remedial Investigation Report
Clifton Former MGP Site
Operable Unit 1 (OU-1)
Staten Island, New York
Site No. 2-43-023

GEI Consultants, Inc.

188 Norwich Avenue - P.O. Box 297
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SUBMITTED TO

KeySpan Corporation
One MetroTech Center
Brooklyn, NY 11201-3850

David B. Terry
Project Manager
GEI Consultants, Inc.

July 1, 2004
Project No. 982482-1-1007

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Executive Summary

On behalf of KeySpan Corporation (KeySpan), GEI Consultants, Inc. (GEI) conducted a remedial investigation (RI) and, in conjunction with Vanasse Hangen Brustlin, Inc. (VHB), prepared this RI report which addresses environmental conditions at and adjacent to the former manufactured gas plant (MGP) located at 25 and 40 Willow Avenue in the neighborhood of Clifton, Staten Island, New York. Qualitative Human Exposure Assessment (QHEA) and Fish and Wildlife Impacts Analysis (FWIA) aspects of the RI were conducted and the corresponding report sections prepared by VHB. The RI was performed in accordance with an Administrative Order on Consent (Index No. D2-0001-98-04) (AOC), the November 9, 1998 approved RI work plan, and the July 26, 1999, November 28, 1999, October 9, 2001, and the May 15, 2002 approved RI work plan addenda.

Five rounds of RI field work were completed between February 1999 and June 2002. The scope of the RI included the completion of exploratory test pits, soil borings, groundwater monitoring wells, piezometers, and surface-soil collection points at the 25 and 40 Willow Street parcels. The parcels have been separated into two operable units as the site progresses towards remedial action. Operable Unit 1 (OU-1) is the focus of this report and includes the following parcels: 40 Willow Avenue and adjacent parcels located at 66 Willow Avenue, the Lynhurst Avenue residential parcels (49 through 67 Lynhurst Avenue).

The parcel located at 25 Willow Avenue will be referenced as Operable Unit 2 (OU-2) and findings will be summarized under a separate RI report. The scope of the RI completed at OU-1 included 5 exploratory test pits, drilling of 43 subsurface-soil borings, drilling and installation of 3 groundwater monitoring wells, installation of 12 piezometers, and the sampling of 60 surface-soil locations. Eighty-eight subsurface-soil samples, 94 surface-soil samples, and 15 groundwater samples were chemically analyzed to evaluate the environmental conditions.

The 40 Willow Avenue parcel is set in an urban residential and commercial area of Staten Island, and encompasses approximately 0.98 acre. KeySpan currently owns the parcel. The 40 Willow Avenue parcel includes a natural gas regulating gate station, a paved parking area, and an unpaved, partially vegetated area. The 40 Willow Avenue parcel was the site of former Relief Gas Holder No. 2 and other structures associated with the former MGP. Residential homes abut the parcel to the south, and a commercial property borders the parcel on the west. The northern side of the parcel is bordered by Willow Avenue and the eastern side is bordered by Bay Street.

Construction of the former MGP began circa 1850 and the plant began production in April of 1857. Throughout the operating life of the plant, most of the operations were located on the 25 Willow Avenue parcel (Staten Island Gas Light/Richmond County Gas Light Company). Sometime prior to 1917, the plant expanded to the 40 Willow Avenue parcel with the addition of Relief Holder No. 2. Between 1937 and 1950, minor expansions occurred on both parcels. The MGP was demolished in 1959.

The geological setting has OU-1 located atop glacial deposits, including ground moraine, terminal moraine, and glacial outwash materials. The Manhattan Schist (bedrock) underlies these glacial deposits. Alluvial materials are also present at shallow depths at the 40 Willow Avenue parcel. Fill is present at shallow depths across the majority of OU-1. Topographically, the 40 Willow Avenue parcel is located in a gently sloping bowl-like depression that appears related to a historic stream channel. The nearest surface water body to the 40 Willow Avenue parcel is New York Harbor, approximately 500 to 600 feet to the northeast. Public water supply is currently provided to the parcels included in OU-1 and all surrounding residents and businesses. The source of the public water supply is reservoirs in the Catskill Mountains north of New York City.

Groundwater beneath OU-1 resides in two aquifers, shallow (water table) and deep. Dense, silty ground moraine and terminal moraine deposits create a hydrogeologic confining unit between the aquifers. The confining unit appears discontinuous beneath the 40 Willow Avenue parcel. Groundwater in the water table aquifer at OU-1 exhibits a radial flow pattern with flow ranging from west to north towards the adjacent 25 Willow Avenue parcel and northeasterly towards New York Harbor.

The most extensive observations of tar, staining, sheen, odors, and soil and groundwater containing chemical constituents related to the former MGP are limited to the 40 Willow Avenue parcel in close proximity to the former MGP-related structures. Tar, tar-staining, sheen, and/or tar-like odors were only present in soils beneath the Lynhurst residential parcels at depths greater than approximately 25 feet. Only naphthalene odors were observed beneath the 66 Willow Avenue parcel. Most of the chemical constituents encountered on the 40 Willow Avenue parcel were related to the presence of tar found within and adjacent to former MGP-related structures that handled tar as part of the gas production and storage process.

Similarly, within OU-1, dissolved chemical constituents in groundwater within the water table aquifer are predominantly limited to the 40 Willow Avenue parcel. Dissolved phase benzene, toluene, ethylbenzene, and xylene (BTEX) and polycyclic aromatic hydrocarbons (PAHs) were present in groundwater within the deep aquifer at well RW-7 and RW-14, adjacent to Relief Holder No. 2 (40 Willow Avenue parcel).

Shallow soils containing lead were identified on the residential parcels on Lynhurst Avenue during the course of investigation. In September 2002 through July 2003, an interim remedial measure (IRM) was conducted in accordance with the approved March 2002 IRM work plan to remove lead-containing soils to a target depth of 3 feet below ground surface on the residential parcels. The implementation of this IRM eliminated any potential contact by the residents with the soil containing lead.

The findings from VHB's qualitative exposure assessment indicate that chemicals present in soils and groundwater at Lynhurst Avenue Residential Parcels (off site) have an exposure pathway through which individuals could potentially be exposed to chemicals, which is incomplete based upon current and anticipated land use of the parcels.

The assessment of composure pathways and chemical occurrence of the 40 Willow Avenue parcel revealed that chemicals were present in surface soils, subsurface soils, and groundwater above applicable regulatory standards or site background conditions. Based upon the current site conditions and site access, potential for exposure scenarios were incomplete or determined to be minimal. The future site use scenario at the 40 Willow Avenue parcel could have potential pathways of concern if subsurface soils and groundwater are exposed. A feasibility study report has been prepared to assess the appropriate means to mitigate conditions related to the former relief holder on the 40 Willow Avenue parcel. The draft feasibility study was issued in December 2002.

The fish and wildlife impact analysis (FWIA) indicated that the site and surrounding area represent poor environmental resources due to the lack of vegetation in the urban environment. Wildlife species present are adapted to an urban setting and due to the limited size of vegetated areas only a few individuals would be present. Concentrations of several chemicals of potential ecological concern (COPECs) in soils pose a potential risk to wildlife, however this potential risk has minimal ecological significance. Only transient species and a few individual animals would use this area, therefore the frequency and duration of exposure to COPECs is limited. Therefore, the on-site COPECs do not pose a current risk nor an anticipated future risk to wildlife.

The body of this RI report presents the environmental observations and findings. The reader is referred to Sections 6 and 7 for a summary of the conceptual site model and a summary of the environmental and risk findings, respectively.

1. Introduction

GEI Consultants, Inc. (GEI) was retained by KeySpan Corporation (KeySpan) to conduct a remedial investigation (RI) and, in conjunction with Vanasse Hangen Brustlin, Inc. (VHB), to prepare this RI report which addresses environmental conditions related to the former manufactured gas plant (MGP) operation at the parcels located at 25 and 40 Willow Avenue in the neighborhood of Clifton in Staten Island, New York (Figure 1-1). VHB was responsible for conducting and preparing and updating the Qualitative Human Exposure Assessment (QHEA) and Fish and Wildlife Impacts Analysis (FWIA) aspects of the RI. As such, Section 7 of this report, including all associated tables and figures, have been prepared by VHB. All other report sections were prepared by GEI. The site has been separated into two operable units (OUs). Operable Unit 1 (OU-1) is the focus of this report and includes the 40 Willow Avenue parcel, the adjacent Lynhurst Avenue residential parcels (49 through 67 Lynhurst Avenue), and the adjacent 66 Willow Avenue commercial parcel. The remainder of the site (including 25 Willow Avenue) constitutes OU-2. Plate 1 presents the extent of investigations at each operable unit through 2002. The findings for OU-2 will be summarized under a separate RI report cover once additional field investigation is completed.

The RI was performed in accordance with the Administrative Order on Consent (AOC) (Index No. D2-0001-98-04) between Brooklyn Union Gas Company (Brooklyn Union) (KeySpan's predecessor) and the New York State Department of Environmental Conservation (NYSDEC) for the former Richmond County Gas Light Company MGP located at the 25 and 40 Willow Avenue parcels.

KeySpan currently owns the 40 Willow Avenue parcel. Plate 1 presents the current layout and former MGP plant configuration for both operable units. The scope of the RI included the completion of exploratory test pits, subsurface borings, groundwater monitoring wells, piezometers (temporary and permanent), and surface-soil collection points.

Subsection 1.2.1 presents a detailed description of the OU-1 parcels.

The remainder of Section 1 discusses the RI Objectives and Scope (subsection 1.1), background (subsection 1.2), the physical and environmental setting (subsection 1.3), and a summary of previous investigations (subsection 1.4).

Section 2 discusses the RI Scope of Work and methods used during the RI. Section 3 discusses the geology and hydrogeology underlying OU-1. Section 4 discusses the nature and extent of physical observations and chemical constituents. Section 5 discusses the fate

and transport of chemical constituents. Section 6 presents a conceptual site model for OU-1, Section 7 presents an QHEA and an FWIA. The findings of the OU-1 RI are summarized in Section 8.

1.1 RI Objectives and Scope

The RI was conducted in accordance with the AOC and as outlined in the approved RI Work Plan, dated November 9, 1998, and its approved addenda listed below. The addenda work plans are included in Appendix A.

- *Remedial Investigation Clifton Former MGP Site, Amendment to the Work Plan, Staten Island, New York* (July 26, 1999)
- *Clifton Former MGP Site, Additional Scope of Work for Residential Lots Adjacent to the 40 Willow Avenue Parcel, Staten Island, New York* (November 28, 1999)
- *Former Clifton MGP Site, Revised Supplemental Investigation (RI) Work Plan, 25 and 40 Willow Avenue Parcels, Staten Island, New York (October 9, 2001)*
- *Former Clifton, Staten Island MGP Site, Supplemental Remedial Investigation (RI) Revised Work Plan (May 15, 2002)*

The RI was intended to characterize soil and groundwater conditions at the 40 Willow Avenue parcel and adjacent parcels included in OU-1. The information gathered during the RI was intended to supplement information available from previous investigations of the 40 Willow Avenue parcel. Two previous investigations were completed at the 40 Willow Avenue parcel by Brooklyn Union, and Fanning, Phillips, and Molnar (FP&M) between 1993 and 1998. These previous investigations are discussed in subsection 1.4.

1.2 Background

This subsection provides a description of the setting of OU-1 and discusses the surrounding demographics and the history of the former MGP.

1.2.1 Description of Parcels

The 40 Willow Avenue parcel encompasses approximately 0.98 acre. The 40 Willow Avenue parcel is located at the southwestern corner of Bay Street and Willow Avenue and is bounded on the northwest by Willow Avenue, on the northeast by Bay Street, on the west by a two-story commercial building and a paved parking lot (66 Willow Avenue), and by

residential dwellings (49 through 67 Lynhurst Avenue) on the south. The residential parcels encompass approximately 0.66 acre and front on Lynhurst Avenue (Plate 1).

The 40 Willow Avenue parcel includes:

- A paved parking lot on the northern and eastern portions of the parcel
- Two, one-story brick buildings utilized as a natural gas regulating gate station on the northern portion of the parcel
- An undeveloped, partially grassed lot on the southern portion of the parcel, periodically used for vehicle parking (Plate 1)

The regulating station and unpaved lot on the 40 Willow Avenue parcel were previously the location of a former gas holder (Relief Holder No. 2). A chain-link fence surrounds the entire perimeter of the 40 Willow Avenue parcel.

The 66 Willow Avenue parcel consists of a two-story, commercial office building with loading docks and a paved parking lot that surrounds the building (Plate 1).

The Lynhurst Avenue residential parcels (49 through 67) consist of occupied residential dwellings (Plate 1). Each residential parcel contains a grassed and landscaped back yard with the only exception being a paved parking area on the 51 Lynhurst Avenue parcel. A chain-link fence surrounds the perimeter of each parcel.

The OU-1 parcels are located in an area of mixed commercial and residential land use. Population data was obtained from the United States Environmental Protection Agency (EPA) Internet web site based upon 1990 census data. Census data from 1990 indicate that the average population density per square mile within 1 mile of the two parcels is 8,266 (Figure 1-2). There are 10,255 household units and a population totaling about 26,000 within this 1-mile radius. Updated population data obtained from the 2000 Census Internet web site indicates that the population density for Richmond County (Staten Island) ranges between 4,655 and 7,588 persons per square mile.

1.2.2 History

The Clifton former MGP was operated by Richmond County Gas Light from 1856 to 1901 and the Staten Island Gas Light Company circa 1884. Plate 1 shows the historic layout of the former plant. From 1901 until 1957, the plant was operated by the New York and Richmond Gas Company. Brooklyn Union acquired that company in 1957, at which point MGP operations ceased. Brooklyn Union (KeySpan) never operated the gas works.

The following discussion regarding the MGP history pertains to both OU-1 and OU-2.

Only a partial history of the former plant is available based on public records; however, through review of documentation at the Staten Island Institute of Arts and Sciences, *Brown's Directory of American Gas Companies*, and available Sanborn Fire Insurance (Sanborn) maps, a general depiction of the former plant development is possible.

The earliest available map of the general vicinity is a Revolutionary War period map of Staten Island for the years 1775 through 1783 (Figure 1-3). Here the location of the future plant is shown as undeveloped with a small (unnamed) stream flowing from the uplands to the south toward the northeast into New York Harbor. Bay Street (a.k.a. Shore Road) is essentially a shoreline travel way near the future plant location. Anchorages are also noted just offshore of where the MGP would be built 70 years later. In 1853, a James Butler map of the vicinity depicts substantial changes in the vicinity of the future plant (Figure 1-4). A street grid has been established, the shoreline appears to have bulkheads, and a number of dwellings dot the landscape. The unnamed stream that flows through the former MGP site is illustrated in more detail. This drawing probably represents the community layout at the time the MGP was constructed in 1850. It is documented in the Richmond County Gazette that the construction of the MGP began in 1850. At that time, the plant consisted of the following.

- A 30- x 50-foot brick retort house
- A 25- x 30-foot purifying house which contained purifiers, condensers, and a scrubber
- An office and meter house, 20 x 30 feet in dimension
- A single 75-foot diameter holder having a brick tank 21 feet deep (subsequently referred to as Relief Holder No. 1)
- Lime and coal sheds

The plant was owned by the Richmond County Gas Light Company, which started production in April 1857.

An *1874 F.W. Beers Map of Staten Island* shows what is considered the earliest plant layout. Referring to Plate 1, the first gas holder is the same as Relief Holder No. 1. The main production facilities were located just to the southwest of the holder. Plate 1 indicates three of the original buildings as "purifying," "retort house," and "coal shed."

According to an article written by F. Rider in 1961, titled *Looking Back to Gas Light Era*, a second gas company, the Staten Island Gas Light Company, had previously existed only on paper with no plant or infrastructure improvements on the island. The Staten Island Gas Light Company was indicated to have built a plant adjacent to the Richmond County Gas

Light Company (also referred to as the Richmond Gas Works). In 1884, the Staten Island Gas Light Company merged with the Richmond County Gas Light Company and a new carbureted water gas plant was built at the current 25 and 40 Willow Avenue parcels. The Staten Island Company was responsible for production and the Richmond County Gas Light Company distributed the gas.

The 1885 Sanborn map depicts a gas works with a gasometer as "not completed" on the western portion of the 25 Willow Avenue parcel that are believed to be the Staten Island Gas Light Company operations. The 1885 Sanborn map also shows various operational features of the unlabeled gas works, including a gasometer (referred to in later years and in Plate 1 as Relief Holder No. 1), a fuel oil tank, several coal sheds, a purifying house, a lime house, and a retort house. In the 1898 Sanborn map, a second generating house, gasometer, and associated structures in the western portion of the 25 Willow Avenue parcel (likely the former Staten Island Gas Light Company operations) and a gasometer (referred to in later years as Relief Holder No. 2) are depicted on the 40 Willow Avenue parcel. The 25 Willow Avenue plant is referred to as the Richmond Gas Works in this Sanborn map.

A *1907 Atlas of the Borough of Staten Island, Richmond, City of New York*, indicates that the MGP is referred to as the Richmond County Gas Light Company. The atlas depicts the configuration of the plant to be relatively unchanged from the 1898 Sanborn map.

A 1917 Sanborn map shows that much expansion had occurred at the plant between the late 1800s and 1917, including the addition/conversion of the original coal carbonization plant to a water gas plant, and construction of a large-capacity (1 million cubic feet) gas holder (Holder No. 2) at the northern corner of the 25 Willow Avenue parcel near Bay Street. In addition, in the northeastern portion of the site, a tar separator was located east of Relief Holder No. 1 and tanks (later referred to as tar tanks) and two oil tanks are depicted. The MGP is listed as the New York and Richmond Gas Company. This expansion in the plant was accompanied by increased gas production at the site from 38 million cubic feet (MMCF) to 372 MMCF in 1920 *Brown's Directory* listings (*Brown's*, 1890 and 1920). The former gas works (Staten Island Gas Light Company) and associated structures have been incorporated into the New York and Richmond Gas Company MGP (also referred as the Richmond County Gas Light Company) and were used for site operations.

A 1937 Sanborn map shows the expansion of the water gas plant and purifying facilities, the addition of another tar separator, and three fuel oil tanks at the southwestern corner of the 25 Willow Avenue parcel, and the addition of support equipment on the 40 Willow Avenue parcel around Relief Holder No. 2. Gas production continued to increase at the site to 910 MMCF by 1935 (*Brown's*). Between 1937 and 1950, minor expansions occurred on both sides of Willow Avenue. Gas production at the site continued to increase to 1,230 MMCF by 1945 and reached a peak of 1,400 MMCF in 1955. The gas plant was demolished in the

spring of 1959 according to a newspaper article in the "Advance." The 1977 Sanborn map shows the Brooklyn Union Service Center on the southeastern corner of the 25 Willow Avenue parcel, and a Brooklyn Union natural gas regulator station on the southern side of Willow Avenue (40 Willow Avenue parcel). The natural gas regulator station is the building associated with the gas plant that is depicted on the 1977 Sanborn map.

1.2.3 Water Use

Public water supply is currently provided to the OU-1 parcels and the surrounding area by the New York City Water Department. Mr. Joseph McGuire, a representative from the New York City Water Department, was contacted regarding historic water use on Staten Island (McGuire, 2000). According to Mr. McGuire, all of Staten Island's water supply currently comes from the Catskill Region of New York and is stored in the Clove Lakes area of Staten Island in underground storage tanks (USTs). Staten Island was connected to the New York City water system in 1970, when the Richmond Tunnel was completed across The Verrazano Narrows.

No wells are known to be currently in use. The nearest former well to OU-1 was an industrial/private water supply well operated by Louis Dejone and Company located at 330 Tompkins Avenue (McGuire, 2000). The well is not active and was located approximately 0.2 mile southwest and upgradient of the OU-1 parcels. Soren (1988) identified another former well approximately 0.2 mile south of the parcel. The former use of this well is unknown.

In previous investigations at the site, an 8-inch steel well that was likely associated with the former MGP was encountered on the site. The discovery and the decommissioning of this well are described within subsection 1.4.1.

1.3 Physical and Environmental Setting

The OU-1 parcels are in a locally topographic high area that gently slopes to the north towards the 25 Willow Avenue parcel and east-northeast towards New York Harbor (Plate 1). The parcels reside on the edge of a topographic bowl-like depression that appears to be associated with the historic stream that flowed on the northwestern portion of the adjacent 25 Willow Avenue parcel. Historic maps reveal that an unnamed stream was present beneath the existing railroad bed on the northwestern portion of the 25 Willow Avenue parcel (Figures 1-3 and 1-4). This stream appears to have been filled at one point and replaced with the current stormwater drainage system. New York Harbor is the closest surface water body to OU-1 and is located approximately 500 to 600 feet northeast (Figure 1-1).

1.3.1 Regional Geology

The 40 Willow Avenue parcel is located in the Manhattan Prong Geologic Province, which contains bedrock associated with the New York City group (Bennimoff and Ohan, no date). Two other geologic provinces on Staten Island include the Staten Island Serpentinite that makes up the central highlands or spine of Staten Island, and the Newark Basin, which is located on the western portion of Staten Island (Bennimoff and Ohan, no date). OU-1 is believed to be underlain by the Manhattan Schist, which is described as a metamorphosed dark gray micaceous rock unit of Late Proterozoic to Cambrian Age that was folded, faulted and eroded with younger deposits overlying (Soren, 1988). Surficial, unconsolidated Pleistocene age (Wisconsin) glacial deposits lie unconformably on the Manhattan Schist in the northeastern portion of Staten Island (Soren, 1988). Holocene (recent) aged deposits are inferred to be associated with streams, rivers and marsh deposits.

The OU-1 parcels are indicated as underlain by Harbor Hill Terminal Moraine deposits which consist of unsorted sand, gravel, cobbles, and boulders within a clayey and silty matrix with some occurrences of locally stratified sand and gravel beds (Soren, 1988). A nearby geologic contact indicates that Pleistocene Age (Wisconsin) Ground Moraine deposits are located just to the west of the parcels and are described as a mainly reddish-brown, clayey-till from the surface to approximately 150 feet below ground surface (bgs). The unit is described as having local bodies of stratified sands and gravel bodies within the unit (Soren, 1988).

1.3.2 Regional Hydrogeology

The regional hydrogeology of the northern portion of Staten Island is characterized by groundwater flow from the central highlands easterly towards New York Harbor. Groundwater elevations range from as much as 350 feet above sea level in the central spine of Staten Island to sea level at the shore. The water table is less than 10 feet above sea level in the vicinity of the OU-1 parcels. Water table conditions are encountered on Staten Island where sandy till is present and confined conditions are encountered where silty-till and clayey-till over water-bearing units are present (Soren, 1988).

The terminal moraine that underlies OU-1 is estimated to have an average hydraulic conductivity of 0.001 feet per day for a clayey till and 0.008 feet per day for a silty till. Horizontal hydraulic conductivities are approximately 10 to 20 times greater than the vertical hydraulic conductivities (Morris and Johnson, 1967, and Soren, 1988). Higher hydraulic gradients were noted within the stratified sand and gravel layers contained within the ground moraine unit.

1.3.3 Climatology

Climatologic records were reviewed for the Newark International Airport in Newark, New Jersey for the time period 1970 through 1997. The Newark International Airport is located approximately 8 miles to the northwest of the 40 Willow Avenue parcel and its weather records are considered representative of weather conditions at the parcels. Based upon a review of this data, the normal maximum and minimum daily temperature, normal monthly and annual precipitation, and mean wind speed and prevailing direction were obtained. Table 1-1 summarizes the climatologic data for the airport. The average daily maximum temperature was 63.4°F and the average daily minimum temperature was 46.1°F. The lowest normal daily maximum temperature was 37°F recorded for January and the highest normal daily maximum was 87.0°F recorded for July. The annual precipitation (rainfall) for the area is 43.97 inches with the largest northerly amount of precipitation of 4.5 inches, which occurs in July. The annual snowfall in the vicinity is 27.0 inches with the largest amount (9.2 inches) falling in February. The average annual wind speed is 10.2 miles per hour from the south/southwest (230°E).

1.4 Previous Investigations

Subsurface investigations were conducted by others in and around the 40 Willow Avenue parcel since 1993. These investigations are summarized below.

1.4.1 40 Willow Avenue Investigation

1.4.1.1 Brooklyn Union Previous Activities (February 1993)

A summary of previous Brooklyn Union activities for the 40 Willow Avenue parcel is presented in the August 29, 1994 report by FP&M. A summary of observations and activities reported in FP&M's report are as follows.

- Discovery of an oil-like substance on the unpaved lot at the 40 Willow Avenue parcel
- Discovery of an 8-inch steel well casing on the 40 Willow Avenue parcel
- Removal of a water/hydrocarbon mixture from the 8-inch well and sealing of the well with cement grout
- Excavation of 20 cubic yards (cy) of soil down slope of the 8-inch pipe

The following paragraphs provide a detailed summary of these events as obtained from the FP&M report, dated August 29, 1994.

Brooklyn Union personnel had previously discovered a puddle of an oil-like substance on unpaved soil located approximately 20 feet southeast of the Gate Station on the 40 Willow

Avenue parcel. The oil-like substance was originally assumed to be related to site use by Brooklyn Union contractors that had previously used the area as a temporary soil and pavement storage area. Stained soils and soils containing the oil-like substance were drummed and sampled. Analysis by the Brooklyn Union laboratory revealed that the oil-like substance closely resembled coal tar [sic]. In February 1993, an additional soil cleanup by Brooklyn Union personnel revealed an 8-inch diameter steel pipe located just below the ground surface (Plates 1 and 3). The well was observed to be vertical with a welded steel cap that was leaking small amounts of water and an oil-like material. The well was measured to a depth of approximately 90 feet bgs. Miller Environmental Group (the environmental contractor) was contacted and subsequently removed water and a hydrocarbon free-product mixture from the well into a vacuum tanker. Brooklyn Union subsequently sealed the 8-inch pipe with a mixture of cement grout and removed approximately 20 cy of soil downgradient of the casing (Plates 1 and 3). Brooklyn Union notified NYSDEC and the incident was assigned Spill #92-12952.

1.4.1.2 Fanning Phillips & Molnar, 1993-1994 Subsurface Investigation and Soil Removal (40 Willow Avenue Parcel)

A subsurface investigation conducted between April 1993 and June 1994 is summarized as follows.

- Installation of three monitoring wells (MW-1 through MW-3)
- Completion of eight soil borings (SB-1 through SB-8)
- Sampling of subsurface soil and groundwater
- Removal of groundwater and free product (coal tar) [sic] from the deep well and abandonment of the deep well
- One excavation resulting in the removal of approximately 43 cy of soil

The following paragraphs present these activities in chronological order and provide more detail regarding the 40 Willow Avenue parcel.

Between April 1 and 5, 1993, three shallow monitoring wells (MW-1, MW-2, and MW-3) were installed within 10 feet of the former puddle in topographically uphill and downhill directions (FP&M, 1993) (Plates 1 and 3). The wells were installed to a maximum depth of 24 feet below grade. No free product was observed in soil samples or within wells MW-1 or MW-2 after 48 hours. The soil at MW-3 contained coal tar [sic]-saturated material in the 0- to 2-foot sample interval. Volatile organic compounds (VOCs), including benzene, toluene, ethylbenzene, and xylenes (BTEX), and polycyclic aromatic hydrocarbons (PAHs) were detected in the soil. At a depth of 22 feet below grade, soil concentrations of VOCs and PAHs were two to three orders of magnitude less than those encountered at the 0- to 2-foot depth. The groundwater samples detected xylenes in MW-2 and acenaphthylene (PAH) in MW-3.

On December 7, 1993, eight additional soil borings (SB-1 through SB-8; see Plate 1) were installed topographically downhill of the steel well to further characterize shallow soil in the area of the former 8-inch steel well (FP&M, August 29, 1994) (Plate 2). The majority of the chemical constituents and observed staining, etc. in soils down slope of the steel well were found to be localized in the vicinity of MW-3.

Between December 9 and 17, 1993, the concrete grout slurry in the 8-inch steel well was drilled out by air rotary drilling and tar and groundwater within the steel well was removed by pumping (FP&M, August 29, 1994). The 8-inch well was drilled out to a total depth of 79 feet and connection with the aquifer was determined by the reddish-brown silt present in the water flowing from the well. It was concluded by FP&M engineers that tar [sic] present in the well did not migrate into the formation because no discoloration or staining was noted in the groundwater flowing from the well. The well was gauged for light nonaqueous phase liquids (LNAPL) and dense nonaqueous phase liquids (DNAPL) and none were detected. The well was subsequently sealed by pressure grouting with cement slurry in accordance with NYSDEC well abandonment guidelines and with NYSDEC approval.

On June 15, 1994, 43 tons of soil in the vicinity of MW-3 and SB-4 was excavated and disposed of in accordance with NYSDEC regulations (FP&M, 1994). Sidewall and bottom confirmation samples were taken from the excavation prior to backfilling. These sidewall samples had detections of VOCs and PAHs. Following the removal of source materials, sampling results indicated that minimal groundwater impacts existed.

On January 19, 1996, NYSDEC issued a letter to Brooklyn Union, stating that the results of the investigations and remediation show little or no signs of contamination in the soil, and that the work was done satisfactorily and meets all Departmental requirements. This letter closed Spill Number 92-12952.

2. Remedial Investigation Scope of Work

The RI was primarily completed on the parcels located at 25 and 40 Willow Avenue, which contained the primary operations of the former MGP. Some work was completed on adjacent parcels contained within OU-1 and OU-2. The scope of work for OU-1 included the completion of soil borings, test pits, installation of groundwater monitoring wells, soil sampling, hydraulic conductivity testing, and groundwater sampling to characterize the soil and groundwater conditions. Figure 2-1 depicts the RI sampling locations at OU-1.

The RI was completed in five rounds of field work: Round 1 (February through April 1999); Round 2 (July through October 1999); Round 3 (November through December 1999); Round 4 (November 2001 through January 2002); and Round 5 (May through June 2002). Sampling locations were selected to address/identify former MGP structures; to obtain information regarding the soil and groundwater conditions at the 40 Willow Avenue parcels; and to characterize the soil and groundwater at adjacent parcels.

The OU-1 portion of the RI included completion of 5 exploratory test pits, drilling of 43 subsurface-soil borings, drilling and installation of 3 groundwater monitoring wells, installation of 12 piezometers, and the sampling of 60 surface-soil locations. Eighty-eight subsurface-soil samples, 94 surface-soil samples, and 15 groundwater samples were chemically analyzed to evaluate the environmental conditions within OU-1.

This section generally describes the methods used for the sampling in accordance with the NYSDEC-approved work plan and the NYSDEC-approved work plan addenda. Detailed field procedures are located in the work plan and work plan addenda. Sample analyses were completed by Severn-Trent Laboratories (STL), located in Shelton, Connecticut (a NYSDEC-approved laboratory).

2.1 Field Work

2.1.1 Round 1 - Investigation of 40 Willow Avenue Parcel (February through April 1999)

The general objective of this phase of the RI was to identify the presence/absence of the former MGP structures and to characterize the subsurface conditions at the 25 and 40 Willow Avenue parcels.

In accordance with the RI work plan, two test pits (TP-10 and TP-10A) and seven borings (SB-17/RW-7, SB-18, SB-21, SB-22, SB-23, SB-36, and RW-4) were completed at the 40 Willow Avenue parcel [OU-1] (Figure 2-1). Of the seven soil borings, two (RW-4 and RW-7/SB-17) were installed as monitoring wells.

Surface- and subsurface-soil sampling, groundwater sampling, hydraulic conductivity testing, and groundwater level measurements (at high and low tides) were completed during the first round of the RI.

Within OU-1, groundwater samples were collected from monitoring wells RW-4 and RW-7 as part of the Round 1 scope of work. A single-well pump test was conducted on RW-4 to assess the hydraulic conductivities of the deep groundwater aquifer beneath the 40 Willow Avenue parcel. Each monitoring well was gauged for the potential presence of non-aqueous phase liquid (NAPL) during the groundwater sampling event. In addition, temporary hand-dug piezometers (PZ-2 and PZ-3) were installed to provide additional groundwater elevation data, and five surface-soil samples (SS-1 to SS-5) were collected from the unpaved portion of the 40 Willow Avenue parcel (Figure 2-1).

Nine air quality stations (AQS-1 to AQS-9) were established to monitor the air quality on the perimeter of the 25 and 40 Willow Avenue parcels during the test pit excavations (Plate 1 and Figure 2-1). Air quality monitoring was also conducted immediately adjacent to test pits (work zone) to document the air quality during exposure of soils during shallow excavations. The air-monitoring program included the collection of real-time air quality data, time-averaged air quality data, and meteorological data to document potential migration routes of airborne VOCs and particulates.

2.1.2 Round 2 Investigation of 25 and 40 Willow Avenue Parcels and Adjacent Parcels (July through October 1999)

This portion of the RI was completed to characterize subsurface soils to a confining layer (bedrock), characterize shallow subsurface soils, determine the presence of additional former MGP structures, characterize groundwater conditions within the upper and lower aquifers, evaluate the lateral and vertical extent of subsurface conditions, and evaluate surface-soil conditions on adjacent residential and other abutting parcels.

Within OU-1, five soil borings were drilled and sampled (SB-40, SB-41, SB-42/RW-14, SB-43, SB-44) with one of these borings completed as a monitoring well (RW-14/SB-42). Six residential parcel surface soils (SS-6 to SS-11) were collected from 63, 61, 59, 55, 53, and 51 Lynhurst Avenue, respectively.

Surface- and subsurface-soil sampling, groundwater sampling, hydraulic conductivity testing, and groundwater level measurements (at high and low tide stages) were completed at boring and monitoring well locations on the 40 Willow Avenue parcel. Groundwater samples were collected from monitoring wells RW-4 and RW-14. Monitoring well (FPM-MW-1) and piezometers (PZ-2 and PZ-3) were used to determine water table groundwater flow directions. Monitoring wells RW-4 and RW-14 were used to determine the groundwater flow within the deep aquifer. Groundwater information from OU-2 was used to supplement groundwater information collected within OU-1.

In addition to the proposed work described in the work plan addenda, hand-dug piezometers (PZ-2, and PZ-3) were replaced with permanent GeoProbe®-installed piezometers with sand packs and protective well heads (Figure 2-1). PZ-2 and PZ-3 were permanently reinstalled in their approximate original locations.

2.1.3 Round 3 Investigation of Lynhurst Avenue Residential Lots and Commercial Lot at 66 Willow Avenue (November through December 1999)

This phase of the RI was conducted to characterize the soil conditions beneath the residential lots on Lynhurst Avenue. In addition, further characterization of surface soils at these lots was performed and background surface-soil samples were collected to establish the condition of background soils in the vicinity of the former MGP.

In accordance with the RI work plan addendum dated November 11, 1999, five soil borings (SB-58, SB-59, SB-60, SB-61, and SB-62) were drilled on the residential parcels with a GeoProbe® rig and 12 residential surface-soil samples (SS-12, SS-14, SS-15, SS-16, SS-19, SS-21, SS-22, SS-23, SS-26, SS-28, SS-29, and SS-30) were collected from the residential parcels located at 49 through 59 Lynhurst Avenue. An additional three soil borings (SB-65, SB-66, and SB-67) were drilled with a GeoProbe® in the paved parking lot on the commercial property located at 66 Willow Avenue (Figure 2-1). Proposed soil borings SB-63 and SB-64 and surface-soil samples SS-17, SS-18, SS-24, SS-25, SS-31, and SS-32 were not able to be completed at the time of the investigation because site access agreements to 61 and 63 Lynhurst Avenue could not be secured. Proposed surface-soil samples SS-13, SS-20, and SS-27 were not able to be completed because concrete covered the residential yard area.

Ten background surface-soil samples (SS-33 through SS-42) were collected at accessible locations in the vicinity of the 25 and 40 Willow Avenue parcels. These samples were collected to establish background conditions against which the residential parcel surface-soil samples could be compared (Plate 1).

2.1.4 Round 4 - Former Clifton MGP Site, Revised Supplemental Investigation (RI) Work Plan, 25 and 40 Willow Avenue Parcels, Staten Island, New York (October 9, 2001) (November 2001 through January 2002)

This phase of the RI was conducted to characterize the soil conditions between the Relief Holder No. 2 located at 40 Willow Avenue and the residential parcels on Lynhurst Avenue and within Lynhurst Avenue. In addition, further characterization of soils and groundwater directly adjacent to Relief Holder No. 2 and a construction and integrity assessment of Relief Holder No. 2 was completed to assist in the feasibility study being completed for the removal of the holder. Additional surface characterization was also completed on the Lynhurst Avenue residential parcels.

In accordance with the RI work plan addendum dated October 9, 2001, one soil boring (SB-77) was installed with a GeoProbe® within the backyard of the 59 Lynhurst Avenue parcel and one soil boring (SB-78) was installed with a Resonant Sonic drilling rig within the Lynhurst Avenue Right-of-Way (ROW). Twelve soil borings (GP-01A/B, GP-02, GP-03A/B, GP-04, GP-05, GP-06, GP-07, GP-08, GP-09, GP-10, GP-11, and GP-12) were installed with a GeoProbe® drill rig. Two test pits (TP-12 and 13) were completed with a rubber-tired backhoe. Nine residential surface soils (SSR-40 through SSR 48) were collected from the 63 and 67 Lynhurst Avenue parcels.

Ten air quality stations (AQS-1 to AQS-10) were established to monitor the air quality on the perimeter of the 25 and 40 Willow Avenue parcels during the test pit excavations (Plate 1 and Figure 2-1). The original nine air quality stations (AQS-1 through AQS-9) were monitored during Round 4 and an additional air quality station (AQS-10) was established adjacent to the 40 Willow Avenue and 66 Willow Avenue property line. Air quality monitoring was also conducted immediately adjacent to test pits (work zone) to document the air quality during exposure of soils during shallow excavations. The air-monitoring program included the collection of real-time air quality data, time-averaged air quality data, and meteorological data to document potential migration routes of airborne VOCs and particulates.

In addition to the proposed work described in the work plan addenda, an additional test pit (TP-14) was completed within Relief Holder No. 2 to better define the outer holder wall of former Relief Holder No. 2 (Plate 1, Figure 2-1).

2.1.5 Round 5 - Former Clifton, Staten Island MGP Site, Supplemental Remedial Investigation (RI) (May through June 2002)

This phase of the RI was conducted to further characterize the soil conditions between the Relief Holder No. 2 and the residential parcels on Lynhurst Avenue and within Lynhurst Avenue. Shallow groundwater quality adjacent to the residential dwellings was also

evaluated. The floor profile of the former Relief Holder No. 2 was also investigated to determine the contents and construction to support the feasibility study.

In accordance with the RI work plan addendum dated March 14, 2002, four subsurface-soil borings were installed with a GeoProbe® drill rig within the back yards of three of the Lynhurst Avenue parcels, as follows: SB-79/79A on 63 Lynhurst Avenue; SB-80 on 51 Lynhurst Avenue; and SB-87 on 53 Lynhurst Avenue. Three borings (SB-84, SB-85, and SB-86) were installed on the southeastern side of Lynhurst Avenue. Eight temporary piezometers (PZ-5 through PZ-12) were installed on 49 through 67 Lynhurst Avenue residential parcels adjacent to the basements of the dwellings. Groundwater samples were collected from the groundwater piezometers to evaluate the shallow groundwater quality adjacent to the residential homes.

In addition to the proposed work described in the work plan addenda, additional surface-soil samples SSR-49 through SSR-63 were collected on 51, 63 and 67 Lynhurst Avenue to support the lead impacted surface soil interim remedial measure (IRM) that commenced in September 2002 and was completed in July 2003.

2.2 Field Methods

Several pieces of heavy equipment were mobilized and various sampling techniques were utilized to complete the RI. This subsection generally describes the sampling procedures utilized. For details refer to the approved RI work plan and addenda.

2.2.1 Air Monitoring

2.2.1.1 Perimeter Air Monitoring

Ambient air monitoring was completed during the excavation of test pits (Round 1 and Round 4). Nine perimeter air quality stations (AQS-1 to AQS-9) were sampled during Round 1 and ten air quality stations (AQS-1 to AQS-10) were sampled during Round 4 of the RI (Plate 1). The air quality monitoring program was designed to evaluate the potential migration of VOCs and particulates off the perimeter of the parcels where excavation occurred, and to document the levels of VOCs and particulates in air at the property boundaries. A photoionization detector (PID) organic vapor analyzer (OVA) and MiniRAM™ particle detector were used in the collection of the air quality data at each air quality station. Each instrument was calibrated prior to use. Measurements were taken hourly at each sampling station while test pit excavation occurred. The perimeter air quality monitoring program was supplemental to, and discrete from, the air monitoring program implemented for purposes of evaluating worker health and safety.

Meteorological data, including wind speed, wind direction, and temperature, were monitored throughout the air sampling program to evaluate potential migration pathways of VOCs and particulates. These data were collected from a weather station temporarily mounted on the roof of the building at the 25 Willow Avenue parcel during Round 1 of the RI. Meteorological information was collected from a temporary weather station mounted on the chain-link fence adjacent to the gate of the 40 Willow Avenue parcel during Round 4 of the RI.

2.2.1.2 Worker Health and Safety Air Quality Monitoring

As specified in the work plan and addenda, two particulate meters were used during the test pit activities (Round 1 and Round 4 of the RI) to monitor dust generation during excavation of test pits. One unit was placed upwind of the excavations and the remaining unit was placed downwind of the excavations. The particulate meters were placed approximately 10 to 20 feet away from the excavation activities. The units were moved as appropriate during the excavation activities, based on wind direction. Potential organic vapor emissions were also monitored using a PID-OVA approximately 10 to 20 feet downwind of excavation activities. In addition, personnel working on excavating and logging each test pit monitored total VOCs within their work space breathing zone with a PID-OVA.

Subsection 2.3 discusses the results of the air monitoring program.

2.2.2 Soils (Borings, Test Pits, and Surface)

This subsection describes the methodology used at OU-1 to collect soil samples during the RI. Table 2-1 identifies the rationale for conducting each boring, submittal of each sample for laboratory analysis, and the analyses completed for each sample. Generally, soils were logged and screened in accordance with the RI work plan. Selected soil samples were placed directly into certified pre-cleaned containers and placed directly into ice-filled coolers. The samples were then shipped to STL under chain-of-custody or were picked up by laboratory courier and delivered to the laboratory for analysis. Boring logs and monitoring well construction logs are presented in Appendix B. Test pit logs are presented in Appendix C.

2.2.2.1 Test Pit Excavations

A backhoe was used to perform excavation of test pits TP-10 and TP-10A, TP-12, TP-13, and TP-14 at the 40 Willow Avenue parcel to investigate the presence, integrity and contents of the former Relief Holder No. 2 (Plate 1, Figure 2-1). Test pits 12, 13, and 14 were completed in support of the feasibility study to be completed for the Relief Holder No. 2. Soil from the test pits was excavated, logged and screened with a PID-OVA according to the RI Work Plan. Test pit logs are provided in Appendix C. If historic structures were

encountered in a test pit, the structure was described and the locations of the structures were noted in the field book.

Two soil samples were collected from the test pits for analytical testing (Table 2-1). Soils from TP-10 and TP-10A were analyzed for BTEX (EPA Method 8260); semivolatile organic compounds (SVOCs) and 20 tentatively identified compounds (TICs) (EPA Method 8270); Resource Conservation and Recovery Act (RCRA 8) metals (EPA Method 6010); and total cyanide (TCN) (EPA Method 9012). No analytical samples were collected from TP-12, TP-13, and TP-14 during the excavation of TP-12, TP-13, and TP-14. Once test pits were logged, the test pits were backfilled in the reverse sequence that they were excavated.

2.2.2.2 Soil Borings

Forty-six borings were completed as part of the RI for OU-1 (including three completed as monitoring wells). Table 2-1 provides the boring IDs as well as the rationale for sampling. Soil boring logs and monitoring well construction logs are provided in Appendix B. Soil boring samples were collected utilizing GeoProbe®, hollow-stem auger, drive casing (drive and wash and mud rotary), and Rotosonic™ drilling methods. The objective of these borings was to evaluate the shallow and deep geologic conditions, and to install monitoring wells to screen the groundwater quality at the OU-1 parcels.

Within each boring, soil samples were generally collected from intervals exhibiting the greatest observed occurrence of tar, staining, odors, sheen, and/or PID readings and from a deeper interval not exhibiting these physical observations. Soils with discrete intervals of observed tar, staining, sheen, odors, and/or PID detections, soils at the completion depth of selected borings, and soils from the water table interface were also submitted for analysis. Generally, soils were analyzed for VOCs (full scan and BTEX fraction only), SVOCs (full scan and PAH fraction only), RCRA 8 metals, and TCN as specified in the RI Work Plan and addenda. Selected samples were also analyzed for total organic carbon (TOC) and grain size (Table 2-1).

Soils were logged, screened with a PID-OVA, and visual and olfactory observations were noted according to the RI work plan and work plan addenda. At sampling locations that are overlain by pavement, sampling generally began immediately beneath the pavement and the underlying gravel base.

Hollow-stem auger, drive casing, GeoProbe®, and Rotosonic™ drilling methods used were described in the work plan and/or agreed to in the field by GEI representatives and the NYSDEC field representative.

2.2.2.3 Monitoring Well Installation and Well Development

Three monitoring wells (RW-4, RW-7, and RW-14) and 12 piezometers (PZ-2, PZ-3, PZ-4A, PZ-TP-13, and PZ-5 through 12) were completed at OU-1 as part of the RI. Table 2-2 provides a summary of all the OU-1 monitoring wells installed during and prior to the RI, and Appendix B presents the well construction logs. Monitoring wells RW-4 and RW-7 were installed utilizing the hollow-stem auger drilling method while RW-14 was installed utilizing Rotosonic™ drilling methods.

Each well (except RW-14) was completed as a 2-inch ID monitoring well with flush-threaded polyvinyl chloride (PVC) 0.0010-inch slotted screen, solid PVC riser, and a flush-mounted cover. The annular space between the well screen, the borehole wall, and approximately 2 feet above the screen was backfilled with a sand pack. A 1- to 2-foot bentonite clay seal was placed above the sand pack. The thickness of the bentonite seal in some monitoring wells was less than specified in the work plan because of shallow groundwater conditions. The remaining annular space was filled to grade with a cement-bentonite grout. A concrete pad surrounds each flush-mounted well cover. Each well was sealed with an expandable well cap that was secured with a padlock.

Monitoring well RW-14 was installed utilizing the Rotosonic™ drilling method. This well was completed at the top of the saprolite layer (weathered bedrock) to characterize and monitor the deep aquifer water conditions. This well was constructed with 4-inch ID, flush-threaded PVC 0.0010-inch slotted screen, solid PVC riser, and a flush-mounted cover. The annular space between the well screen and the borehole wall was backfilled with a sand pack to approximately 3 feet above the screen. An 11-foot bentonite seal was placed above the sand pack. The remaining annular space was tremie-grouted to grade with a cement-bentonite grout slurry. A concrete pad surrounds the flush-mounted well cover for well RW-14.

Following installation, each monitoring well was developed to remove silt and clays from the well and to stabilize the well filter pack. Development was done in accordance with the RI work plan.

2.2.2.4 Surface-Soil Sampling

Surface-soil sampling was completed at the 40 Willow Avenue parcel, at the adjacent residential parcels on Lynhurst Avenue, and at background locations surrounding OU-1 and OU-2 (Plate 2). Table 2-1 provides a summary of the rationale for surface-soil collection and analysis. The 40 Willow Avenue surface-soil samples (SS-1 through SS-5) were collected from 0 to 6 inches bgs. Residential surface-soil samples SS-6 to SS-11 were from 0 to 6 inches bgs on the residential lots at 63 to 51 Lynhurst Avenue. Residential surface-soil samples (SS-12 to SS-30) were collected from 0 to 2 inches of mineral soil immediately

beneath the sod at the residential parcels at 49 to 59 Lynhurst Avenue. Background surface-soil samples (SS-33 to SS-42) were collected from 0 to 2 inches of mineral soil immediately beneath the sod in the vicinity of the 25 and 40 Willow Avenue parcels. Residential surface-soil samples (SSR-40 through SSR-49, SSR-51, SSR-52, SSR-53, SSR-55, SSR-57, SSR-59, SSR-60 through SSR-63) were collected from 0 to 2 inches of mineral soil beneath the sod at the residential parcels located at 51, 63, and 67 Lynhurst Avenue.

Additionally, soil samples from 1-foot, 2-foot, and 3-foot intervals were collected at surface-soil sample locations (SSR-43, SSR-44, SSR-59, SSR-60, SSR-61, SSR-62, and SSR-63) on 51 and 63 Lynhurst Avenue. Soil samples were also collected from 0.5- to 0.75-foot, 1-foot, 2-foot, and/or 3-foot depth intervals at surface-soil sample locations SSR-50, SSR-52, SSR-54, SSR-56, and SSR-58 on 67 Lynhurst Avenue.

Each surface-soil sample was collected using decontaminated, stainless-steel sampling tools. Soils were placed into certified pre-cleaned sampling containers. Surface-soil samples SS-1 to SS-5 were analyzed for SVOCs, RCRA 8 metals, and TCN. Surface soil samples SS-6 through SS-42 were analyzed for VOCs (BTEX), SVOCs, RCRA 8 metals, TCN, and TOC. In addition, surface-soil samples SS-6 to SS-11 and SS-33 to SS-42 were analyzed for grain size distribution. Surface-soils SSR-44 through SSR-63 were analyzed for lead only (Table 2-1).

2.2.3 Groundwater

Groundwater sampling was conducted at OU-1 in April 1999, October 1999, January 2002, and June 2002. Groundwater sampling completed in April and October 1999 (Rounds 1 and 2) at OU-1 included monitoring wells RW-4, RW-7, and RW-14. No groundwater sampling was completed as part of Round 3 of the RI. In January 2002 (Round 4), groundwater sampling included piezometers PZ-TP-13, PZ-4A and PZ-3, and groundwater elevations were collected from PZ-2 and monitoring well FMP-MW-02. Groundwater monitoring sampling in June of 2002 included temporary piezometers (PZ-5 through PZ-12) located on the residential parcels 49 through 67 Lynhurst Avenue. In addition, a round of groundwater elevations was collected from piezometers PZ-2, PZ-3, and PZ-4A on 40 Willow Avenue and PZ-5, PZ-6, PZ-7, PZ-8, PZ-10, and PZ-12 on the Lynhurst Avenue residential parcels. Table 2-2 provides a summary of monitoring well information, including the screened interval and groundwater elevations.

At monitoring wells where groundwater was sampled, groundwater levels were measured prior to sampling, followed by purging and sampling of the monitoring wells. Groundwater depths were measured from the surveyed top of the PVC riser pipe for each well. Following

sampling, the groundwater levels were again measured in each monitoring well. Sampling was completed in accordance with the RI work plan and work plan addenda.

2.2.3.1 Purging

Three well volumes were removed from each well prior to sampling to ensure that a representative sample from the aquifer was obtained. Sampling and purging wells in the shallow groundwater aquifer (PZ-3, PZ-4A, PZ-TP-13, and PZ-5 through PZ-12) was performed using low-flow methods employing a peristaltic pump with dedicated down hole tubing for groundwater piezometers. Purging rates varied because of the aquifer conditions; however, pumping rates generally ranged between 50 milliliters (mL) and 100 mL per minute in the shallow groundwater aquifer. Sampling and purging wells in the deep groundwater aquifer (RW-4 and RW-7) was performed using low flow methods employing a peristaltic pump with dedicated tubing. Purge rates varied because of aquifer conditions; however, pumping rates generally ranged between 575 ml to 700 ml. Regardless of the purge rate, draw down of the static water level was minimized as much as possible at all times.

A submersible Grundfos® pump with dedicated tubing was used to purge and sample groundwater in deep monitoring wells RW-4 and RW-14. These wells were screened in the deep groundwater aquifer, which displayed artesian conditions. These monitoring wells were purged at a rate of 0.600 mL per minute to 6 liters per minute. The monitoring wells were able to be pumped at higher rates with minimal draw down of the water column because of higher permeability materials and the flowing artesian conditions.

All wells were monitored for field parameters (temperature, pH, conductivity, dissolved oxygen, and oxygen reduction potential [ORP]) with flow-through cells during purging. In addition to these parameters, purge water from each well was monitored for turbidity in Round 1 and salinity in Round 2, turbidity and salinity in Round 4, and turbidity in Round 5. Measured flow rates and purge volumes were recorded coincidently with field parameter measurements. When at least three well volumes were purged and values of measured field parameters remained within a 10 percent difference over several consecutive readings, the well was sampled.

2.2.3.2 Sampling

After each well was purged, groundwater samples were collected and placed into preserved containers provided by STL. Groundwater samples were analyzed for VOCs, SVOCs, TCN, and RCRA 8 metals for both the Round 1 and Round 2 sampling events. In addition, analyses of polychlorinated biphenyls (PCBs), total dissolved solids, and salinity were completed for groundwater samples obtained from wells RW-4 and RW-7 during Round 1. Groundwater samples from piezometers PZ-3, PZ-4A, and PZ-TP-13 were analyzed for VOCs, SVOCs, pH, RCRA 8 metals, copper, nickel, zinc, hexavalent chromium, flashpoint,

total dissolved solids, total suspended solids, total PCBs, total petroleum hydrocarbons (TPH), total cyanide, and amenable cyanide during the Round 4 sampling event. The only exception to this sampling schedule was that PZ-4A was unable to be sampled for TPH because of an extremely low recharge rate for the piezometer and short laboratory hold times for other analyses. VOCs were collected using a dedicated single check-ball bailer for the shallow aquifer groundwater samples and double check-ball bailers were used for the deep aquifer samples. The double check-ball bailers minimized the potential for mixing of the sample with water in the water column as the bailer was retrieved from the well screen interval. Sample aliquots for analysis of SVOCs, RCRA 8 metals, TCN, total dissolved solids (EPA Method 160.1), total suspended solids (EPA Method 160.2), pH (EPA Method 9040B), flashpoint (EPA Method 1010), amenable cyanide (EPA Method 335.1), hardness (EPA Method A2340B), TPH (EPA Method 418.1), PCBs (EPA Methods 8081 and 8082), and salinity (EPA Method 2520B) were collected through dedicated tubing utilizing a peristaltic pump or a Grundfos® pump. A peristaltic pump was used for sampling shallow monitoring wells and groundwater was sampled at approximately 50-80 mL/minute. A Grundfos® and a peristaltic pump were used for groundwater sample collection from deep wells RW-14 and RW-4. The pump rate for the Grundfos® pump was approximately 1,000 mL/minute while sampling because this was the lowest flow rate the Grundfos® pump could attain before it disengaged. Following collection, groundwater samples were placed into an ice-filled cooler and shipped under chain of custody to STL Laboratories in Shelton, Connecticut for analysis.

Additionally, a sample of tar product was obtained from the bottom of RW-7 during the Round 1 groundwater sampling event. This sample was analyzed for VOCs, SVOCs, RCRA 8 metals, and TCN.

2.2.4 Survey

At the conclusion of the RI field activities, each boring and well location was surveyed by a GEI-employed New York State licensed surveyor (New York License No. 050156) with reference to the state coordinate grid system. The lateral accuracy of the survey was 0.1 foot and the vertical accuracy was 0.01 foot. The data were tied into a United States Geological Survey (USGS) benchmark to ensure that all groundwater elevations are referenced to the National Geodetic Vertical Datum (NGVD) and the National Astronomic Vertical Datum (NAVD). A reference point on the bulkhead at the harbor was surveyed to facilitate monitoring of tidal fluctuations during Round 1 and Round 2. Surface-soil and test pit sampling locations were either surveyed or field measured relative to known features.

2.3 Air Monitoring Findings

2.3.1 Meteorological Observations

Throughout the test pit excavation program of Round 1, wind blew out of the north at speeds ranging from 1 to 20 miles per hour (mph), with an overall average of 8 mph. Wind gusts ranged from 3 to 29 mph and averaged 13 mph. The outside temperature ranged from 20°F to 47°F, with an average of 35°F. Wind chill ranged from -3.9°F to 46°F, with an overall average of 27°F.

During the Round 4 of the RI, meteorological observations were collected during the test pit excavations and are summarized as follows: wind blew from the east to northeast from 2 to 8 mph, with an overall average of approximately 5 mph. The outside temperature ranged from 47°F to 49°F, with an average of 48°F. The wind chill was approximately 45°F.

2.3.2 Perimeter Air Monitoring Findings

Air monitoring at the perimeter of the 40 Willow Avenue parcel was conducted in accordance with Section 5 of the Health and Safety Plan (HASP). At no time did total organic vapor levels exceed 5 parts per million (ppm) above background at the perimeter of the 40 Willow Avenue parcel during the excavation of test pits (TP-10, TP-10A, TP-12, TP-13, and TP-14) (RI Rounds 1 and 4).

During Round 1 of the RI, there were five occurrences where the upwind perimeter particulate levels exceeded the downwind particulate levels by at least 150 $\mu g/m^3$ (two-minute maximum readings). The upwind exceedances occurred at stations along Bay Street and automobile and truck traffic likely resulted in high upwind (background) dust levels. There were 11 occurrences where the downwind perimeter particulate levels exceeded the upwind particulate levels by at least 150 $\mu g/m^3$ (two-minute maximum readings). Only three of these 11 occurrences had downwind two-minute time-weighted averages greater than at least 150 $\mu g/m^3$ greater than the upwind particulate levels, indicating that 8 of the 11 occurrences were very brief. For the three occurrences where the downwind time-weighted averages exceeded the upwind time-weighted averages, it was noted that dust-generating activities other than excavation were occurring nearby and likely accounted for the occurrences.

During Round 4 of the RI, there were no occurrences at the upwind perimeter or the downwind perimeter where the particulate level exceeded the 150 $\mu g/m^3$ two-minute maximum or average.

2.3.3 Worker Health and Safety Air Monitoring Results

Approximately 500 PID-OVA data points were recorded during excavation and backfilling at test pits on the 25 and 40 Willow Avenue parcels during Round 1 of the RI. No PID readings displayed detections greater than 0.0 ppm. During Round 4 of the RI, monitoring during the excavation of test pits TP-12 and 13 revealed detections ranging from 0.0 to a maximum of 1.0 ppm, which coincided with the excavation of soils within TP-12 on the western portion of the 40 Willow Avenue parcel. At no time did the PID readings exceed 5.0 ppm.

There were no instances where the average downwind particulate levels exceeded 150 $\mu g/m^3$ during the test pit monitoring on the 40 Willow Avenue parcel during Round 1 or Round 4 test pit excavation.

3. Site Geology and Hydrogeology

This section documents the geology and hydrogeology beneath the 25 and 40 Willow Avenue parcels and the surrounding vicinity.

3.1 Geology

Four major stratigraphic units were identified during the RI drilling program: (1) fill, (2) alluvial/marsh deposits, (3) glacial deposits, and (4) weathered bedrock (saprolite). The general stratigraphy beneath OU-1 consists of the saprolite overlain by the glacial deposits, alluvial deposits, and fill in order of decreasing depth. Cross-sections A-A' through C-C' (Plate 2) and cross-sections D-D' through F-F' were developed to illustrate the geology underlying OU-1 (Plate 3). Cross-sections G-G', H-H', I-I', and J-J' depict the geology outside former Relief Holder No. 2 and cross-sections K-K' and L-L' depict the nature of materials within former Relief Holder No. 2 (Plate 4). Figure 2-1 indicates the location of each cross section. These cross sections also depict the physical observations of tar, tar blebs, staining, sheen, and odors. Table 3-1 summarizes the geologic units encountered during the RI. The distribution of chemicals and environmental observations is described in Section 4. Detailed geologic descriptions and well construction details are provided in Appendices B and C.

A general description of the four stratigraphic units is provided below.

3.1.1 Fill

Fill is present at the ground surface or immediately beneath a thin layer of topsoil or asphalt (Plates 2, 3 and 4). Fill consists of silt, sand, and gravel mixed with slag, coal fragments, brick, concrete, wood, metal, and porcelain fragments, transite, ash and clinkers. Typically, the fill is loose and non-cohesive. Fill was encountered in each of the test pits, soil borings, and monitoring well locations completed at OU-1, with the exception of soil borings SB-65 and SB-66 (Plate 3). The fill unit on the 40 Willow Avenue parcel ranged from a few inches in the vicinity of monitoring well RW-7 to a maximum of 16 feet in boring GP-11. Fill was also present from the ground surface to the bottom of the following subsurface structures of the former Relief Holder No. 2 and former rectangular foundation (likely the former cooling tower) located adjacent to the former relief holder. Borings SB-21, SB-40, GP-04, GP-09, and GP-13 through GP-18 were completed within Relief Holder No. 2 (Plate 4). The floor of the relief holder was encountered at depths ranging from approximately 15 feet bgs to 20 feet bgs. GP-08 was completed just outside the former Relief Holder and confirmed that fill

material extended to 23 feet bgs. Boring SB-22 was completed through the floor of the former rectangular foundation that was located at approximately 6 feet bgs. Fill was also present at parcels adjacent to the 40 Willow Avenue parcels as observed in borings SB-58 to SB-62, SB-79, SB-80, and SB-87 on the Lynhurst Avenue residential parcels (Cross-section B-B′, Plate 3), SB-84 through SB-86 along Lynhurst Avenue (Cross-section C-C′, Plate 3), and SB-67 on 66 Willow Avenue.

3.1.2 Alluvial Deposits

A mix of alluvial/marsh deposits was encountered, generally beneath a layer of fill, at the 40 Willow Avenue parcels and at the boring locations located on the Lynhurst Avenue residential parcels and at the 66 Willow Avenue parcel. The alluvial/marsh deposits consist of sub-units of sand, gravelly-sand, gravelly-silt, silt, silt-clay, and peat, and are present throughout the majority of the OU-1 parcels. Historical maps of the area indicate that an unnamed stream had previously flowed along the north-central portion of the adjacent 25 Willow Avenue parcel and into New York Harbor. The former stream and its tributaries likely deposited these alluvial/marsh deposits.

Deposits encountered during the RI drilling are consistent with a former active stream depositional environment and an associated lower energy (marsh) environment. For this discussion, the deposits are broken down into the alluvial deposits (sorted sands and gravelly-sands) associated with the former active stream environment, and marsh deposits (silts, silt-clay, and peat deposits) associated with a lower energy depositional environment. The sand and gravelly sand units are typically gray, brown, red-brown fine to coarse sand and gravelly-sand with trace silt, and were generally loose and non-cohesive. The alluvial deposits are illustrated in cross-sections E-E′ and F-F′ (Plate 3). As shown on these cross-sections, these alluvial deposits extend to approximately 21 feet bgs at borings SB-22, GP-06, and GP-07.

An inferred scour into the underlying glacial deposits extends from the north of GP-07 to the south of GP-06, as depicted in cross-sections E-E′ and F-F′ on Plate 3. This scour is interpreted as a former stream channel/inter-tidal marsh that was related to the former stream that crossed the adjacent 25 Willow Avenue parcel to the northwest of OU-1. Historical maps of the area discussed in subsection 1.2.2 show an unnamed historic stream flowing through the northern portion of the 25 Willow Avenue parcel. The stratified sand units encountered in borings in the northern portion of OU-1 are consistent with former alluvial deposits and are interpreted as related to the former stream. These deposits ranged between 13 and 21 feet bgs in borings GP-06, GP-07, GP-10, GP-11, SB-22, and SB-61 (Cross-sections E-E′ and F-F′ on Plate 3).

The sand units associated with alluvial deposits were encountered at the residential parcels on Lynhurst Avenue, on the Lynhurst Avenue ROW and on the commercial parcel at 66 Willow Avenue.

Silt, gravelly-silt and silt-clay were encountered on the northern, eastern and central portions of the 40 Willow Avenue parcel. These deposits are believed to be associated with a former marsh (possibly intertidal) that was located adjacent to the former inferred stream and its tributaries and New York Harbor. These units are described as black, olive, gray to brown, soft, and slightly cohesive to cohesive. The northern/central portion of the 40 Willow Avenue parcel was characterized by thicker silt and silt-clay units than in the remainder of the 40 Willow Avenue parcel, 66 Willow Avenue parcel, the adjacent Lynhurst Avenue residential parcel, and beneath Lynhurst Avenue. The thickness of these units ranged from 2 feet in SB-22 to approximately 10 feet in GP-07 and GP-08 on the north/central portion of the 40 Willow Avenue parcel. These units were encountered approximately 8 to 16 feet bgs. Silt and silt-clay units were also present on the Lynhurst Avenue residential parcels.

3.1.3 Glacial Deposits

Glacial deposits were encountered beneath the alluvial/marsh deposits and above the saprolite layer at 40 Willow Avenue, the Lynhurst Avenue residential parcels, and beneath Lynhurst Avenue. The glacial deposits can be classified into two sub-units based upon previous geologic investigations by Soren, 1988: the Harbor Hill Terminal Moraine and the Ground Moraine. According to Soren, 1988, a geologic contact between the Harbor Hill Terminal Moraine and the Ground Moraine is located within the vicinity of the 25 and 40 Willow Avenue parcels.

The Harbor Hill Terminal Moraine and the Ground Moraine underlie the alluvial deposits at OU-1. The Ground Moraine was encountered in a number of borings during the RI (Plates 2 and 3). The Ground Moraine, as observed during the RI, consists of a silt to silt-sand mixture, with little to some cobbles and gravels, is dense to very dense and is slightly moist; this is consistent with the descriptions by Soren (1988). The top of the Ground Moraine varies from just below the ground surface in GP-01 to approximately 23 feet bgs in GP-08 (Cross-section E-E′ Plate 3). The unit extends to the top of the weathered bedrock with stratified graded sand layers likely of glacial fluvial origin noted within the lower portions of this unit at RW-7, RW-14, RW-4 and SB-78 (Cross-sections A-A′, E-E′ and F-F′, Plates 2 and 3). The Ground Moraine is believed to act as a leaky confining unit between the water table aquifer and the deeper confined unit (see subsection 3.2).

The 40 Willow Avenue parcel is believed to be partially underlain by the Harbor Hill Terminal Moraine, which consists of a clayey-silt with varying amounts of gravel as observed in borings SB-23, SB-18, and SB-36. This unit is similar to a description provided

by Soren, 1988. A red-brown sand-silt-clay unit that ranged from loose to dense was encountered in borings on the 40 Willow Avenue parcel. The unit was encountered at approximately 7 feet bgs in RW-4/SB-36 to a maximum depth of around 45 feet bgs in boring SB-18 (Cross-section A-A', Plate 2). Borings SB-22, RW-7, and RW-14 contained stratified sand and gravel layers within the glacial deposits that were encountered from about 50 feet bgs to the top of the saprolite layer.

A cobble zone was encountered during drilling in borings SB-18, SB-22, and SB-23 (Plates 2 and 3). This zone is characterized by minimal recovery and difficult drilling conditions. A large block of displaced saprolite (weathered bedrock) was encountered during the drilling of RW-4. This block is believed to have been scoured from the bedrock surface by glacial action, was incorporated into the Ground Moraine material and was stranded at a higher elevation (-50.85' NGVD or 61 feet bgs) than the in-situ saprolite.

3.1.4 Saprolite

Saprolite, or weathered bedrock, was encountered beneath the glacial deposits (sand layers) at the 40 Willow Avenue parcel in boring RW-14/SB-42 and within Lynhurst Avenue in boring SB-78 (Cross-section E-E', Plate 3). The top of the saprolite unit elevation ranged between -108.76' NAVD within SB-78 to -116.00' NAVD within RW-14/SB-42. Based on these data points and additional points at OU-2 where the saprolite was encountered (Boring RW-15/SB-55A, -105.05' NAVD and within Boring RW-16/ SB-56, -116.18' NAVD), the saprolite unit appears to dip to the north. The saprolite was formed by in-place weathering of bedrock; likely the Manhattan Schist based on descriptions of the bedrock by Soren, 1988.

The encountered saprolite was a red to red-brown, gray to green-gray clay with some silts and relict schist-like rock layering present, included muscovite and biotite mica mineral layers, and was very dense and dry. At the RW-14 location, a dense, micaceous silt and micaceous sand were encountered on the surface of the saprolite (Cross-section E-E', Plate 3). The saprolite is believed to be the lower confining layer of the deep aquifer beneath OU-1.

3.2 Hydrogeology

No surface water bodies are located at or immediately adjacent to the OU-1 parcels. However, a stream formerly traversed the 25 Willow Avenue parcel (Figures 1-3 and 1-4). A stormwater drain follows the approximate trace of the historic stream and extends along the northwestern border of the adjacent 25 Willow Avenue parcel within OU-2. The storm drain empties into New York Harbor approximately 500 to 600 feet to the northeast.

Two aquifers are present beneath OU-1: a shallow, unconfined (water table) aquifer and a deep confined aquifer. The shallow groundwater aquifer is located in fill, alluvium/marsh, and shallow glacial deposits. The water table elevations (shallow aquifer) ranged from 7.78 feet NAVD in PZ-4A to 11.18 feet in PZ-3 (Table 2-2). The deep aquifer is under confining pressure and the wells tapping it exhibited flowing artesian conditions (RW-4, RW-7, and RW-14). These wells are screened in stratified silty-sand and gravelly sand layers within the glacial deposits located above bedrock. Static head elevations in the deep aquifer ranged between 12.44 feet (NGVD) in RW-4 and 13.62 feet (NGVD) in RW-7 (Table 2-2). The dense silt ground moraine and Harbor Hill Terminal moraine form a confining to semi-confining layer separating the water table aquifer from the deep aquifer, also resulting in confining pressure within the deep aquifer.

Groundwater table elevations were measured in Round 1 (April 1999), Round 2 (October 1999), Round 4 (January 2002) and Round 5 (June 2002) (Table 2-2). A slight seasonal variation in the water table elevation was observed between Round 2 and Round 4 with the Round 4 elevations being generally lower than elevations measured in October between 0.18 and 0.35 foot. However, no change in the groundwater flow pattern was observed between these two events. This decrease in groundwater elevation is likely attributable to the severe drought experienced by the Northeast during 2002.

Groundwater elevations were measured in monitoring wells during Round 2, both at high tide and low tide, to evaluate possible tidal influences on the groundwater flow pattern. Tidal influence on the shallow groundwater aquifer is apparently minimal based upon groundwater elevations gathered from Round 2 of the RI. In the deep groundwater aquifer, a decrease in groundwater elevations (-0.1' to -0.59') was observed between high tide and subsequent low tide groundwater measurements (Table 2-2).

Groundwater contour maps were created for the shallow and deep aquifers using the measurements collected at high tide on October 13, 1999 (Plate 5 and Plate 6) during Round 2 and for the shallow groundwater aquifer for Round 4 and Round 5 (Plate 7 and Plate 3-1). Groundwater contour patterns were evaluated for both high tide and low tide during the Round 2 monitoring event.

3.2.1 Water Table Aquifer

Groundwater flow within the water table aquifer appears to be dominated by two features: groundwater moving toward the former stream trace in the northern portion on the 25 Willow Avenue parcel, and groundwater flowing directly toward New York Harbor near the eastern portion of the 40 Willow Avenue parcel. As shown by Plate 5, Plate 6 and Plate 7, groundwater flows toward the former stream trace (current stormwater sewer) from west of the 25 Willow Avenue parcel and from the majority of the 25 Willow Avenue parcel.

Groundwater moving along the actual trace of the former stream is expected to discharge to New York Harbor.

An apparent divide between the influence of the local former stream trace and the more regional influence of New York Harbor exists on the 40 Willow Avenue parcel. Groundwater on the western side of this divide is flowing toward the former stream trace, while groundwater on the eastern side of the divide is flowing directly toward New York Harbor.

The average horizontal hydraulic gradients of the shallow groundwater aquifer ranges from 0.015 to 0.026 ft/ft. The steepest hydraulic gradients occurred on the northwestern portion of the 40 Willow Avenue parcel near piezometer PZ-4A. Lower hydraulic gradients are evident in the southwestern portion of the parcel nearer to New York Harbor.

No hydraulic conductivity tests were performed on the shallow groundwater table wells at OU-1. The shallow groundwater aquifer at OU-1 consists of low permeability glacial deposits similar to those encountered at OU-2. Hydraulic conductivities were calculated for water table wells using data generated from single well permeability tests (slug tests) conducted on wells RW-3, RW-6, and RW-12 at OU-2. A summary of the hydraulic conductivities is presented in Table 3-2. Appendix D includes the slug test data files and the hydraulic conductivity calculations.

Based upon slug tests completed within OU-2, the hydraulic conductivities (K) ranged from 3.2×10^{-4} centimeters/second (cm/sec) [0.9 feet/day] at RW-12 to 5.0×10^{-4} (cm/sec) [1.4 feet/day] at RW-3. These values are consistent with those expected for the silty-sand (Freeze and Cherry, 1979).

Average linear flow velocities for the water table aquifer were calculated based on the measured hydraulic conductivities and the horizontal hydraulic gradients using the following equation:

$$V = ki/n$$

where:

k = hydraulic conductivity of the formation
i = hydraulic gradient
n = effective porosity of the formation

Assuming an effective porosity of 30%, hydraulic gradients between 0.015 foot/foot along the southeastern portion of the property near FPM-MW-1 and 0.026 foot/foot in the vicinity

of PZ-4A (western portion of the 40 Willow Avenue parcel), and the calculated hydraulic conductivity from RW-3 (1.4 ft/day), the average linear flow velocity of the water table aquifer ranges from 27 feet/year on the eastern to southeastern portion of the 40 Willow Avenue parcel to 44 feet/year on the northeastern portion of the 40 Willow Avenue parcel.

3.2.2 Deep Aquifer

The groundwater contour pattern for the deep aquifer is depicted in Plate 6. An apparent groundwater divide is oriented roughly north-south through the middle of the 40 Willow Avenue parcel. Groundwater on the western side of the divide appears to be flowing westerly and groundwater on the eastern side of the divide appears to be flowing easterly. It is unclear whether this divide actually exists or if it is an artifact of tidal influence. This apparent groundwater flow pattern may be the result of tidal lag influences. In other words, one or more of the deep aquifer monitoring wells may be "feeling" the effects of a tidal cycle, while other well(s) may not have been influenced by the tidal effect at the time these measurements were collected.

In the deep aquifer, the average horizontal hydraulic gradient was determined to be 0.00294 foot/foot in the vicinity of RW-4 on the 40 Willow Avenue parcel.

The hydraulic conductivity was calculated for the deep aquifer wells using data generated from a single-well pump test completed in well RW-4. This monitoring well was screened in relatively low permeability silt to silty fine-to-coarse sands related to the glacial deposits. Table 3-2 presents a summary of the hydraulic conductivity values, and Appendix D presents the pump test data and hydraulic conductivity calculations. The hydraulic conductivity (K) for RW-4 was 8.7×10^{-4} (cm/sec) [2.4 feet/day] at RW-4.

A similar calculation of the average linear flow velocity for the deep groundwater aquifer was performed. The average linear flow velocity of the groundwater was calculated to be 8.58 feet/year near RW-4.

Vertical hydraulic head potentials between the shallow aquifer and the deep aquifer were calculated for the following well clusters or nearby shallow and deep aquifer pairs: RW-4/PZ-2, PZ-3/RW-7, PZ-3/RW-14. The upward vertical head potentials for these well pairs ranged between 0.022 and 0.079 foot/foot. Vertical head potentials were greater between well pairs PZ-2/RW-4 on the northeastern portion of the 40 Willow Avenue parcel, than between the well pairs PZ-3/RW-7 and PZ-3/RW-14 on the southeastern portions of the two parcels. The three-well cluster of RW-7, RW-14 and PZ-3 confirmed that once below the semi-confining layer, the deep groundwater aquifer on the 40 Willow Avenue parcel behaves as one hydrologic unit. There was virtually no vertical head potential between RW-7 and RW-14, while a vertical gradient existed between these wells and the water table piezometer PZ-3.

4. Nature and Extent

This section summarizes the physical observations made during the RI, presents the analytical findings of the investigation, and discusses the degree and extent of observed tar, staining, sheen, odors, and chemical constituents detected during the RI. The sample locations are shown on Plate 1 and Figure 2-1.

The following terminology and descriptions were used to describe the visual and olfactory observations made during the field investigation. These terms are also used in this report section to describe the nature of the observed materials.

- **Saturated:** the entirety of the pore space of the soil matrix for a given soil sample was filled with a NAPL. The characteristics of the observed NAPL were used in the description (i.e., tar-saturated or petroleum-saturated).

- **Blebs:** observed discrete sphericals or pockets of NAPL within a soil sample. The majority of the soil matrix did not exhibit the presence of NAPL beyond these discrete blebs. The characteristics of the observed NAPL were used in the description (i.e., tar blebs or petroleum blebs).

- **Stained:** the soil sample exhibited a discoloration not associated with natural processes. The color of the observed stain was used and if the characteristics of the staining material were discernible, they were also noted (i.e., tar-stained or petroleum-stained).

- **Sheen:** iridescence was observed within a soil sample. Sheens were typically noted in moist to wet soils.

- **Odor:** if an odor was observed, it was described based on its relative intensity and characteristics. Modifier terms such as strong, moderate, and faint were used to describe relative odor intensity. Descriptive terms such as tar-like or petroleum-like odors were also used.

Subsection 4.1 discusses the soil findings and is subdivided by parcel. The soil findings for each parcel are further divided into surface-soil and subsurface-soil sections.
Subsection 4.2 discusses groundwater conditions for the entire OU-1 study area of the RI.

The nature and extent of the chemical constituents is determined by the geologic conditions, groundwater flow patterns, and historic parcel use, processes and structures located at the site. During the drilling of soil borings and the excavation of test pits, tar-saturated soil, staining from tar, and odors characteristic of tar were observed. These physical observations were recorded on the boring and test pit logs (Appendices B and C) and were summarized on the geologic cross sections A-A′ through L-L′ on Plates 2, 3, and 4.

In addition to the physical observations, this section also discusses the analytical results of the surface-soil, subsurface-soil, and groundwater samples collected during the RI and previous sampling programs. Tables 4-1 and 4-2 present the detected laboratory analytical results for surface-soil and subsurface-soil samples, respectively. Table 4-3 presents a statistical summary of the surface-soil results. Table 4-4 presents the detected laboratory analytical results for groundwater samples. Appendices E and F present the validated laboratory Form I reports and chain-of-custody forms.

BTEX compounds were the principal VOCs detected and are the common VOCs associated with tar. SVOCs were also detected at the site with PAHs being the common subset of SVOCs in tar. For purposes of this report, PAHs include the compounds listed below.

- 2-Methylnaphthalene
- Benzo(b)fluoranthene
- Fluorene
- Acenaphthene
- Benzo(g,h,i)perylene
- Indeno(1,2,3-cd)pyrene
- Acenaphthylene
- Benzo(k)fluoranthene
- Naphthalene
- Anthracene
- Chrysene
- Phenanthrene
- Benz(a)anthracene
- Dibenz(a,h)anthracene
- Pyrene
- Benzo(a)pyrene
- Fluoranthene

Of these PAHs, the following constituents are considered carcinogenic PAHs by EPA.

- Benz(a)anthracene
- Benzo(a)pyrene
- Chrysene
- Indeno(1,2,3-cd)pyrene
- Benzo(k)fluoranthene
- Benzo(b)fluoranthene
- Dibenz(a,h)anthracene

The analytical results of the RI and previous investigations are discussed relative to the total BTEX, total PAHs (TPAH), and total carcinogenic PAHs (CPAH).

Tables 4-1 and 4-2 include the sum of PAHs, the sum of carcinogenic PAHs, sum of the non-carcinogenic PAHs, and the sum of BTEX constituents for surface soil and subsurface soil,

along with the analytical results for individual analytes. For non-detect results ("U" qualified), the value used in these sums was 0.00. For estimated values ("J" qualified), the value used in the sums was the numerical result for each analyte.

At the request of the NYSDEC, a comparison of detected analytes to the New York State Recommended Soil Cleanup Objectives (RSCOs) was also completed. The exceedances were highlighted and bolded on the tables. The frequency of the exceedances by analyte are also presented on Tables 4-1 and 4-2. Table 4-4 includes the sum of PAHs, carcinogenic PAHs, non-carcinogenic PAHs and BTEX for groundwater, along with the analytical results for individual analytes. At the request of the NYSDEC, a comparison of detected analytes to the New York State Ambient Groundwater Standards and guidance values for a GA area for all groundwater samples collected was completed. Exceedances have been highlighted and bolded in the table. The frequency of exceedance for each analyte is also presented in Table 4-4.

4.1 Soil

Surface Soils

Surface-soil samples were collected from the 40 Willow Avenue parcel, the Lynhurst Avenue residential parcels (49 through 67 Lynhurst Avenue), and at background locations in the vicinity of the 25 and 40 Willow Avenue parcels. Table 4-1 summarizes the detected analytes for all surface-soil samples. Appendix E includes the validated laboratory Form I reports and chain-of-custody forms for the RI samples. Plate 1 and Figure 2-1 depict the surface-soil sample locations.

Subsurface Soils

Subsurface-soil samples were collected from the 40 Willow Avenue parcels, from a commercial parking lot located at the 66 Willow Avenue parcel, from residential parcels located at 49, 51, 53, 55, 59 and 63 Lynhurst Avenue, and from the Lynhurst Avenue ROW. Table 4-2 is organized by parcel and summarizes the detected analytes for all subsurface-soil samples collected during the RI and during previous investigations. Appendix E includes the validated laboratory Form I reports and chain-of-custody forms for the RI samples. Plate 1 and Figure 2-1 depict the subsurface-soil sample locations (soil borings, test pits, monitoring wells).

The overall extent of tar, staining, sheen, odors, and chemical constituents detected in soils was located primarily adjacent to the former Relief Holder No. 2 on the 40 Willow Avenue parcel. However, discrete intervals of tar-related materials were noted at depth beneath the Lynhurst Avenue residential parcels and beneath Lynhurst Avenue. As shown by cross-

sections B-B', C-C', and E-E' (Plates 2 and 3), no visible evidence of tar, staining or sheen, odors, or positive PID detections were observed in borings completed beneath the Lynhurst Avenue parcels or within the Lynhurst Avenue ROW at depths above 24 feet bgs. In general, the lateral extent of physically observed tar, staining, sheen, and odors within OU-1 was primarily limited to former Relief Holder No. 2 and within soils immediately surrounding this structure. Minor layers of sands with tar, staining, sheen, and odors were noted beneath the Lynhurst residential parcels and Lynhurst Avenue ROW.

In general, elevated levels of TPAH, CPAH, and BTEX correlated with the occurrence of observable tar, odors and/or sheen. Where physical evidence of tar was not encountered, analyses indicated generally low to trace levels of these chemical constituents. As with the observed extent of tar, staining, odors, etc., the overall extent of chemical constituents was generally limited to the 40 Willow Avenue parcel, and to a discrete interval beneath the Lynhurst Avenue residential parcels and Lynhurst Avenue.

In addition to these analytes, RCRA 8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver), total cyanide, and TOC were analyzed for in certain soil samples. Total cyanide was only detected in eight subsurface-soil samples, all except one detection being significantly below 10 ppm. Total cyanide in subsurface soils does not appear to be of concern.

Total cyanide was only detected in 12 surface-soil samples analyzed. Surface-soil sample CFSS-1 on the 40 Willow Avenue parcel had the highest concentration at 33.6 ppm. From the parcels adjoining the 40 Willow Avenue parcel, the maximum total cyanide concentration detected was 1.94 ppm in sample SS-9 from the 55 Lynhurst Avenue parcel. Elevated lead concentrations were noted within surface soils. Lead was detected in all but one surface-soil sample. Lead concentrations ranged from non-detected within SSR-46 (3') and a maximum of 2,810 ppm within surface-soil sample SSR-58.

4.1.1 40 Willow Avenue

Surface Soil

Surface-soil samples SS-1 through SS-5 were collected from 0- to 0.5-foot on the 40 Willow Avenue parcel.

TPAHs ranged from 22.4 ppm in sample SS-1 to 84.7 ppm in sample SS-4. CPAH ranged from 10.66 ppm in SS-1 to 45.8 ppm in SS-4. BTEX constituents were not analyzed for these surface-soil samples. Total cyanide was not detected in sample SS-3, and otherwise ranged from 4.86 ppm in duplicate of SS-4 to 33.6 ppm in SS-1. The only metal detected

that appeared elevated in these surface-soil samples was lead, with values ranging from 98.6 ppm in SS-3 to 383 ppm in SS-5.

Subsurface Soil

At the 40 Willow Avenue parcel, the lateral extent of tar, staining, sheens, odors and chemical constituents is generally limited to the vicinity of Relief Holder No. 2. As shown by cross sections A-A', E-E', K-K', and L-L' (Plates 2, 3 and 4), tar-saturated soils were encountered at various depths within the holder (soil borings SB-40, GP-04, GP-09, GP-13, and GP-18) beginning as shallow as 4 feet bgs and extending to the bottom of the holder at 20 feet bgs. However, tar-saturated soils were not encountered in test pits TP-10 or TP-10A or within borings GP-13, GP-14, GP-15, GP-16, and GP-17 within the center of former Relief Holder No. 2. Based upon these borings, it was determined that the bottom of former Relief Holder No. 2 had a domed shape with the depth to the bottom at the center of the holder at 14 feet bgs (-1.33 NAVD) and the depth to the bottom at the outside edge at approximately 20 feet bgs (-8.14' NAVD).

Test pits TP-12, TP-13, and TP-14 confirmed the edge of former Relief Holder No. 2 to be larger than depicted in the historic Sanborn maps. The holder was determined to be a brick and mortar constructed holder with a concrete coating.

Tar-saturated soils are present outside the holder at soil borings SB-17/RW-7, SB-22, SB-41, SB-42/RW-14, SB-43, GP-06, GP-07 and GP-08. Tar within these borings was generally contained within sand and gravelly-sand layers.

Rotosonic™ soil boring RW-14/SB-42 was completed to characterize deep soils at the 40 Willow Avenue parcel. Soil boring SB-42 was placed adjacent to Relief Holder No. 2, which represented a location where downward migration of tar was possible.

As discussed in subsection 3.1, the ground moraine located on the northwestern portion of the 40 Willow Avenue parcel consists of a dense silt unit and silt-sand unit with stratified sand and gravelly sand layers. This transitions into the Harbor Hill terminal moraine in the northeastern portion of the parcel (Plates 2 and 3). These units appear to be behaving as a hydrogeologic confining layer between the upper (water table) aquifer and the lower confined aquifer. However, these units have not acted as a confining unit to the downward mobility of tar. Tar-saturated soils in boring RW-14/SB-42 extend down to about 79 feet bgs, with discrete tar blebs being observed to 100 feet bgs, and tar-like odors extending to the bottom of the confined aquifer (top of saprolite) at 124 feet bgs.

Soil boring SB-18 (near the former 8-inch steel well, depicted on Figure 2-1 and Plates 2

and 3) encountered tar-like odors from 65 feet to 84 feet bgs and a sheen from 71 feet to 82 feet bgs. Soil boring SB-23 encountered tar-like odors and a sheen from 70 to 93 feet bgs, and slight tar-like odors from 93 to 111 feet bgs where the boring was terminated.

Subsurface-soil analytical data for the 40 Willow Avenue parcel are discussed relative to former Relief Holder No. 2, the former 8-inch steel well and former excavation area, and data collected adjacent to Bay Street.

Within the former holder, laboratory analytical data were obtained from test pits TP-10 and TP-10A and from borings SB-21, SB-40, GP-04, and GP-09. Subsurface-soil data from within the holder indicated BTEX ranging from non-detect in sample TP-10 (3') to 10,670 ppm in sample SB-40 (18'-20') atop the holder floor [Note: sample ID was 18 to 20 feet, but the holder floor was encountered at 18 feet]. TPAH ranged from 3.4 ppm in TP-10A (3') to 85,170 ppm in GP-09 (4'-8'). CPAH ranged from 2.2 ppm in TP-10A (3') to 9,070 ppm in GP-09 (4'-8'). The BTEX and PAH detections in samples from boring SB-40, GP-04, and GP-09 corresponded to the observation of tar at the sample intervals.

Outside the former holder, laboratory analytical data were obtained from borings SB-22, SB-41, RW-14/SB-42, RW-7/SB-17, SB-43, SB-44, GP-01 through GP-03, GP-05 though GP-08, and GP-10 though GP-12. BTEX results from these borings ranged from non-detect in samples RW-14 (126'-128') and SB-41 (10'-12') to 3,580 ppm in sample GP-06 (28'-32'). TPAH ranged from non-detect in sample SB-44 (29'-31') to 19,050 ppm in sample GP-06 (28'-32'). CPAH ranged from non-detect in samples GP-10 (40-45'), GP-11 (40'-45'), GP-12 (20'-24'), and SB-44 (29'-31') to 870 ppm in sample GP-06 (32'-32').

Outside the former holder, tar, staining, sheen, and odors were observed and detected levels of BTEX and PAHs generally correlated with these observations. In shallow soils, the sample SB-22 (2 to 3 feet) exhibited the highest BTEX (334.6 ppm) levels; TPAHs and CPAHs were not measured for this sample. At the elevation of the bottom of the holder (15 to 20 feet bgs), soils exhibited the highest concentrations of BTEX (2,260 ppm), TPAH (16,350 ppm), and CPAH (850 ppm) at boring GP-08 within tar-saturated soils. Below the elevation of the holder floor, the 28- to 30-foot sample from boring GP-06 exhibited 19,050 ppm TPAH; 870 ppm CPAH; and 3,580 ppm BTEX. The 76- to 78-foot sample from RW-7 exhibited over 8,000 ppm TPAH, which coincided with a layer of tar-saturated soil.

In the vicinity of the former 8-inch steel well, soil analytical data are available from previous investigation wells (FPM-MW1, FPM-MW2, and FPM-MW3), excavation sidewall samples (FPM-SS1, FPM-SS2, and FPM-SS3), excavation bottom sample (FPM-BS-01), and from RI borings (SB-18 and SB-23). Soil data from the previous investigation monitoring well installations did not indicate the presence of BTEX or PAHs at the locations of FPM-MW1 and FPM-MW2. However, soil samples from well FPM-MW3 contained PAHs and BTEX.

Soils in this vicinity were removed during an excavation summarized in subsection 1.4. Excavation sidewall samples collected at the time indicated TPAHs at concentrations ranging between 20.5 ppm and 25.1 ppm; CPAHs ranging in concentration between 8.1 and 13.6 ppm; and BTEX ranging in concentrations between 0.01 and 0.03 ppm in samples FPM-SS1 through FPM-SS3. At the bottom of the former excavation in sample FPM-BS-01, BTEX and CPAHs were not detected; however, 5 ppm TPAHs were detected in this sample.

RI soil borings SB-18 and SB-23 were completed in the vicinity of the former 8-inch steel well and confirmed the relative low-level PAH concentrations in shallow subsurface soils. Sample SB-18 (4 to 7.5 feet) contained 17.5 ppm TPAHs, 9.6 ppm CPAH, and only 0.006 ppm BTEX. The 4- to 8-foot sample from SB-23 contained 0.027 ppm BTEX, 0.5 ppm TPAH, and 0.2 ppm CPAH.

Three samples from RI borings SB-18 and SB-23 were analyzed from depths between 73 feet and 111 feet bgs (SB-18 [73'-76'], SB-23 [92'-94'], and SB-23 [109'-111']), which was in the vicinity of the bottom of the former 8-inch well that was estimated to be 95' bgs. BTEX ranged from 0.026 ppm in sample SB-23 (109'-111') to 8.5 ppm in SB-18 (73'-76'). TPAH ranged from 0.27 ppm in SB-23 (109'-111') to 272 ppm in SB-18 (73'-76'). CPAH ranged from non-detect in SB-23 (109'-111') to 24.4 ppm in SB-18 (73'-76'). These analytical detections coincided with observed tar-like odors at these depths.

Subsurface-soil data along the Bay Street property line were obtained from boring SB-36 and RW-4. The 4- to 8-foot and the 16- to 20-foot samples from boring SB-36 detected 0.018 and 0.019 ppm BTEX, 0.65 and 0.03 ppm TPAH, and 0.15 ppm non-detect CPAH, respectively. The 88- to 90-foot sample from RW-4 detected 0.071 ppm TPAH; BTEX and CPAH were not detected.

4.1.2 Background Locations

Surface Soil

Surface-soil samples SS-33 through SS-42 were collected from locations around the 25 and 40 Willow Avenue parcels (Plate 1). BTEX ranged from non-detect in samples SS-36, SS-37, SS-38, and SS-41 to 0.001 ppm in sample SS-40. TPAH ranged from 5.3 ppm in sample SS-41 to 91.9 ppm in sample SS-34. CPAH ranged from 3.1 ppm in sample SS-41 to 54.0 ppm in sample SS-34.

The mean of the BTEX values was calculated as 0.00035 ppm and the mean of the TPAH was calculated as 22.7 ppm. Table 4-3 presents these calculated mean values along with the maximum and minimum values. Table 4-3 also presents the maximum, minimum, and mean values of RCRA 8 metals and total cyanide for these samples.

Subsurface Soil

No background subsurface-soil samples were collected.

4.1.3 Lynhurst Avenue Residential Parcels

Surface Soil

Surface soil samples were collected from Lynhurst Avenue residential parcels as follows:

Parcel	Sample ID	Depth Interval (inches)
49 Lynhurst	SS-12	0-2
	SS-19	0-2
	SS-26	0-2
51 Lynhurst	SS-11	0-6
	SSR-60	0-2, 12, 24, 36
	SSR-61	0-2, 12, 24, 36
	SSR-62	0-2, 12, 24, 36
	SSR-63	0-2, 12, 24, 36
53 Lynhurst	SS-10	0-6
	SS-14	0-2
	SS-21	0-2
	SS-28	0-2
55 Lynhurst	SS-9	0-6
	SS-15	0-2
	SS-22	0-2
	SS-29	0-2
59 Lynhurst	SS-8	0-6
	SS-16	0-2
	SS-23	0-2
	SS-30	0-2
61 Lynhurst	SS-7	0-6
	SSR-40	0-2
	SSR-41	0-2
	SSR-42	0-2
63 Lynhurst	SS-6	0-6
	SSR-43	0-2, 12, 24, 36
	SSR-44	0-2, 12, 24, 36
	SSR-45	0-2
	SSR-59	0-2, 12, 24, 36

Parcel	Sample ID	Depth Interval (inches)
67 Lynhurst	SSR-46	0-2, 12, 24, 36
	SSR-47	0-2
	SSR-48	0-2
	SSR-49	0-2
	SSR-50	6-9, 12, 24, 36
	SSR-51	0-2
	SSR-52	0-2, 6-9, 12, 24, 36
	SSR-53	0-2
	SSR-54	6-9, 12, 24, 36
	SSR-55	0-2
	SSR-56	6-9, 12, 24, 36
	SSR-57	0-2
	SSR-58	6-9, 12, 24, 36

BTEX in the residential lot surface-soil samples ranged from non-detect in samples SS-6, SS-8, SS-10, SS-11, SS-14, SS-15, SS-19, SS-23, S-26, SS-28, and SS-30, to 0.006 ppm in sample SS-7. TPAH ranged from 1.2 ppm in sample SS-28 to 38 ppm in sample SS-6. CPAH ranged from 0.6 ppm in sample SS-28 to 18.6 ppm in sample SS-23. Table 4-3 presents the calculated mean values for BTEX and PAHs, along with the maximum and minimum values. Lead was detected within surface and shallow subsurface soils located at the Lynhurst Avenue residential parcels. Lead was detected in all soil samples collected from the Lynhurst Avenue residential parcels. Concentrations ranged between non-detected within SSR-46 at 3′ bgs to a maximum of 2,700 ppm in sample SS-12 (0-2″) adjacent to the 40 Willow Avenue parcel. Table 4-3 also presents the maximum, minimum, and mean values of RCRA 8 metals and total cyanide for these samples.

Based upon the laboratory analysis, an IRM has been conducted to mitigate the elevated lead concentrations in shallow soils on 49 through 67 Lynhurst Avenue. The IRM, performed in accordance with the NYSDEC-approved IRM Work Plan, dated March 2002, removed soils containing elevated lead to a depth of 3 feet bgs. The backyards were restored to their pre-existing conditions.

Subsurface Soil

No evidence of tar, staining, sheen, or odors was observed from the ground surface to approximately 24 feet bgs in any borings (SB-58 through SB-62, SB-77, SB-79/79A, SB-80, or SB-87) completed at the residential parcels located at 49 through 63 Lynhurst Avenue (Cross-section B-B′, Plate 2). As shown in cross-section B-B′, the upper 2 to 7 feet beneath the residential parcels consists of fill. The first evidence of odors and sheen were encountered within SB-79 at approximately 24 feet, within SB-77 at approximately 25 feet bgs, and within SB-87 at approximately 36 feet bgs. Evidence of tar, staining, sheening, and odors extended through the termination depths of borings SB-79/79A, SB-77, and

SB-87. Tar-saturated gravelly sand layers were noted within borings SB-79/79A and SB-87 at a maximum depth of approximately 52 feet bgs with tar-coated soils and tar blebs noted as deep as 60 feet bgs.

Laboratory analyses detected PAHs and BTEX, as well as RCRA 8 metals and cyanide in the subsurface soils at the residential parcels. Figure 2-1 and Cross-section B-B' (Plate 2) shows the subsurface-soil sample locations.
For subsurface soils from the ground surface to 24 feet bgs, BTEX ranged from non-detect in samples SB-59 (8'-10'), SB-61 (0'-4'), SB-62 (0'-4'), and SB-80 (0'-4') to 0.004 ppm in a duplicate of sample SB-60 (0'-4'). TPAH ranged from 0.10 ppm in a duplicate of sample SB-79 (24'-28') to 14.4 ppm in SB-60 (0'-4'). CPAH ranged from 0.03 ppm in SB-60 (4'-8') to 6.5 ppm in SB-60 (0'-4'). The presence of PAHs in shallow soils from these residential lots coincides with observed fill material that was found from approximately 0 to 6 feet beneath the residential lots. Laboratory detections are generally higher in shallow soils from 0 to 4 feet bgs than in soil samples collected from 4 to 10 feet bgs. The remaining detections of analytes in the subsurface soils may be explained by the nature of the materials and the historic industrial and commercial land use surrounding the investigation area. The IRM conducted in September 2002 removed these fill materials to a depth of 3 feet bgs.

For deep subsurface soils collected from borings SB-77, SB-79/79A, SB-80, and SB-87 from below 24 feet bgs, BTEX ranged from non detect in SB-79 (24'-28'), SB-80 (52'-56'), and SB-87 (60'-64') to a maximum of 155.4 ppm in sample SB-79A (51'-55'). TPAH concentrations ranged from non-detect in sample SB-80 (52'-56') to a maximum of 1,977 ppm within sample SB-79A (51'-55'). CPAH concentrations ranged from non-detected levels within SB-80 to a maximum of 72 ppm within soil sample SB-77 (37'-39'). Trace odors were noted as deep as 64 feet bgs and were characterized with BTEX levels of 0.007 ppm, TPAH concentrations of 0.065 ppm, and non-detect CPAH concentrations. The elevated levels of BTEX, TPAHs and CPAHs coincided with observations of tar-saturated and stained soils.

4.1.4 Lynhurst Avenue Right-of-Way

No evidence of tar, staining, sheen, or odors was observed from the surface to approximately 40 feet bgs in any borings (SB-78, SB-84, SB-85, and SB-86) within the Lynhurst Avenue ROW (Plates 2 and 3). Tar staining, sheening and/or odors were noted within two of the four borings completed within the Lynhurst Avenue ROW. Boring SB-78 exhibited sheening and odors starting at 44 feet bgs and sheening, tar blebs, and odors extended to 50 feet bgs within a coarse-grained gravelly sand layer. To the south of SB-78, boring SB-84 exhibited sheening and odors within a sand lens 40 feet bgs. No odors or evidence of tar was noted from 50 feet bgs to the top of the saprolite located at 125 feet bgs.

Laboratory analyses detected PAHs and BTEX, as well as RCRA 8 metals, in the subsurface soils at the residential parcels. Figure 2-1 shows the subsurface-soil sample locations. For borings SB-78, SB-84, SB-85, and SB-86 within Lynhurst Avenue, BTEX was only detected within SB-78 at a maximum of 155 ppm within the 49- to 50-foot sample interval and at a minimum of 0.011 ppm in the 114- to 115-foot interval. BTEX was not detected within samples from SB-84, SB-85, and SB-86. TPAH concentrations ranged from non-detected in samples collected from SB-78 (114'-115'), SB-84 (48'-52'), SB-85 and SB-86 to a maximum of 5,053 ppm within sample SB-78 (49'-50'). CPAH concentrations ranged from non-detect within samples collected from SB-85 and SB-86 to a maximum of 11 ppm within SB-78 (49'-50'). The elevated levels of BTEX, TPAHs, and CPAHs coincided with observations of tar-stained, sheened, and odors within soil samples.

4.1.5 66 Willow Avenue Parcel

Surface Soil

No surface-soil samples were collected on this parcel because the parcel is paved.

Subsurface Soil

Black staining was noted in borings SB-66 from 0 to 2 feet bgs and in SB-67 from approximately 3.0 to 3.2 feet bgs (Plate 3). Slight naphthalene odors were noted from 12 to 20 feet bgs at SB-66.

Subsurface-soil laboratory analytical results were obtained from borings SB-65, SB-66, and SB-67. BTEX was not detected in samples SB-65 (0'-4'), SB-65 (4'-8'), SB-67 (0'-4'), or SB-67 (4'-6). The highest BTEX concentration (0.13 ppm) was detected in sample SB-66 (12'-16'). TPAH ranged from non-detect in sample SB-65 (4'-8') to 31.4 ppm in sample SB-66 (0'-2'). CPAH ranged from non-detect in samples SB-65 (4'-8'), SB-66 (12'-16'), and SB-67 (4'-6') to 10.4 ppm in sample SB-66 (0'-2'). Laboratory detections of BTEX in sample SB-66 (12'-16') coincided with observed naphthalene odors and PID field measurements of 57.4 ppm. Laboratory detections of PAHs in samples SB-66 (0'-2') and SB-67 (0'-4') coincided with observed black soil staining.

4.2 Groundwater

All available groundwater analytical data from the RI and previous investigations are summarized in Table 4-4. Appendix F includes the validated laboratory Form I reports from the RI investigation. A summary of TPAH, CPAH, and BTEX results from the October 1999 RI sampling event is presented on the shallow aquifer and deep aquifer groundwater contour maps (Plate 5 and Plate 6). A summary of the January 2002 (Round 4) and June (Round 5)

RI groundwater sampling is presented on the shallow groundwater aquifer contour maps (Plates 5 and 6).

Groundwater samples in the vicinity of former Relief Holder No. 2 contained BTEX constituents and the lighter molecular weight SVOCs (also referred to as non-carcinogenic PAHs), which are generally more soluble than the heavier molecular weight SVOCs. Concentrations of BTEX and non-carcinogenic PAHs were noted at higher concentrations in the vicinity of the former relief holder. Concentrations of these compounds decreased by orders of magnitude away from the holder.

Shallow groundwater beneath the residential Lynhurst Avenue parcels is not impacted by chemical constituents associated with the former MGP at 40 Willow Avenue. Trace detections of benzene and toluene (0.3 parts per billion [ppb]) within the PZ-11 groundwater sample and duplicate were the only detected concentrations within the shallow groundwater aquifer on the Lynhurst Avenue residential parcels.

4.2.1 Shallow Aquifer

Measurements for the presence of NAPL (dense and light) were taken at each groundwater monitoring well during Round 1, Round 2, Round 4, and Round 5 of the RI groundwater sampling events. No measurable NAPL was observed in any shallow groundwater monitoring wells or piezometers sampled as part of OU-1. Tar odors were noted within PZ-3, PZ-4A, and PZ-TP-13 during development (40 Willow Avenue parcel).

As discussed in subsection 3.2.1, shallow groundwater within OU-1 flows radially to the northwest and the northeast. On the northwestern portion of the 40 Willow Avenue parcel, 66 Willow Avenue parcel, and Lynhurst Avenue parcels (59 through 67), groundwater flows northwesterly and appears to generally be flowing toward the former stream trace on the western portion of the 25 Willow Avenue parcel. Groundwater beneath the remaining portion of the 40 Willow Avenue and Lynhurst Avenue parcels (49 through 55) appears to flow northeasterly towards New York Harbor. Plate 5, Plate 7, and Figure 3-1 present a summary of BTEX, TPAH, and CPAH analytical findings on the water table (shallow aquifer) contour map for Round 2, Round 4, and Round 5 RI groundwater sampling events.

Shallow groundwater sample results obtained from the 40 Willow Avenue parcel are summarized below. Historic data from 1993 and 1994 exist for previous investigation wells FPM-MW1, FPM-MW2, and FPM-MW3. Wells FPM-MW1, FPM-MW2, and FPM-MW3 are located downgradient (to the east) of Relief Holder No. 2. Data from these sampling events indicate trace levels of BTEX (maximum of 17 ppb in FPM-MW2 in 1993), and trace levels of TPAH. Groundwater samples from FPM-MW3 contained the highest levels of TPAH at 22 ppb during the 1993 sampling event. Individual PAH compounds detected in

these wells included naphthalene, pyrene, fluorene, acenaphthene, acenaphthylene, and phenanthrene. CPAHs were not detected above the detection limit in these three wells.

Shallow groundwater samples were collected for potential dewatering parameter analysis during Round 5 from piezometers PZ-3, PZ-4A, and PZ-TP-13. These piezometers are located on the 40 Willow Avenue parcel, directly adjacent to the former relief holder. Water levels from monitoring well FPM-MW-2 and piezometer PZ-2 were also gauged as part of the Round 4 sampling. Groundwater samples contained BTEX and TPAHs. CPAHs were not detected above the detection limit in these three samples. BTEX ranged in concentration from 7,700 ug/L within PZ-3 to a maximum of 20,400 ug/L within PZ-TP-13. TPAH concentrations ranged in concentration from 833 ug/L within groundwater sample PZ-4A to a maximum concentration of 7,900 ug/L within PZ-TP-13. Elevated BTEX and TPAHs are likely attributable to dissolved fractions immediately adjacent to the holder.

Groundwater samples were also collected from piezometers PZ-5 through PZ-11 on the Lynhurst Avenue residential parcels as part of Round 5. Only BTEX was detected in the groundwater sample from PZ-11 and its duplicate. BTEX concentrations ranged from 0.03 ug/L to 0.6 ug/L within this sample. No TPAHs were present above the laboratory detection limit in any of the residential groundwater samples. The trace levels of BTEX are likely attributable to an aboveground heating oil UST located nearby at 53 Lynhurst Avenue.

4.2.2 Deep Aquifer

Measurements for the presence of NAPL (dense and light) were taken at each groundwater monitoring well during Round 1 and Round 2 of the RI groundwater sampling events. A measurable amount of DNAPL (tar) was observed in monitoring well RW-7 during the Round 1 and Round 2 groundwater sampling events. One sample of NAPL was collected for laboratory analysis. The analytical results of this sample (CF-TAR01) are presented in Table 4-4. NAPL thickness in the bottom of RW-7 was 3.95 feet in Round 1 and 1.5 feet in Round 2. The change in thickness was likely attributable to the pumping of tar product from the bottom of RW-7 for laboratory analysis in Round 1. No measurable NAPL was observed in the remainder of the deep wells sampled (RW-4 and RW-14).

Groundwater quality in the deep aquifer was assessed by the collection of groundwater samples from wells RW-4, RW-7, and RW-14 (see Plate 6). A summary of the TPAH, CPAH, and BTEX analytical results is shown on Plate 6 along with the groundwater elevation contours from October 13, 1999.

Groundwater quality from RW-4 at the eastern edge of the 40 Willow Avenue parcel exhibited trace levels of BTEX (0.2 ppb) and TPAH (0.2 ppb). However, groundwater from well RW-07 and RW-14 adjacent to Relief Holder No. 2 exhibited higher concentrations of

TPAH and BTEX. Within RW-07, TPAH was detected at 8,911 ug/L and BTEX was detected at 32,290 ug/L. These detections are consistent with the DNAPL within the bottom of the well and the tar-saturated gravelly-sand aquifer. Detections deeper within RW-14 exhibited decreased TPAH (3,634 ppb) and BTEX (4,240 ppb) concentrations. CPAHs were not detected, but the detection limits were elevated. The presence of PAHs and BTEX constituents in the deep aquifer at RW-14 is consistent with the physical observation of tar-like odors near the bottom of the aquifer, where the well is screened.

5. Fate and Transport

This section provides an analysis and discussion of the data presented in previous sections to provide an interpretation of the interaction between physical and chemical processes that affect the behavior of chemical constituents in the subsurface. Through an understanding of these physical and chemical processes, mechanisms affecting the fate and transport of chemicals at the site will be evaluated.

The following analysis takes into account the physical characteristics of the OU-1 parcels, including the 40 Willow Avenue, 66 Willow Avenue, Lynhurst Avenue residential parcels and the Lynhurst Avenue ROW parcels; the interaction of the surface and groundwater hydrogeology; the nature of chemical compounds encountered during the sampling and analysis program; and any apparent trends in the distribution of these materials with the OU-1 parcels. This section provides a discussion of the physical and chemical characteristics of BTEX and PAHs, and a discussion of the sources and transport pathways for these constituents.

The chemical constituents can exist in four different phases, nonaqueous phase liquid, dissolved in an aqueous phase, sorbed to a solid, or as a vapor. Transport of chemical constituents between these four phases will depend upon the physical and chemical properties of the specific chemicals and the physical characteristics of the OU-1 parcels. The transport pathway and how it relates to chemical constituents is discussed below.

- **Solubility.** Is the measure of a chemical's ability to dissolve in water. Chemical constituents sorbed to soil or in a NAPL may dissolve in water as groundwater flows through the soil matrix, or may dissolve in stormwater runoff. BTEX compounds have a high solubility. PAHs have a varying degree of solubility. The lighter molecular weight PAHs are generally more soluble while the heavier molecular weight PAHs are less soluble and typically do not dissolve into an aqueous phase.

- **Sorption.** Is usually defined as the reversible binding of a chemical to a solid matrix. However, there is evidence in the published literature that there is a partially irreversible component related to the time that the compound has been sorbed to a soil matrix (Brusseau, et al., 1989; Brusseau, et al., 1991; Loehr, et al., 1996).

- **Volatilization.** Describes the movement of a chemical from the surface of a liquid or solid matrix to a gas or vapor phase. BTEX constituents are highly volatile and are therefore readily transported into the atmosphere from surficial soil. PAHs are

nonvolatile and transport of these chemicals by this process is not considered a major pathway for transport.

Sorption of the COCs to solids limits the fraction available for other fate processes such as volatilization and/or solubility. In general, BTEX compounds have low sorption potential, coupled with high water solubility and volatility, which make sorption a relatively minor environmental fate process for BTEX compared to other mechanisms. PAHs exhibit varying degrees of binding affinity to organic matter and soil particles and this affinity is dependent upon their individual molecular structures. In general, the higher molecular weight PAHs, (e.g., benzo(a)pyrene) are strongly sorbed, whereas the lighter PAHs (e.g., naphthalene) are less strongly sorbed (EPA, 1979; EPA, 1986). Therefore, the lighter-molecular weight PAHs may be desorbed and transported by other mechanisms.

Once released into the environment, COCs have the potential to interact with organisms. The following is a brief summary of the process of the bioconcentration of MGP-related compounds.

Bioconcentration factors (BCFs), which relate the concentration of the chemical in an organism at equilibrium to the concentration of the chemical in water, are used to assess the potential for chemical bioconcentration. BCFs are related to the octanol/water partition coefficient and solubility of a chemical. Since VOCs have log K_{ow} and high water solubilities, these chemicals have a low potential to bioconcentrate in organisms (Howard 1990).

PAHs contain only carbon and hydrogen and consist of two or more fused benzene rings in linear, angular or cluster arrangements. In general, most PAHs can be characterized as having low vapor pressure, low to very low water solubility, low Henry's Law constant, high log K_{ow}, and high organic carbon partition coefficient (K_{oc}). Thus, PAHs remain bound to soil and do not freely enter groundwater.

High partition coefficients and low solubilities suggest that PAHs are likely to be sorbed onto sediment particles. Conversely, these properties indicate that most PAHs will not readily volatilize into the atmosphere.

Although PAHs are regarded as persistent in the environment, they are degradable by microorganisms. Environmental factors, microbial flora and physicochemical properties of the PAHs themselves influence degradation rates and degree of degradation. Important environmental factors influencing degradation include temperature, pH, redox potential (the tendency of a chemical to accept or donate electrons, or to become reduced or oxidized) and microbial species. Physicochemical properties, which influence degradation, include chemical structure, concentration and lipophilicity ("fat-loving" tendency). In general, PAHs

show little tendency to biomagnify in food chains despite their high lipid solubility because most PAHs are rapidly metabolized by the organisms that are exposed to them (Eisler 1987).

Metals, which do mobilize from the soil into groundwater, are usually mobile under acid conditions. Higher pH usually reduces their bioavailability (McIntosh 1992).

A qualitative human health exposure assessment and fish and wildlife impact analysis is presented in Section 7.

The environmental media that are of primary concern for the subject properties are NAPL, subsurface and surface soil, and groundwater. Section 4 provides a detailed description of the nature and extent of chemical constituents. Plates 2, 3, and 4 illustrate the vertical and lateral extent of tar, staining, sheen, odors, along with the geology and hydrogeology at the OU-1 parcels.

5.1 NAPL

NAPL (tar) is present at the site. NAPL is considered to include the visual observation of tar-saturated material or soil containing tar blebs or tar lenses (see Section 4 for a description of these terms). NAPL was observed within the subsurface foundations of the former relief holder and in the subsurface materials surrounding the former holder that handled tar. The chemical constituents addressed that are in NAPL include BTEX and PAHs.

NAPL (tar) generally migrated downward through permeable fill and other permeable soils on the 40 Willow Avenue parcel. NAPL was observed to a depth of 80 feet beneath the 40 Willow Avenue parcel. NAPL was generally observed in near proximity to the former historic structures and lateral migration of NAPL away from the 40 Willow Avenue parcels through soils above 20 feet is not considered a major pathway for transport. Some lateral migration of NAPL within more permeable layers was noted at depths greater than 24 feet beneath the Lynhurst Avenue parcels and within the Lynhurst Avenue ROW (Cross-sections B-B′, C-C′ and E-E′, Plates 2 and 3).

NAPL present within the subsurface will desorb and contribute to chemical constituents in the soil and groundwater beneath the 40 Willow Avenue, Lynhurst Avenue residential parcels and the Lynhurst Avenue ROW. BTEX and lighter molecular weight PAHs will dissolve into groundwater and can be transported with groundwater flow. Heavier PAHs will sorb to soil and will remain relatively immobile. BTEX in NAPL above the water table on the 40 Willow Avenue parcel can also volatilize and diffuse through the soil pore spaces in the vadose zone.

5.2 Subsurface Soil

In general, the distribution of BTEX and PAHs in subsurface soil correlates with the presence of NAPL (tar). Chemicals sorbed to soils in the subsurface will continue to be a source of dissolved chemical constituents in groundwater. BTEX and lighter molecular weight PAHs can desorb from soil, dissolve into groundwater, and be transported with groundwater flow. BTEX can also volatilize from soil and diffuse through the vadose zone. Heavier molecular weight PAHs will remain sorbed to soil and will remain relatively immobile.

5.3 Surface Soil

Surface-soil samples were not collected from the paved portions of the 40 Willow Avenue parcel (approximately half of the parcel area). PAHs were identified in surface soil present on the southern, unpaved portion of the 40 Willow Avenue parcel. Total BTEX concentrations in surface soil range from non-detect to 2.5 ppm. Low levels of PAHs were also detected in surface soils on the residential parcels. These surface soils were mitigated during the IRM conducted in September 2002.

Lighter molecular weight PAHs sorbed to surface soil could desorb and dissolve in stormwater. PAHs dissolved in infiltrating precipitation could be transported to shallow groundwater and move with groundwater flow. PAHs that potentially dissolve in runoff will be transported through storm sewer systems. Lighter molecular weight PAHs could also migrate through the surface soil by volatilization. In addition, PAHs sorbed to soil could be transported off the 40 Willow Avenue parcels and Lynhurst Avenue parcels as airborne particulates or as particulates entrained in surface water runoff.

5.4 Groundwater

Two groundwater aquifers have been identified at OU-1 and are described in Section 3. Chemical constituents detected in the shallow groundwater aquifer include BTEX and PAHs. Chemical constituents in the deeper artesian aquifer are primarily BTEX, but PAHs are also present in groundwater within the deep aquifer at the well locations of RW-7 and RW-14.

BTEX and PAHs dissolved in groundwater are present in the vicinity of NAPL. Groundwater in the shallow aquifer under the OU-1 parcels flows radially to the northwest and northeast.

Groundwater flow direction in the deep aquifer is unclear and is either split along a divide or is heterogeneously affected by tidal influences. Based on the available data, it appears that on the eastern portions of the 40 Willow Avenue parcel, groundwater flow in the deep

aquifer is generally to the east towards the bay. On the western portions of the 40 Willow Avenue parcel, groundwater flow in the deep aquifer appears to be toward the southwest.

Dissolved BTEX and lighter molecular weight PAHs will be transported with groundwater flow within the shallow groundwater towards the former stream trace along the northwestern portion of OU-1 and towards New York Harbor. The decrease in concentrations away from the relief holder makes this unlikely. Groundwater elevations within the deep groundwater aquifer reveals flow towards the harbor; however, based upon the decrease in detected concentrations away from the holder towards the harbor, it is unlikely that deep aquifer dissolved phase constituents migrate beyond the site.

6. Conceptual Site Model

This section discusses the conceptual site model as it pertains to the nature of the physical observations of tar, staining, sheening and odors, migration pathways and receptors. From all the five successive rounds of investigation that have taken place at the site, it has become apparent that the primary area of concern within OU-1 is former Relief Holder No. 2 located at the 40 Willow Avenue parcel.

The former gas holder is located in the northwest to central portion of the 40 Willow Avenue parcel where the former holder foundation currently exists today. Upon its decommissioning, fill material was used to backfill the brick masonry holder. Some tar and tar-impacted material may have remained within the former holder mixed with the fill. This tar, in conjunction with tar historically produced and handled on site during the operation of the former MGP, appears to represent the source of DNAPL (tar) observed within soils on site. Cross-sections A-A′ located on Plate 2 and cross-sections E-E′ and F-F′ located on Plate 3 depict the vertical extent of tar and tar-impacted soils within OU-1. Cross-sections L-L′ and K-K′ depict the contents of the former holder.

The inferred alluvial sand and gravelly sand located at the base of the former holder may have been impacted by the seepage of tar through the bottom of the brick and masonry holder side and bottom in the vicinity of SB-22 and GP-06 on the northern portion of the site. Once released, the tar is hypothesized to have continued to migrate downward through the subsurface by micro-fractures and grain-to-grain movement within coarser grained materials and preferentially collected within localized sand and sandy-gravel layers within the glacially derived soil unit (ground moraine). These layers also may have allowed small amounts of tar to migrate from the former holder laterally to the southeast to as far as Lynhurst Avenue. Increased frequency and size of the more permeable sand/gravelly glacial outwash sands facilitated the continued migration of tar downward in the vicinity of the former holder to a depth of approximately 80 feet bgs at the 40 Willow Avenue parcel. No physical observations of tar were noted within soils beneath Lynhurst Avenue at this depth. In the vicinity of the holder, physical observations of tar odors were present to the top of weathered bedrock interface at approximately 125 feet bgs.

Zones of tar-impacted soils that do not contain source or residual NAPL surround the source area laterally and vertically at depth within OU-1. These areas are distinguished by having sheens and odors. Concentrations of BTEX and PAHs are significantly reduced away from the source.

Groundwater is impacted in the areas associated with DNAPL residuals in the vicinity of the former holder foundation. Dissolved tar-related constituents (BTEX and PAHs) are limited in extent to the vicinity of the former holder and concentrations decrease in both the shallow and deep groundwater aquifer in the direction of New York Harbor. No tar-related impacts were noted in the shallow groundwater aquifer on the Lynhurst Avenue residential parcels adjacent to the site.

7. Qualitative Human Exposure Assessment and Fish and Wildlife Impact Analysis

This report section presents the qualitative human exposure assessment and fish and wildlife impact analysis (FWIA) for the site. These assessments consider the chemical distribution at the site in terms of possible human exposure and impact(s) to fish and wildlife and are part of an Order on Consent (Index No. D1-0002-98-11) between KeySpan and the NYSDEC concerning the former MGP site located in Clifton, Richmond County, New York. These assessments used data collected as part of GEI's initial remedial investigation and supplemental data collected in 2001 and 2002. The qualitative human health exposure assessment was performed to meet the requirements identified in the NYSDOH's November 9, 2000 guidance memorandum titled *New York State Department of Health, Qualitative Human Health Exposure Assessment.* The ecological portion of the assessment presented here is consistent with the NYSDEC's *Fish and Wildlife Impact Analysis* guidance (NYSDEC 1994b). The objectives of the assessments are:

- To identify chemicals of potential concern (COPCs) that are related to the former gas manufacturing activities conducted at the site
- To identify potential pathways of exposure to people, plants, animals, and fish
- To estimate and characterize the potential ecological impact associated with these exposures
- To indicate whether there is a need for mitigative measures to reduce potential exposures

For purposes of the qualitative human health exposure assessment and the FWIA, OU-1 is discussed in terms of potential on-site exposures associated with the former plant parcel (40 Willow Avenue); and potential off-site exposures which are associated with the residential parcels located along Lynhurst Avenue. The site location and description are discussed in Section 1 of this report. The site-specific hydrogeologic characteristics of OU-1 are discussed in Section 3.

KeySpan conducted an interim remedial measure (IRM) (from September 2002 to July 2003) to remove lead-impacted soils from the Lynhurst Avenue residential backyards (Figure 7-2A). The IRM removed the upper 3 feet of soil from the areas. The analytical results for samples collected from soils that were removed during the IRM were not used in the human health exposure assessment OU-1. The current site plan for OU-1 is presented in Figure 7-2A.

7.1 Qualitative Human Exposure Assessment

7.1.1 Nature and Extent of Chemical Constituents

BTEX constituents were the principal VOCs detected in soil and groundwater samples at the site and are the common VOCs associated with coal tar. SVOCs also were detected at the site. PAHs are the common subset of SVOCs found in coal tar. Certain metals as well as cyanide are also commonly associated with MGP sites. Section 4 of this report provides a detailed description of the nature and extent of chemical constituents found on-site and at relevant off-site locations. Section 5 of this report provides a detailed description of the fate and transport of analytes commonly associated with MGP sites. The potential migration pathways for chemical constituents are illustrated on Figure 7-1.

7.1.2 Selection of Chemicals of Potential Concern

Several classes of chemicals were detected in soil and groundwater. COPCs were selected following the practice established by EPA in the Risk Assessment Guidance for Superfund, Volume I, Part A (EPA, 1989). Selection criteria were as follows:

- Chemicals not detected at least once above the limit of detection were automatically excluded from the assessment, regardless of the size of the data set.
- Frequency of detection was considered. Chemicals with a frequency of detection of less than 5% in a data set of 20 or more samples were excluded from the assessment.
- Chemicals present at concentrations statistically greater than background.
- Chemicals that are not associated with MGP operations were not considered COPCs.

Tables 7-1 through 7-6 list for each medium (i.e., surface soil, subsurface soil, and groundwater) and location, the chemicals reported at least once above the limit of detection, their frequency of detection, and their minimum and maximum concentrations. The chemicals listed in these tables are those that meet the frequency of detection criteria listed above. Chemicals that are both MGP-related and exceed either background or applicable

NYSDEC SCGs are considered COPCs and appear in bold italics in these tables. The distribution of the data set also is provided in the tables where appropriate. Additionally, these tables present the 95 percent upper confidence limit (UCL) of the mean for the applicable data set, and relevant and appropriate concentrations (i.e., background concentrations for surface soil, and NYSDEC TAGM and TOGS concentrations for subsurface soil and groundwater, respectively). Except for soils removed during the IRM, soil sample data obtained from the 1999 and 2001-2002 field investigations were combined to estimate the 95 percent UCL.

Data sets were developed to estimate the UCL according to the exposure scenario being evaluated. For off-site Lynhurst Avenue residents, surface and subsurface soil and groundwater sample results from the residential parcels were used to evaluate exposure pathways. For the on-site exposure scenarios, surface soil, subsurface soil, and groundwater samples collected from the 40 Willow Avenue parcel were used to evaluate the exposure pathways. Samples collected to a maximum depth of 16 feet were used to estimate exposure point concentrations for ingestion and dermal contact. The depth of samples used depended on the scenario being evaluated, *i.e.,* excavation scenarios considered soil to a depth of 16 feet.

For surface soil, the 95 percent UCL background concentration is presented in Tables 7-1 and 7-2. This background concentration was calculated using samples collected from depths of zero (0) to two (2) inches below ground surface. A description of how the background sampling locations were selected is presented in Section 4.1.2 of this report.

The 95% UCL is determined from the detected concentrations and the substitution of one-half the limit of detection for samples reported as non-detected (U-qualified). U-qualified chemical concentrations were used in the exposure assessment at one-half the limit of detection if other samples in the data set were reported at least once above the limit of detection (USEPA 1989).

Prior to calculating the 95 percent UCL, statistical tests were performed to identify the best distributional assumption of the data (i.e., lognormal or normal). Normally distributed data are those that, when plotted, exhibit a bell-shaped curve, while lognormally distributed data exhibit a skewed curve. All data sets in this assessment contained fewer than 50 samples; consequently, the data were evaluated using the W-test developed by Shapiro and Wilk (Gilbert 1987). The W-test was performed using an Excel add-in called Analyse-It™. If the results of the W-test indicated the data did not represent a normal distribution and/or the data did not exhibit a bell-shaped curve, then a lognormal distribution was assumed. The appropriate equation was then used to calculate the 95 percent UCL concentrations (USEPA 2002).

If the data set was found to be consistent with the normal distribution, then the 95% UCL was calculated from the following equation (USEPA 2002):

$$95\%\ UCL = \bar{x} + t\left(\frac{s}{\sqrt{N}}\right)$$

where:

$\bar{x}$ = mean of the (untransformed) data
t = Student t-statistic (from Gilbert 1987)
S = standard deviation of the (untransformed) data
N = number of samples

If the data set was assumed to be consistent with the lognormal distribution, then the 95% UCL concentration was calculated from the following equation (USEPA 2002):

$$95\%\ UCL = e^{\left(\bar{x} + 0.5s^2 + \frac{SH}{\sqrt{N-1}}\right)}$$

where:

e = base of the natural log = 2.718
$\bar{x}$ = mean of the log transformed data
S = standard deviation of the log transformed data
H = H-statistic (interpolated from Gilbert 1987)
N = number of samples

Maximum concentrations were used to represent the mean concentration in small data sets (sample size < 10). Additionally, if the calculated 95 percent UCL exceeded the maximum detected concentration, the maximum concentration was used to represent the mean (USEPA 1992).

In order to aid remedial planning for the site, the exposure point concentration (EPC) calculated for each data set was compared to the 95 percent UCL or maximum detected concentration determined from the background data set for surface soil (Tables 7-1 and 7-2). The EPCs calculated for subsurface soil were compared to NYSDEC TAGM concentrations (Tables 7-3 and 7-4, NYSDEC 1994). Concentrations detected in groundwater samples were compared to NYSDEC TOGS (Tables 7-5 and 7-6, NYSDEC 1998). These comparisons are discussed in Section 7.2.7.

7.1.3 Current and Reasonably Foreseeable Site Use

It is anticipated that the eastern portion of the 40 Willow Avenue lot (on-site) will continue as a commercial property for the foreseeable future. Likewise, the 60 Willow Avenue lot (on site) (the western portion of the parcel herein referred to as 40 Willow Avenue) will continue

as a gate station for the purposes of controlling gas distribution. Furthermore, the 40 Willow Avenue parcel is located in a M3-1 zone, which indicates manufacturing. Consequently, the land use of the property is not expected to change substantially from the current commercial/manufacturing use (see Figure 7-2D). Additionally, no new residences or community facilities are permitted. Therefore, a future on-site residential scenario was not considered in this exposure assessment.

The Lynhurst Avenue residential parcels (off-site) are located in an R3-A zone which is a residential zoning designation. The off-site residential area located along Lynhurst Avenue, south of the 40 Willow Avenue parcel is expected to remain residential for the foreseeable future.

7.1.4 *Exposure Setting and Identification of Potentially Exposed Populations*

The human health exposure assessment provides qualitative descriptions of potential exposure to site-related COPCs for human populations who may reasonably be expected to contact site media under present or future conditions. The exposure assessment is comprised of two components:

- Description of exposure setting and identification of potentially exposed populations
- Identification of exposure pathways

Under current and future site use conditions, the potentially exposed populations (*i.e.*, potential receptors) are those that might come into contact with those COPCs identified above. Figure 7-1 presents a conceptual risk system model (CRSM), and Table 7-7 identifies the potential exposure routes for current and future on-site (40 Willow Avenue) and off-site (homes along Lynhurst Avenue, south of the 40 Willow Avenue parcel) human populations. Potentially exposed populations and pathways of exposure, as outlined in the CRSM and Table 7-7, are described below.

40 Willow Avenue Parcel (On-Site) Current Scenarios
The 40 Willow Avenue parcel is currently an operational regulating gate station for KeySpan. It consists of an open vegetated area; a small building and a small paved parking area all surrounded by a locked, barbed wire-topped chain-link fence. While trespassers have not been observed at the site, the potential for trespasser exposure is considered because the facility could be accessed, with difficulty, over the fence or through unlocked gates during the day. The parking area is used periodically to store cars by the tenant of the 25 Willow Avenue parcel (OU-2). Potential exposures to individuals at the parking area were not considered here because the area is paved, which precludes potential direct contact with soils and inhalation of particulates and vapors.

Thus, receptors considered in the assessment under current site conditions include (see Figure 7-1 and Table 7-7):

- On-site KeySpan employees – i.e., those employees working at the gate station building
- On-site trespassers – children, adolescents, and adults

40 Willow Avenue (On-site) Future Scenarios
As discussed above, future uses of the site and immediate off-site areas are not expected to change substantially from the current commercial/residential uses. As a consequence, the current exposure scenarios also hold for future use of the site. However, to account for the possibility that construction activities may occur at the site to accommodate facility expansion or reorganization or conversion for other commercial use, a future on-site construction worker and future on-site commercial workers and visitors to these commercial establishments were considered (see Figure 7-1 of this report). Other potential exposure populations include nearby off-site utility workers.

Lynhurst Avenue parcels (Off-site)
The residential properties evaluated in this assessment are immediately adjacent to the southern boundary of the gate station parcel. The receptors for the Lynhurst Avenue residential parcels include adults and children who reside in the homes. As previously stated, the future use of the residential parcels is presumed to remain residential.

7.1.5 Identification of Exposure Pathways

Generally, human populations may be potentially exposed to COPCs in the following impacted media: surface soil, subsurface soil, groundwater, ambient air, and indoor air.

40 Willow Avenue Parcel (On-Site)
Under current on-site conditions, dermal contact, incidental ingestion, vapor inhalation and inhalation of particulates from chemical constituents in soil is possible for on-site KeySpan employees and on-site trespassers.

For KeySpan employees, exposure to surface soil may occur during the course of their normal workday activities.

Given the nature of their work (*i.e.*, trenching, excavation, installing deep piles, etc.), future on-site construction workers may reasonably be expected to contact surface and subsurface soil via ingestion, dermal contact, inhalation of soil particulates, and vapor inhalation. In

addition, construction workers may contact groundwater during trenching activities, since the depth to groundwater is one to eight feet below ground surface. If current KeySpan employees engage in on-site excavation work, they are required to have appropriate training. They also have the potential for exposure via the aforementioned pathways. Chemical exposures for nearby, off-site utility workers may occur because of the presence of subsurface sewer, telephone, gas, and water facilities in the areas immediately adjacent to the site. The exposure pathways through which this population could be potentially exposed are identical to those for the construction worker.

Future on-site commercial workers are assumed to be inside workers. These individuals as well as visitors to these commercial establishments may be exposed, absent remedial measures, to vapors in indoor air.

Exposures associated with direct contact with groundwater are limited to those individuals who engage in excavation work (*e.g.*, on-site construction workers and nearby off-site utility workers). There is no on-site use of groundwater for consumptive or other purposes. Consequently, the only potential complete exposure pathways for groundwater are dermal contact and inhalation of vapors emanating from the groundwater. These potential exposures are most likely to occur for the construction worker, the utility worker and the KeySpan employee.

Lynhurst Avenue Residential Parcels (Off-Site)

Under current off-site conditions, dermal contact, incidental ingestion, vapor inhalation, and inhalation of particulates from chemical constituents in soil is possible for off-site residents. Residents may contact surface soil during everyday activities such as playing, gardening, etc. Therefore, a gardening scenario (composed of ingestion and dermal contact with surface soils, inhalation of particulates, and consumption of homegrown produce) is included for the off-site resident.

The residential properties along Lynhurst Avenue are served by municipal water supplies and no wells were observed to be in use (even for the irrigation of gardens/lawns). Although off-site residents may contact groundwater through excavation work in their yards, this exposure is considered minimal as compared to other potential exposure pathways (*i.e.*, direct contact with surface soils). Therefore, the only potential exposure pathway for the residents is inhalation of vapors emanating from the groundwater. Water table groundwater samples collected as part of the off-site investigation of these parcels did not reveal the presence of VOCs at concentrations that would results in an indoor or ambient air concern. Therefore, the potential for this exposure pathway to be complete is considered minimal.

7.1.6 Screening Level Assessment

The exposure point concentrations determined for each portion of OU-1, the 40 Willow Avenue parcel (on-site), and the residential area along Lynhurst Avenue (off-site), were compared to background or appropriate NYSDEC concentrations, and the results of this screening are as follows.

40 Willow Avenue (On-Site)

Surface Soils

Comparisons of the surface soil concentrations for the 40 Willow Avenue parcel indicate that 21 chemicals are present at concentrations above the 95% UCL of the background samples. However, 12 of these chemicals (anthracene, fluoranthene, benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, chrysene, arsenic, barium, cadmium, chromium, lead, and mercury) are present at concentrations within the range of background samples (see Table 7-1).

Subsurface Soils

Subsurface soil concentrations at the 40 Willow Avenue Parcel also were compared to NYSDEC TAGM concentrations. This comparison indicates that the majority of chemicals are present at concentrations that exceed applicable TAGM concentrations. The following chemicals were detected at concentrations below TAGM concentrations: acetone, 4-methylphenol, di-n-butylphthalate, diethylphthalate, phenol, bis(2-ethylhexyl)phthalate, arsenic, barium, and selenium; Table 7-3).

Groundwater

Evaluation of groundwater concentrations at the 40 Willow Avenue parcel indicates that seven chemicals (benzene, ethylbenzene, toluene, xylenes, 2,4-dimethylphenol, phenol, and total cyanide) exceed applicable TOGS concentrations. TOGS concentrations were not available for some of the detected chemicals (Table 7-5).

Lynhurst Avenue Residential Parcels (Off-Site)

Surface Soils

Six chemicals detected in surface soil samples from the residential parcels (fluoranthene, pyrene, arsenic, barium, chromium, and selenium) were present at concentrations that exceed the 95 percent UCL for background (see Table 7-2). However, with the exception of selenium, these chemicals were present at concentrations within the range detected in background samples. The maximum Lynhurst Avenue concentration for selenium, 2.7 mg/kg, is slightly above the maximum detected background concentration of 2.4 mg/kg. Benzene was detected in one surface soil sample collected from Lynhurst Avenue. This sample result, 0.0006 mg/kg is essentially the same as the maximum detected background concentration of 0.0005 mg/kg.

Subsurface Soil

Chemicals detected in subsurface soils at the Lynhurst Avenue parcels were compared to available NYSDEC TAGM concentrations (see Table 7-4). Results of this comparison indicate that twelve chemicals (benzene, ethylbenzene, xylenes, benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, arsenic, barium, chromium, and mercury) are present at concentrations that exceed the applicable TAGM concentration. TAGM concentrations are not available for some of the chemicals detected in these subsurface soils. Although these chemicals exceed their respective TAGM concentrations, the potential for exposure to these subsurface soils is unlikely.

Lynhurst Avenue – Groundwater

Six chemicals (benzene, toluene, methyl bromide, methyl chloride, tetrachloroethylene, and diethylphthalate) were detected infrequently in groundwater samples collected from the residential parcels. Methyl bromide, methyl chloride, tetrachloroethylene, and diethylphthalate are not associated with MGP sites; therefore, these chemicals are not considered COPCs. Concentrations of benzene and toluene were compared to appropriate TOGS concentrations and are present at concentrations that are lower than the TOGS concentration (see Table 7-6).

7.1.7 Conclusions

7.1.7.1 Lynhurst Avenue Residential Parcels (Off Site)

Surface Soils

Results of the screening of surface soil sample results for the Lynhurst Avenue parcels against background concentrations indicates that only one analyte, selenium, is present at a concentration that is slightly above the range of background concentrations. The surface soil sample results used here are for samples collected from the front yards of the residences along Lynhurst Avenue. These front yards are very small and children's play areas and gardens were not observed in these areas. As discussed previously, significant portions of the backyards were excavated to a depth of three feet in order to address lead-impacted soils. These excavated soils are being replaced with clean fill. Given the relative size of the front and back yards, child and adult residents are much more likely to recreate/garden in their backyards. The results of the screening indicate that the concentrations of chemicals in surface soils to which residents may potentially be exposed are representative of background conditions. This information, coupled with the observed and anticipated activity patterns of the residents of homes along Lynhurst Avenue, indicate that potential exposures to surface soils at these homes are not exposure pathways of concern.

Subsurface Soils

Results of subsurface soil screening indicate that while some chemicals are present at concentrations above the TAGM concentrations, the potential for residential exposure to subsurface soils at these parcels is minimal for two reasons: 1) the infrequent nature of excavation work in a residential setting and 2) the presence of clean fill to a depth of three feet in the backyards.

Groundwater

Chemicals detected in groundwater are present at concentrations below applicable NYSDEC concentrations. Additionally, groundwater wells were not observed during the field investigation and these homes and surrounding properties are served by a municipal water supply. It is expected that any new construction would be connected to the municipal water supply; consequently, exposure to potentially MGP-related constituents that may be present in groundwater does not occur under existing conditions (*i.e.*, potential exposure to groundwater is an incomplete exposure pathway), nor is it expected to occur under future use conditions.

Results of the screening analysis suggest that potential inhalation of vapors in ambient and indoor air and inhalation of wind-borne particulates derived from chemicals present in soils are not exposure pathways of concern. In addition, the evaluation of a gardening scenario indicates that inhalation of wind-borne particulates from surface soils is not an exposure pathway of concern.

7.1.7.2 40 Willow Avenue (On-Site)

This assessment indicates that chemicals are present in surface soil at concentrations that exceed the range of background concentrations. Additionally, chemicals were detected in subsurface soil at the 40 Willow Avenue parcel at concentrations that exceed the applicable TAGM concentrations. Consequently, potential exposure to these soils may be considered a pathway of concern. However, under current site conditions, access to the site is restricted by a gated fence so the potential for trespasser exposure to these soils is minimal. A KeySpan employee visits the regulating station on average once per week and a portion of this time is spent in the on-site building where direct contact with soil does not occur.

Because future redevelopment of the site or conversion to another commercial use would likely entail construction and utility work and, by definition, direct contact with subsurface soils, the concentrations of chemicals detected in subsurface soil at the 40 Willow Avenue parcel indicate that direct contact with these soils may be an exposure pathway of concern.

Several chemicals in groundwater are present at concentrations that exceed TOGS. Potential direct contact exposures to groundwater are expected to be limited to those individuals engaged in excavation work (e.g., construction worker, KeySpan employee, and utility

worker). Results of the screening analysis indicate that this may be an exposure pathway of potential concern. However, under current site conditions, direct contact with groundwater is an incomplete exposure pathway.

Based on this analysis, potential inhalation of vapors from soil and groundwater and particulates from soil at the 40 Willow Avenue parcel is an exposure pathway of potential concern.

7.1.8 Summary

In summary, results of this screening level assessment indicate that chemicals present in soil and groundwater at the Lynhurst Avenue residential parcels (off site) are either not of concern or the exposure pathways through which individuals could potentially be exposed to these chemicals are incomplete. Data for the 40 Willow Avenue parcel (on site) indicate that under future site use conditions, and absent remedial measures, exposure to soil and groundwater are potential pathways of concern.

7.2 Fish and Wildlife Impact Analysis (FWIA)

This FWIA has been conducted to identify actual or potential impacts to fish and wildlife residing in the vicinity of the site from chemicals potentially migrating from the former MGP. Specifically, it focuses on impacts associated with site-related chemicals detected in soil and groundwater.

This analysis contains:

- Site descriptions including a characterization of the floral and faunal resources present and the concentration of these resources to humans;
- The identification of applicable regulatory standards and criteria for fish and wildlife;
- Evaluations of potential exposure pathways to fish and wildlife from site-related chemicals of potential ecological concern (COPECs);
- Comparison of chemical concentrations for COPECs to regulatory criteria or derived toxicological benchmarks for the protection of fish and wildlife;
- Conclusions regarding the potential of exposure and possible impacts to fish and wildlife on or about the site.

This FWIA was initially prepared for the RI report issued in 2000 that encompassed the entire Clifton site. Because the conclusions regarding the potential for adverse impacts to flora and fauna were not significantly altered by the additional data collected during the supplemental RI, a decision was made not to revise the previously submitted FWIA. Consequently, the initial FWIA is being re-issued in this report and is reproduced in its entirety on the following pages.

7.2.1 Fish and Wildlife Resources

Terrestrial Resources

The U.S. Fish and Wildlife Service and the NYSDEC Natural Heritage Program were contacted regarding species of concern, significant habitats, and fishery resources within two miles of the site. In addition, a field reconnaissance survey of the site and surrounding 0.5-mile radius was conducted on September 2, 1999. The objectives of the survey were to:

- Map and describe plant communities and aquatic resources on and adjacent to the site;
- Observe wildlife species;
- Identify significant ecological resources; and
- Observe evidence of stress to plants and animals, if any, from site-related chemicals.

Approximately two-thirds of the area within the 0.5-mile radius of the site is upland. Currently, commercial uses dominate the land within 0.5 mile of the site. The residential areas consist of buildings surrounded by maintained lawns and ornamental plantings. Commercial establishments are covered by buildings and asphalt. Little vegetation exists to support wildlife populations. As a result, much of the area is classified as paved road or urban structure exterior. The paved road category includes much of the site, parking lots, streets, and sidewalks. The residential areas consist of buildings surrounded by maintained lawns and ornamental plantings.

Aquatic Resources – New York Harbor

The site lies within the New York Harbor drainage basin. A Comprehensive Conservation and Management Plan (CCMP) has been developed for the Harbor. The areas of concern outlined in the CCMP are: habitat and living resources, toxic contamination, nutrients and organic enrichment, pathogenic contamination, dredged material management, floatable debris, and rainfall-induced discharges. The NYSDEC classifies the New York Harbor as "SI" indicating the water is suitable for fish propagation and fish survival.

The Narrows section of New York Harbor is approximately 600 feet to the east and northeast of the site. The drowned mouth of the Hudson River forms much of New York Harbor. The physical constraints of Manhattan and New Jersey, Brooklyn and Staten Island define the harbor in the area known as the Upper Bay. The Narrows links the Upper Bay to the Lower Bay, south of Staten Island and the Atlantic Ocean.

The estuarine setting to the east of the site within the 0.5-mile radius includes intertidal and subtidal communities formed largely by artificial conditions and the influence of the Hudson River. To the south-southeast of the site and south of commercial piers, the intertidal and higher shoreline consists of rip/rap and artificial structures. The developed shoreline within 0.5-mile southeast and east of the site involves pilings from two former piers that remain in near-shore water north of the site. The pilings and shoreline bulkheads that extend through intertidal and subtidal zones provide substrate for sedentary life forms, such as microbes, algae and invertebrate epifauna (hydroids, polychaete worms, amphipods and bryozoans), as well as refuge, browsing habitat and spacial reference for mobile organisms, such as crabs and fish, including such species as tautog (*Tautoga onitis*) and cunner (*Tautogolabrus ad.spersus*).

Offshore, beyond the piers, the Narrows constitute a coastal inlet between the Atlantic Ocean and the Hudson River. Resident and seasonal fish species known from the coastal ocean and lower Hudson estuary could be expected in the Narrows. Resident fish include bay anchovy (Anchoa mitchilli), silverside (Membras martinica and Menidia spp.), scup (Stenotomus chrysops), spot (Leiostomus xanthurus), and winter flounder (Pseudopleuronectes americanus). Seasonal species include warm-weather visitors: menhaden (Brevortia tyrannus), Atlantic needlefish (Strongylura marina), juvenile bluefish (Pomatomus saltatrix), weakfish (Cynoscion regalis); and anadromous species, that pass through the area when moving to and from Hudson River waters, such as Atlantic sturgeon (Acipenser oxyrhynchus), shad (Alosa sapidissima) and striped bass (Morone saxatilis).

Redevelopment of the Staten Island waterfront to the northeast and north of the site, between 0.5 and 1 mile away, occurred during the early 1990s as part of the US Navy's Stapleton Homeport Program. Former piers were removed, a million cubic yards of dredging occurred and a new pier was constructed. One maintenance dredging event occurred following construction of the new pier. Planned Navy use of the new facility never occurred, but the US Coast Guard operated from the facility until recently (USACOE, 2000). As a result of the Homeport project, significant modification occurred during the past 10 years within the subtidal and intertidal zones between 0.5 and 1.0 miles from the site.

The Narrows area is inherently a relatively deep part of the harbor. The waters northeast and southeast between one and two miles of the site include areas with depths >50 feet. In the vicinity of active piers, water depths may be as much as 40 feet.

7.2.2 Freshwater and Tidal Wetlands

Wetlands have been identified on the U.S. Fish and Wildlife National Wetland Inventory (NWI) Maps (The Narrows and Jersey City, NY-NJ quadrangles) and NYSDEC Tidal Wetland Maps (see Figure 7-2C). Portions of the New York Harbor near the site are mapped as an estuarine, intertidal, aquatic bottom, agael, regularly flooded wetland (E2AB1N). Some of the remaining wetlands are downgradient from the site. However, there are no known direct migration pathways from the site into the wetlands. Also, due to distance involved and fate and transport mechanisms, no significant effects on wetlands are expected.

7.2.3 Fish and Wildlife Resources

Wildlife uses in the area were evaluated using literature sources and field observations. Wildlife sightings included direct observations and identifications based on vocalizations, tracks, browse, and scat. General wildlife values (e.g., food and cover availability) also were noted.

Federally listed endangered, threatened or species of concern are not known to occur within two miles of the site (Clough, 1999). Seven state-listed endangered species were identified as occurring within two miles of the site (Christoffel, 2000) (see Figure 7-2C). In addition, one significant habitat, serpentine barrens, was identified as occurring within two miles of the site.

The surrounding two-mile radius consists of residential homes and industrial/ commercial properties. These areas typically consist of mowed lawns interspersed with trees and shrubs, which often times are introduced exotics used for ornamental purposes. These areas do not support an abundance of wildlife because of the lack of vegetation, which could provide food and cover, and constant human activity. The unmown lot near the gate station and the narrow strip of vegetation along the right-of-way do provide habitat for wildlife. However, the small size limits the size of the population it can support. The herptile (amphibian and reptile), bird, and mammal species that may potentially occur within and adjacent to the site based on the land uses identified during the field reconnaissance are listed in the table below. The species observed during the field reconnaissance (which are representative for the point in time of the field reconnaissance) are also identified.

7.2.4 Observation of Stress

Signs of stress to vegetation and wildlife from site-related chemicals were not observed during the field reconnaissance.

7.2.5 Value of Habitat to Associated Fauna

The site and adjoining terrestrial properties are of little value to wildlife. The area is developed, and only isolated pockets of vegetation exists, and in most cases these areas are maintained by frequent mowing. The wildlife expected to occur in the vicinity of the site includes more urbanized bird and mammalian species such as mockingbird (*Mimus polyglottos*), gray squirrel (*Sciurus carolinensis*), and Norway rat (*Rattus norvegicus*).

Species That May Potentially Occur on or Adjacent to the Site

Common Name	Scientific Name	Habitat Preference
Northern brown snake	*Stirerua dekayi*	Ubiquitous.
Eastern garter snake	*Thamnophis sirtalis*	Ubiquitous.
Eastern American toad	*Bufo americanus*	Found in almost any habitat.
Killdeer	*Charadrius vociferous*	Lawns, open areas.
Rock dove[a]	*Columba livia*	Open areas near human habitations.
Mourning dove	*Zenaida macroura*	Open areas, lawns, and woodland edges.
Chimney swift	*Chaetura pelagica*	The vicinity of buildings in towns, cities and farms.
Barn swallow	*Hirundo rustica*	Man-made structures near open areas.
House wren	*Troglodytes aedon*	Near human dwellings with sufficient wooded vegetation.
European starling	*Sturnus vulgaris*	Farms, cities, gardens, parks.
Common grackle	*Quiscalus quisscula*	Suburbs, parks, cities.
House Finch	*Carpodacus mexicanus*	Suburban and Urban yards.
House sparrow[a]	*Passer domesticus*	Villages, cities.
Eastern mole	*Scalopus aquaticus*	Lawns.
Norway rat	*Rattus norvegicus*	Near human habitation.
House mouse	*Mus musculus*	Buildings.
Meadow	*Microtis pennsylvanicus*	Fields, lawns.

Notes:
[a] Species observed by sight or sound during field reconnaissance.
Source: DeGraaf and Rudis, 1983; Conat and Collins, 1975; Burt and Grossenheider, 1976

7.2.6 Value of Resources to Humans

The site and surrounding area are of little value to humans for recreational use of wildlife. Bird feeders may be in residential yards. The developed nature of the area precludes small game and deer hunting.

7.2.7 Applicable Fish and Wildlife Criteria and Standards

Site-specific criteria protective of fish and wildlife resources associated with the site that may be applicable to future remediation are included in:

- Migratory Bird Treaty Act, which protects migratory birds, their eggs and nests from harm.

7.2.8 Exposure Pathways Analysis

Chemicals of Potential Ecological Concern

A number of substances were detected in soil and groundwater. Some are naturally occurring. Some are less toxic than others. In order to focus the FWIA on those chemicals that may pose risks to the environment, COPECs were selected.

For this assessment, the chemicals detected in groundwater are not considered COPECs for ecological receptors except indirectly as a potential source of contamination to the surface water or sediment downgradient of the site. The depth to groundwater is generally greater than three feet below ground surface (bgs), which is below the root zone of most plants. Where groundwater is less than three feet bgs, the area is unvegetated and/or paved. Therefore, no exposure routes exist, and the chemicals detected in groundwater are not discussed.

Surface and subsurface soil samples were collected from the site and analyzed for VOCs, SVOCs, RCRA metals and total cyanide. Only shallow subsurface soils (up to four feet below ground surface) were considered in this FWIA. A total of 64 samples (36 surface soil and 28 subsurface soil) were analyzed in this depth interval. Data for deeper subsurface soils were not evaluated due to lack of exposure routes to wildlife. Most burrowing animals create dens in the upper four feet of soil. In addition, the deeper subsurface soil samples (i.e., greater than four feet) are below the root zone of most plants. Essential nutrients (calcium, iron, potassium, sodium and magnesium) are not considered COPECs.

Sec-butylbenzene, 3-Nitroaniline, di-n-butylphthalate, hexachlorobenzene and isophorone were detected infrequently (i.e., in less than 5% of the samples with sample sizes greater than 20 samples). Therefore, these chemicals are not considered COPECs for this assessment.

Chemical Migration and Fate

The COPECs consist of VOCs, PAHs and metals.

Volatile Organic Compounds – The VOCs of concern have high vapor pressures and, therefore, would be expected to volatilize readily from surface soil to the atmosphere. Once released to the atmosphere, these compounds are rapidly photodegraded.

In deeper soils, these compounds degrade slowly, are water soluble and may leach into groundwater. These compounds have low octanol/water coefficients (log K_{ow}) and, therefore, do not sorb to sediment or particulate matter present in the water column.

PAHs - PAHs are a major component of coal tars. PAHs contain only carbon and hydrogen and consist of two or more fused benzene rings in linear, angular or cluster arrangements. The number of rings in a PAH molecule affects its biological activity, and fate and transport in the environment. In general, most PAHs can be characterized as having low vapor pressure, low to very low water solubility, low Henry's Law constant, high log K_{ow}, and high K_{oc}.

Although PAHs are regarded as persistent in the environment, they are degradable by microorganisms. Environmental factors, microbial flora and physicochemical properties of the PAHs themselves influence degradation rates and degree of degradation. Important environmental factors influencing degradation include temperature, pH, and redox potential and microbial species. Physicochemical properties, which influence degradation, include chemical structure, concentration and lipophilicity.

Metals – In a terrestrial setting, trace elements released to the environment accumulate in the soil (Sposito and Page, 1984). Mobility of these trace elements in soil is low and accumulated metals are depleted slowly by leaching, plant uptake, erosion, or chelation. The half-life of trace elements in temperate climate ranges from 75 years for cadmium to more than 3,000 for zinc.

The transport of trace elements in soil may occur via the dissolution of metals into pore water and leaching to groundwater, or colloidal or bulk movement (i.e., wind or surface water erosion). The rate of trace element migration in soil is affected by the chemical, physical and biological characteristics of the soil. The most important characteristics include:

- Eh-pH system;
- Cation exchange capacity and salt content;
- Quantity of organic matter;
- Plant species;
- Water content and temperature; and
- Microbial activity.

Metals that do mobilize from the soil into the water column are most mobile under acid conditions and increasing pH usually reduces their bioavailability (McIntosh, 1992).

The migration pathways for chemicals are illustrated on Figure 7-1 of the report.

Exposure Pathways

Wildlife resources in the commercial/residential area surrounding the site are limited due to the lack of food and cover. Also, constant human disturbance limits the population to wildlife species more tolerant of human activity. No state or federally listed species were identified as occurring on the site. Several wetlands were identified in the two-mile radius study area. These wetlands are currently too distant and/or up-gradient of the site for any likely exposure to site-related chemicals. Also, some of the COPECs are selected metals and PAHs. The fate and transport mechanisms of these chemicals reduce the likelihood of future migration into these areas. Thus, exposure is likely to be limited to wildlife on, near, or immediately downgradient from the site.

Plant roots are not discriminating in the uptake of small organic molecules (molecular weight less than 500) except on the basis of polarity. The more water soluble molecules pass through the root epidermis and translocate throughout the plant and are eventually volatilized from the leaves (Efroymson *et al.*, 1997a). Plants selectively uptake metals in soil by absorption from soil solution by the root. Metals may be bound to exterior exchange sites on the root and not actually taken up. They may enter the root passively in organic or inorganic complexes or actively by way of metabolically controlled membrane transport (Kabata-Pendias and Pendias, 1992). Once in the plant, a metal can be stored in the root or translocated to other plant parts. Potential exposure to wildlife could occur through direct contact with or accidental ingestion of contaminated soil or through the terrestrial food chain.

7.2.9 Criteria-Specific Toxicity Assessment

Soil

The NYSDEC does not have soil cleanup criteria relating to the protection of wildlife and the availability of applicable soil screening values in scientific literature is limited. The screening of soil COPECs was conducted by comparing the chemical concentrations to available screening benchmark values derived by the Oak Ridge National Laboratory (Efroymson *et al.*, 1997a, 1997b and Sample *et al.*, 1996) for the U.S. Department of Energy. The benchmark values are the 10^{th}-percentile of the distribution of various toxic effects threshold for the chemicals in soil for a group of organisms.

Transformation or loss due to environmental degradation is not considered in this assessment. It is assumed that following uptake, concentration in soil will equal

concentrations in organisms. This assumption overestimates potential risk in that wildlife has limited contact with these chemicals in soil and plants.

Benchmark values for three groups of organisms, where available or derived, are presented in Table 7-9. Terrestrial plants were selected since they are critical in nutrient cycling and are a source of food in the diets of higher animals. Also, plants readily take up the COPECs. Earthworms were selected because of their importance in maintaining soil fertility through burrowing and feeding activities. Also, earthworms are at the base of the food chain and are an important food for higher organisms. Meadow voles were selected to represent an herbivorous small mammal. The benchmark values for meadow vole is presented as dietary concentrations in milligram (mg) of chemical per kilogram (kg) of diet that would result in no observed adverse effect levels (NOAELs). For screening purposes, it was assumed that the chemical concentration in soil would be found in the food items of each species. As stated previously, this is a conservative approach that should result in the overestimation of potential exposure and risk.

As indicated in the table on the following page, screening values are available for a few of the COPECs. Therefore, the methodology of the Oak Ridge National Laboratory (Sample *et al.,* 1996) was used to derive toxicological benchmarks for the meadow vole from published toxicological data for laboratory animals. Literature sources included IRIS (USEPA, 2000), HEAST (USEPA, 1997), and the National Toxicology Program. It should be emphasized that the resulting benchmarks obtained from this methodology and toxicological data are based on a conservative approach whose resulting relationship to potential population effects is uncertain.

No observed adverse effect levels (NOAELs) and lowest observed adverse effect levels (LOAELs) are daily dose levels normalized to the weight of the test animal [*e.g.,* mg of chemical per kg body weight per day (mg/kg/day)]. The presentation of toxicity data on a mg/kg/day basis allows for comparison across species with appropriate consideration for differences in body sizes. If a NOAEL (or LOAEL) for a mammalian test species ($NOAEL_t$) is available, then the equivalent NOAEL (or LOAEL) for a mammalian wildlife species ($NOAEL_w$) can be calculated by using an adjustment factor for the difference in body size:

$$NOAEL_w = NOAEL_t \times \left({bw_t}/{bw_w} \right)^{1/4}$$

where:

$NOAEL_w$ = No observed adverse effect level for wildlife species (mg/kg/day)
$NOAEL_t$ = No observed adverse effect level for test species (mg/kg/day)
bw_w = Body weight for wildlife species (kg)
bw_t = Body weight for test species (kg)

In some cases, a NOAEL for a specific chemical was not available, but a LOAEL or lethal dose (LD_{50}) had been determined experimentally. The NOAEL can be estimated by applying an uncertainty factor (UF) to the LOAEL or LD_{50}. In the USEPA methodology (USEPA, 1989), the LOAEL or LD_{50} can be reduced by a factor of 10 or 50, respectively, to derive the NOAEL.

The dietary level or concentration in food (C_f) of a chemical in mg of chemical per kg of food that would result in a dose equivalent to the NOAEL can be calculated from the food factor (f):

$$C_f = \frac{NOAEL_w}{f}$$

The food factor, (f) is the amount of food consumed per day per unit of body weight. The table below provides the body weight, food intake and food factors used in the derivation of chemical-specific NOAELS for the meadow vole. Table 7-8 provides the derived toxicological benchmarks for the meadow vole. When literature values were not available for a chemical, a structurally similar surrogate was used. These surrogates are provided in Table 7-8.

Parameters for Calculation of Toxicological Benchmarks

Organism	Body Weight (kg)	Food Intake (kg/day)	Food Factor f
Mouse	0.03	0.0055	0.18
Rat	0.35	0.028	0.08
Dog	12.7	0.301	0.024
Rabbit	3.8	0.135	0.034
Meadow vole	0.044	0.005	0.114

Screening the maximum concentrations of the COPECs against the literature and derived benchmark values (Table 7-9) indicated:

- Several chemicals did not exceed their respective benchmark values and do not pose a risk to environmental receptors. These include 1,3,5-trimethylbenzene, n-butylbenzene, n-propylbenzene, p-isopropyltoluene, tert-butylbenzene, isopropylbenzene, benzene, ethylbenzene, isopropylbenzene, methylene chloride, styrene, anthracene, benzoic acid, benzo(k)fluoranthene, benzyl alcohol, butylbenzylphthalate, diethylphthalate, fluoranthene, bis(2-ethylhexyl)phthalate, beryllium, chromium, cobalt, manganese, nickel, selenium, cyanide, dieldrin, heptachlor, indeno(1,2,3-cd)pyrene, and endosulfan sulfate.

- Several chemicals exceeded their respective benchmark values and may pose a risk to environmental receptors. They include benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenzo(a,h)anthracene, dibenzofuran, 1,2,4-trimethylbenzene, acetone, carbon tetrachloride, toluene, xylene, 2,4-dimethylphenol, 2-methylnaphthalene, 4-methylphenol, acenaphthene, carbazole, di-n-octylphthalate, fluorene, n-nitrosodiphenylamine, naphthalene, phenanthrene, phenol, pyrene, antimony, arsenic, barium, cadmium, copper, lead, mercury, silver, thallium, vanadium, and zinc.

7.2.10 Conclusions

Habitat Characteristics

The site reconnaissance conducted as part of this analysis indicates the site and surrounding area are poor quality environmental resources, due to the limited presence of vegetation. The site is mostly covered with buildings and asphalt. Wildlife species, typically present are adapted to urban setting. Due to the size of the vegetated areas, only a few individuals will be present. The New York Harbor and several wetland areas are located within 2 miles of the site. Potential migration of COPECs into these resources should be prevented.

Soil

Several COPECs were detected at concentrations greater than the toxicological benchmark values. This suggests that these chemicals may pose a risk to wildlife. In addition, toxicological benchmarks were not derived for several COPECs. However, these potential effects have minimal ecological significance.

The potential risk from COPECs is minimal, for several reasons. Exposure frequency, chemical concentration (especially within the upper 6 inches), mechanism of exposure, and duration of exposure determines risk. The commercial area (i.e., paved areas, buildings, etc.) provides minimal habitat in the form of "weedy" patches that would not support a wildlife population. This area experiences constant physical disturbance that prevents populations of wildlife from developing. Because only transient species and a few individual animals would use this area, the frequency and duration of exposure is limited. Thus, the observed chemicals detected on-site do not pose a current impact, nor is any expected in the future.

8. Summary of Findings

The overall extent of tar, staining, sheen, odors, and chemical constituents detected in soils was located primarily adjacent to former Relief Holder No. 2 located at the 40 Willow Avenue parcel because the ground moraine unit was not as fine-grained and tar blebs and odors extended up to 100 feet bgs. In all instances, the vertical extent of tar ceased prior to encountering saprolite (weathered bedrock) at about 125 feet deep. Some tar impacts were noted deeper than 24 feet bgs beneath the Lynhurst Avenue residential parcels and within the Lynhurst Avenue ROW. These tar-related observations were confined to discrete intervals within minor layers of sands with tar, staining, sheen, and odors. No visible evidence of tar, staining or sheen, odors, or positive PID detections were observed in borings completed on the Lynhurst Avenue parcels above 24 feet bgs or within the Lynhurst Avenue ROW above 40 feet bgs.

In general, elevated levels of TPAH, CPAH, and BTEX correlated with the occurrence of observable tar, odors and/or sheen. Where physical evidence of tar was not encountered, analyses indicated generally low to trace levels of these chemical constituents. As with the observed extent of tar, staining, odors, etc., the overall extent of chemical constituents was generally limited to the 40 Willow Avenue parcel, and to a discrete interval beneath the Lynhurst Avenue residential parcels and Lynhurst Avenue.

Soil analytical data from the adjoining parcels, where tar was not observed, indicated very low to non-detect concentrations of BTEX and total PAHs. Adjoining the 40 Willow Avenue parcel, the highest BTEX concentration in soil was 0.1 ppm in the 12- to 16-foot sample from boring SB-66. This BTEX level corresponds with observed odors at this interval. The highest total PAH concentration detected was 31.4 ppm in the 0- to 2-foot sample from boring SB-66. The elevated PAHs correspond with observed black staining at this interval.

Surface-soil analytical data from the Lynhurst Avenue residential parcels indicates that elevated lead levels were encountered. These lead-impacted surface soils were mitigated as part of an IRM conducted at the parcels.

Similarly, dissolved chemical constituents in groundwater within the water table aquifer appear predominantly limited to the 40 Willow Avenue parcel. Dissolved phase BTEX and PAHs were present in groundwater within the deep aquifer at well RW-14, adjacent to Relief Holder No. 2 (40 Willow Avenue parcel).

Shallow soils containing lead were identified on the off-site residential parcels on Lynhurst Avenue during the course of investigation. From September 2002 to July 2003, an interim remedial measure (IRM) was conducted in accordance with the approved March 2002 IRM work plan to remove lead-containing soils to a target depth of 3 feet below ground surface on the residential parcels. The implementation of this IRM eliminated any potential contact by the residents with the lead containing soil.

The findings of VHB's human health risk assessment indicate that measures are required to mitigate potential on-going exposures to site-related chemicals at the 40 Willow Avenue parcel. A feasibility study report has been prepared to assess the appropriate means to mitigate the conditions related to the former relief holder on the 40 Willow Avenue parcel. The draft feasibility study was issued in December 2002. The findings of the qualitative human exposure assessment and the fish and wildlife impact analysis are discussed further below.

8.1 Qualitative Human Exposure Assessment

The qualitative human exposure assessment focused on chemical distribution and the potential human exposure that may exist within OU-1. The results of this assessment are presented by media (surface soil, subsurface soil, and groundwater) and are organized by off-site (Lynhurst Avenue residential parcels) and on-site (40 Willow Avenue). A summary of the findings is presented below.

Lynhurst Avenue Residential Parcels (Off site)

Results of the screening of the surface soil sample results against background concentrations indicate that soils were generally consistent with background conditions with the exception of soils with levels of lead that were above background conditions. The Lynhurst Avenue residential parcel backyards (off-site parcels adjacent to 40 Willow Avenue) have undergone excavation to 3 feet bgs as part of an IRM to mitigate elevated lead levels within soils. The excavation was subsequently backfilled with clean fill. Based on current and expected future use by the residents and concentrations consistent with background conditions, potential exposures to surface soils are not exposure pathways of concern.

Analytical subsurface soil results compared to TAGM values revealed that concentrations were above established TAGM values. However, the potential for exposure to subsurface soils was considered minimal based upon the current residential land use and the clean material placed into the backyards of the residences as part of the IRM currently being completed.

Analytical groundwater results were present at levels that were detected below applicable TAGM standards. Currently, residences are served by municipal water supply and any future residential development would also be connected to the current municipal water supply system. In addition, no groundwater supply wells were observed during the investigation activities at the parcels. As a result, exposure to potentially groundwater analytes would likely not occur under current or future land use.

Analysis of potential inhalation of vapors in ambient and indoor air and inhalation of wind-born particles present in soils and waters were determined not to be an exposure pathway of concern.

40 Willow Avenue (On site)

Results of the screening of the surface soil samples indicate that constituents were detected in surface soils that exceeded the range of background concentrations and exceeded the applicable TAGM concentrations. Consequently, exposure to these soils presents a potential pathway of concern. However, based on the current site conditions, access to these soils is limited by a locked chain-link fence. Under current operation as a gate station, minimal visits are made to the site by KeySpan personnel to maintain the operation of the facilities. During these visits, time is spent within the gate station and soils are not disturbed. Any future intrusive activities that involve soils on the 40 Willow Avenue could likely result in a potential exposure pathway.

Several chemicals in groundwater are present at conditions that exceed applicable TOGS. Potential exposure pathways would likely include direct contact exposures to those involved with intrusive work. This is consequently a potential pathway of concern for future activities; however, direct contact to groundwater is currently an incomplete exposure pathway.

Based upon detected values of analytes within soils and groundwater at the parcel, the potential inhalation of vapors and particulates from soils and groundwater was evaluated and was determined to be a potential exposure pathway.

8.2 Fish and Wildlife Impact Analysis

The site reconnaissance conducted as part of the RI indicated the site and surrounding area to be poor quality environmental resources, due to the limited presence of vegetation. As such, the wildlife species typically present are adapted to the current urban setting. Due to the limited size of the vegetated areas, only a few individuals will be present. The New York Harbor and several upgradient wetland areas are located within 2 miles of the site.

The potential risk from COPECs observed at the site is minimal for several reasons: exposure frequency, chemical concentration (especially within the upper 6 inches), mechanism of exposure, and duration of exposure determine risk. The commercial area (i.e., paved areas, buildings, etc.) provides minimal habitat in the form of "weedy" patches that would not support a wildlife population. This area experiences constant physical disturbance that prevents populations of wildlife from developing. Because only transient species and a few individual animals would use this area, the frequency and duration of exposure is limited. Thus, the chemicals detected on site do not pose a current risk to wildlife, nor is any expected in the future.

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Tables

Table 1-1
Climatological Normals and Means
Newark International Airport
Newark, New Jersey

Month	Maximum Normal Daily Temperature (Degrees F)	Minimum Normal Daily Temperature (Degrees F)	Average Rainfall Precipitation (inches)	Average Snowfall (inches)	Mean Wind Speed (Miles per hour [mph])	Prevailing Wind Direction (Degrees)
January	37.7	23.4	3.39	8.9	11	300
February	40.5	25.4	3.04	9.2	11.3	310
March	50.8	33.4	3.87	3.7	11.9	310
April	61.9	42.7	3.84	0.7	11.3	320
May	72.4	53.2	4.13	Trace	10	230
June	82.3	62.8	3.22	0	9.6	220
July	87	68.6	4.5	0	9	230
August	85.4	67.4	3.91	0	8.8	230
September	77.6	59.9	3.66	0	9.1	230
October	66.7	48.2	3.05	Trace	9.5	230
November	55.4	39.2	3.91	0.6	10.2	230
December	42.9	29.1	3.45	3.9	10.6	20
Year	63.4	46.1	43.97	27	10.2	230

Source: *Normals, Means, and Extremes for Newark, New Jersey*. National Oceanic Atmospheric Administration: National Climatic Data Center, Ashville, North Carolina. 1968-1997.

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
			Monitoring Wells								
			Round 1 (February 1999 to April 1999)								
RW-4	Monitoring well was installed on the 40 Willow Avenue parcel to evaluate water quality within the deep groundwater aquifer in the vicinity of the former 8-inch well.	CF-RW-4 (88-90)	Sample to analyze soils within the screened interval of the deep groundwater aquifer.	•		• [BTEX only]	•	•	•	•	•
		CF-RW-4 (88-92)	Sample to analyze soils within the screened interval of the deep groundwater aquifer.	•		• [BTEX only]	•	•	•	•	•
		CF-RW-4	Sample to analyze groundwater from the deep aquifer.		•	• [BTEX only]	•	•	•		
RW-7/SB-17	Monitoring well was installed on the 40 Willow Avenue parcel within the SB-17 boring location adjacent to Relief Holder No. 2 to assess vertical and lateral impacts to groundwater and soils.	CF-SB-17 (13-16)	Sample to analyze soils with sheen, tar stains and moderate naphtha/tar.	•		• [BTEX only]	•	•	•		
		CF-SB-17 (76-78)	Sample to analyze soils that are tar-saturated, tar-stained, and have naphthalene/tar odors.	•		• [BTEX only]	•	•	•	•	
		CFRW07-01	Sample to analyze groundwater with tar odors and sheen in the deep aquifer.		•	•	•	•	•		
		CF-TAR-01	Sample to analyze tar in the bottom of RW-7.			•	• [PAH only]				

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
Round 2 (July 1999 to October 1999)											
RW-4	Monitoring well was installed on the 40 Willow Avenue parcel to evaluate water quality within the deep groundwater aquifer in the vicinity of the former 8-inch well.	CF-RW-04	Sample to evaluate deep groundwater aquifer quality.		•	• [BTEX only]	•	•	•		
RW-14/SB-42	Monitoring well was installed on the 40 Willow Avenue parcel adjacent to RW-7 and Relief Holder No. 2 to evaluate the vertical extent of impacts observed in RW-7 and to determine whether site impacts have migrated to the top of bedrock or a confining layer.	CF-SB-42 (24-25)	Sample to analyze soils with tar impacts.	•		• [BTEX only]	•	•	•		
		CF-SB-42 (58-61)	Sample to analyze soil at visually clean zone with slight naphthalene-like odor.	•		• [BTEX only]	•	•	•		
		CF-SB-42 (78-78.5)	Sample to analyze soil with tar impacts.	•		• [BTEX only]	•	•	•		
		CF-SB-42 (119-119.5)	Sample to analyze soil below observed tar impacts.	•		• [BTEX only]	•	•	•		
		CF-SB-42 (126-126.5)	Sample to analyze soils at saprolite (weathered bedrock) interface.	•		• [BTEX only]	•	•	•		
		CF-RW-14	Sample to evaluate deep aquifer quality.		•	• [BTEX only]	•	•	•		
PZ-2	Piezometer was installed on the 40 Willow Avenue parcel adjacent to Bay Street to evaluate shallow groundwater flow.	No analytical sample collected	No analytical sample collected								
PZ-3	Piezometer was installed on the 40 Willow Avenue parcel adjacent to Relief Holder No. 2 to evaluate shallow groundwater flow.	No analytical sample collected	No analytical sample collected								
Round 3 (November 1999 to December 1999)											
No monitoring wells installed		No analytical sample collected	No analytical sample collected								

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
Round 4 (November 2001 to January 2002)											
PZ-4A	Temporary piezometer was installed on the 40 Willow Avenue parcel adjacent to Relief Holder No. 2 to obtain shallow groundwater aquifer conditions for potential dewatering activities.	CF-DWTR-P24	Sample to evaluate shallow groundwater aquifer quality for potential dewatering.		•	•	•	•	•		
PZ-3	Located on the 40 Willow Avenue parcel adjacent to Relief Holder No. 2 to obtain shallow groundwater aquifer conditions for potential dewatering activities.	CF-DWTR-P23	Sample to evaluate shallow groundwater aquifer quality for potential dewatering.		•	•	•	•	•		
PZ-TP-13	Temporary piezometer installed on the 40 Willow Avenue parcel adjacent to Relief Holder No. 2 to obtain shallow groundwater aquifer conditions for potential dewatering activities.	CF-DWTR-P2/TP-13	Sample to evaluate shallow groundwater aquifer quality for potential dewatering.		•	•	•	•	•		
Round 5 (May 2002 to June 2002)											
PZ-5	Temporary piezometer installed adjacent to the residential dwelling located at 51 Lynhurst Avenue to characterize the groundwater aquifer for potential indoor air volatilization.	CF-PZ-5	Sample to evaluate shallow groundwater aquifer quality adjacent to the residential dwelling.		•	•	•				
PZ-6	Temporary piezometer installed adjacent to the residential dwelling located at 53 Lynhurst Avenue for groundwater screening for potential indoor air volatilization.	CF-PZ-6	Sample to evaluate shallow groundwater aquifer quality adjacent to the residential dwelling.		•	•	•				
PZ-7	Temporary piezometer installed adjacent to the residential dwelling located at 55 Lynhurst Avenue for groundwater screening for potential indoor air volatilization.	CF-PZ-7	Sample to evaluate shallow groundwater aquifer quality adjacent to the residential dwelling.		•	•	•				

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
PZ-8	Temporary piezometer installed adjacent to the residential dwelling located at 59 Lynhurst Avenue for groundwater screening for potential indoor air volatilization.	CF-PZ-8	Sample to evaluate shallow groundwater aquifer quality adjacent to the residential dwelling.		•	•	•				
PZ-9	Temporary piezometer installed adjacent to the residential dwelling located at 61 Lynhurst Avenue for groundwater screening for potential indoor air volatilization.	CF-PZ-9	Sample to evaluate shallow groundwater aquifer quality adjacent to the residential dwelling.		•	•	•				
PZ-10	Temporary piezometer installed adjacent to the residential dwelling located at 63 Lynhurst Avenue for groundwater screening for potential indoor air volatilization.	CF-PZ-10	Sample to evaluate shallow groundwater aquifer quality adjacent to the residential dwelling.		•	•	•				
PZ-11	Temporary piezometer installed adjacent to the residential dwelling located at 49 Lynhurst Avenue for groundwater screening for potential indoor air volatilization.	CF-PZ-11	Sample to evaluate shallow groundwater aquifer quality adjacent to the residential dwelling.		•	•	•				
PZ-12	Temporary piezometer installed adjacent to the residential dwelling located at 67 Lynhurst Avenue for groundwater screening for potential indoor air volatilization.	CF-PZ-12	Sample to evaluate shallow groundwater aquifer quality adjacent to the residential dwelling.		•	•	•				
Test Borings											
Round 1 (February 1999 to April 1999)											
SB-18	Located on the 40 Willow Avenue parcel to the northeast (downgradient) of the former 8-inch steel pipe to evaluate the potential lateral and vertical extent of impacts adjacent to the former well.	CF-SB-18 (4-7.5)	Sample to evaluate soils with fill material (glass) and a faint fuel oil odor.	•		• [BTEX only]	•	•	•		
		CF-SB-18 (73-76) [Duplicate is CF-DUP-3]	Sample to evaluate soils with sheen and a naphthalene odor within the deep groundwater aquifer.	•		• [BTEX only]	•	•	•		•

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
SB-21	Located on the 40 Willow Avenue parcel within the former Relief Holder No. 2 to evaluate its contents.	CF-SB-21 (5-7)	Sample to evaluate fill material with black staining and strong tar odor.	•		• [BTEX only]	•	•	•		
SB-22	Located on the 40 Willow Avenue parcel to the north of the former Relief Holder No. 2 to evaluate potential lateral extent of impacts related to the holder.	CF-SB-22 (2-3)	Sample to evaluate tar-saturated fill with a strong tar odor.	•		• [BTEX only]					
		CF-SB-22 (20-21)	Sample to evaluate soil with tar impacts.	•		• [BTEX only]	•	•	•		
SB-23	Located on the 40 Willow Avenue parcel to the northeast of the former 8-inch steel well to evaluate the quality of soil downgradient of this former feature.	CF-SB-23 (4-8)	Sample to evaluate potential lateral and vertical extent of impacts.	•		• [BTEX only]	•	•	•		
		CF-SB-23 (29-31)	Sample to evaluate potential lateral and vertical extent of impacts.	•						•	•
		CF-SB-23 (92-94)	Sample to evaluate soils with a tar stain, sheen, and odor.	•		• [BTEX only]	•	•	•		•
		CF-SB-23 (109-111)	Sample to evaluate soil at the completion depth of the boring.	•		• [BTEX only]	•	•	•		•
SB-36	Located on the 40 Willow Avenue parcel at the off-set boring adjacent to the RW-4 location to evaluate the shallow geologic conditions and lateral and vertical extent of impacts in the vicinity of the former 8-inch steel well.	CF-SB-36 (4-8)	Sample to evaluate fill material with slight septic odors.	•		• [BTEX only]	•	•	•		
		CF-SB-36 (16-20)	Sample to evaluate soils at the completion depth of the boring.	•		• [BTEX only]	•	•	•		

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
Round 2 (July 1999 to October 1999)											
SB-40	Located on the 40 Willow Avenue parcel within the former Relief Holder No. 2 to evaluate its contents, depth, and integrity.	CF-SB-40 (4-6)	Sample to evaluate tar-saturated soil.	•		• [BTEX only]	•	•	•		
		CF-SB-40 (16-18)	Sample to evaluate soils with tar-coated grains and moderate tar odors.	•		• [BTEX only]	•	•	•		
		CF-SB-40 (18-20)	Sample to evaluate tar-saturated soil at the bottom of the holder.	•		• [BTEX only]					
SB-41	Located on the 40 Willow Avenue parcel adjacent to former Relief Holder No. 2 to evaluate potential lateral and vertical impacts resulting from the holder.	CF-SB-41 (10-12)	Sample to evaluate soils at the observed groundwater interface.	•		• [BTEX only]	•	•	•		
		CF-SB-41 (18-20)	Sample to evaluate soils with slight tar-like odor at the bottom of the holder.	•		• [BTEX only]	•	•	•		
		CF-SB-41 (28-30)	Sample to evaluate tar-coated soil grains at the completion depth of the boring.	•		• [BTEX only]	•	•	•		
SB-43	Adjacent to former Relief Holder No. 2 to evaluate potential lateral and vertical impacts resulting from the holder.	CF-SB-43 (6-8)	Sample to evaluate soils with sheen and gray staining at the approximate groundwater interface.	•		• [BTEX only]	•	•	•		
		CF-SB-43 (28-30)	Sample to evaluate soils with tar blebs and a tar layer at the completion of the boring.	•		• [BTEX only]	•	•	•		
SB-44	Adjacent to former Relief Holder No. 2 to evaluate potential lateral and vertical impacts resulting from the holder.	CF-SB-44 (3-5)	Sample to evaluate soils with slight tar odor.	•		• [BTEX only]	•	•	•		
		CF-SB-44 (29-31)	Sample to evaluate soils at the completion depth of the boring.	•		• [BTEX only]	•	•	•		

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
Round 3 (November 1999 to December 1999)											
SB-58	On residential lot at 49 Lynhurst Avenue to evaluate the potential impacts from the former adjacent MGP operations.	CF-SB-58 (0-4)	Sample to evaluate artificial fill material at the apparent groundwater table interface.	•		• [BTEX only]	•	•	•		•
		CF-SB-58 (4-6)	Sample to evaluate artificial fill material.	•		• [BTEX only]	•	•	•		•
SB-59	On residential lot at 51 Lynhurst Avenue to evaluate the potential impacts from the former adjacent MGP operations.	CF-SB-59 (0-4)	Sample to evaluate soils at the apparent groundwater table.	•		• [BTEX only]	•	•	•		•
		CF-SB-59 (8-10)	Sample to evaluate artificial fill material.	•		• [BTEX only]	•	•	•		•
SB-60	On residential lot at 53 Lynhurst Avenue to evaluate the potential impacts from the former adjacent MGP operations.	CF-SB-60 (0-4) [Duplicate is CF-SB-11/30/99]	Sample to evaluate artificial fill material at the groundwater interface.	•		• [BTEX only]	•	•	•		•
		CF-SB-60 (4-8)	Sample to evaluate soils at the apparent groundwater interface.	•		• [BTEX only]	•	•	•		•
SB-61	On residential lot at 55 Lynhurst Avenue to evaluate the potential impacts from the former adjacent MGP operations.	CF-SB-61 (0-4)	Sample to evaluate soils at the apparent groundwater table.	•		• [BTEX only]	•	•	•		•
		CF-SB-61 (4-8)	Sample to evaluate artificial fill material.	•		• [BTEX only]	•	•	•		•
SB-62	On residential lot at 59 Lynhurst Avenue to evaluate the potential impacts from the former adjacent MGP operations.	CF-SB-62 (0-4)	Sample to evaluate soils at the apparent groundwater table.	•		• [BTEX only]	•	•	•		•
		CF-SB-62 (4-6)	Sample to evaluate potential lateral and vertical extent of impacts.	•		• [BTEX only]	•	•	•		•
SB-65	On the commercial lot at 66 Willow Avenue to evaluate the potential impacts from the former adjacent MGP operations.	CF-SB-65 (0-4)	Sample to evaluate shallow soil conditions.	•		• [BTEX only]	•	•	•		•
		CF-SB-65 (4-8)	Sample to evaluate soils at the apparent groundwater table.	•		• [BTEX only]	•	•	•		•

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
SB-66	On the commercial lot at 66 Willow Avenue to evaluate the potential impacts from the former adjacent MGP operations.	CF-SB-66 (0-2)	Sample to evaluate soils with slight naphthalene-like odors.	•		• [BTEX only]	•	•	•		•
		CF-SB-66 (12-16)	Sample to evaluate soils with slight naphthalene-like odors.	•		• [BTEX only]	•	•	•		•
SB-67	On the commercial lot at 66 Willow Avenue to evaluate the potential impacts from the former adjacent MGP operations.	CF-SB-67 (0-4)	Sample to evaluate an artificial fill layer with black staining.	•		• [BTEX only]	•	•	•		•
		CF-SB-67 (4-6)	Sample to evaluate soils at the apparent groundwater table.	•		• [BTEX only]	•	•	•		•
Round 4 (November 2001 to January 2002)											
SB-77	On residential lot located at 59 Lynhurst Avenue to evaluate potential impacts from the nearby Relief Holder No. 2 located on 40 Willow Avenue.	SB-77 (24-28)	Sample to evaluate soils that exhibited stringer of sheen, a naphthalene/tar-like odor, and elevated PID readings.	•		• [BTEX only]	• [PAH only]	•	•		
		SB-77 (37-39)	Sample to evaluate soils with trace NAPL (tar) blebs and light sheen, slight tar/ naphthalene-like odor, and elevated PID readings at the completion of the boring.	•		• [BTEX only]	• [PAH only]	•	•		
SB-78	Located within the Lynhurst Avenue Right-of-Way to evaluate potential impacts from the former MGP operations at 40 Willow Avenue.	SB-78 (49-50)	Sample to evaluate soils with trace tar blebs and sheen, a moderate tar odor, and elevated PID reading.	•		• [BTEX only]	• [PAH only]	•	•		
		SB-78 (114-115) [Duplicate is SB-98 (104-105)]	Sample to evaluate soils within the deep groundwater aquifer.	•		• [BTEX only]	• [PAH only]	•	•		

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
GP-01	Located on 40 Willow Avenue parcel to evaluate potential lateral and vertical impacts to soils from the adjacent Relief Holder No. 2 to support the feasibility study activities for the holder on the parcel.	GP-01B (34-38)	Sample to evaluate soils with tar-coated gravels and tar-coated fractures, a strong tar odor, and elevated PID reading.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			
		GP-01B (42-45)	Sample to evaluate soils with sheen and tar-saturated sand and gravel lenses with a strong tar odor and elevated PID reading at the completion of the boring.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			
GP-02	Located on 40 Willow Avenue parcel to evaluate potential lateral and vertical impacts to soils from the adjacent Relief Holder No. 2 to support the feasibility study activities for the holder on the parcel.	GP-02 (24-28)	Sample to evaluate soils with trace tar-coated gravel and slight tar odor.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			
		GP-02 (43-45)	Sample to evaluate soils at the completion of the boring with a minor sheen and slight naphthalene/tar odor.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			
GP-03	Located on 40 Willow Avenue parcel to evaluate potential lateral and vertical impacts to soils from the adjacent Relief Holder No. 2 to support the feasibility study activities for the holder on the parcel.	GP-03A (16-20)	Sample to evaluate soils with tar-coated gravel, tar blebs and strong tar odor.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			
		GP-03A (28-32)	Sample to evaluate soils with trace sheen and slight tar odor.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
GP-04	Located on 40 Willow Avenue parcel to evaluate potential lateral and vertical impacts to soils from the adjacent Relief Holder No. 2 to support the feasibility study activities for the holder on the parcel.	GP-04 (12-16)	Sample to evaluate viscous black tar and strong tar odor.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			
		GP-04 (16-20)	Sample to evaluate viscous black tar and strong tar odor.	•		• [BTEX only]	• [PAH only]				
GP-05	Located on 40 Willow Avenue parcel to evaluate potential lateral and vertical impacts to soils from the adjacent Relief Holder No. 2 to support the feasibility study activities for the holder on the parcel.	GP-05 (16-20)	Sample to evaluate soils with sheen and tar-saturated sand and gravel lenses with a strong tar odor and high PID reading.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			
		GP-05 (32-35)	Sample to evaluate soils with sheen and tar-saturated sand and gravel lenses with a strong tar odor and high PID reading.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			
GP-06	Located on 40 Willow Avenue parcel to evaluate potential lateral and vertical impacts to soils from the adjacent Relief Holder No. 2 to support the feasibility study activities for the holder on the parcel.	GP-06 (28-32)	Sample to evaluate tar-saturated soils, strong tar odor, and elevated PID reading.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			
		GP-06 (40-44)	Sample to evaluate soils with trace tar coatings, sheen, and slight naphthalene odor on the bottom of the sample.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
GP-07	Located on 40 Willow Avenue parcel to evaluate potential lateral and vertical impacts to soils from the adjacent Relief Holder No. 2 to support the feasibility study activities for the holder on the parcel.	GP-77 (12-16)	Sample to evaluate soils with trace petroleum odor.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			
		GP-07 (16-20)	Sample to evaluate soils with tar-coated grains, strong tar odor and elevated PID reading.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			
GP-08	Located on 40 Willow Avenue parcel to evaluate potential lateral and vertical impacts to soils from the adjacent Relief Holder No. 2 to support the feasibility study activities for the holder on the parcel.	GP-08 (12-16)	Sample to evaluate soils with moderate tar odor.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			
		GP-08 (16-20)	Sample to evaluate tar-saturated soils with strong tar odor	•		• [BTEX only]	• [PAH only]	• [Lead Only]			
GP-09	Located on 40 Willow Avenue parcel to evaluate potential lateral and vertical impacts to soils from the adjacent Relief Holder No. 2 to support the feasibility study activities for the holder on the parcel.	GP-09 (4-8)	Sample to evaluate viscous tar and fill with moderate tar odor.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			
		GP-09 (12-16)	Sample to evaluate tar-saturated fill material with sheen and a moderate tar odor.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
GP-10	Located on 40 Willow Avenue parcel to evaluate potential lateral and vertical impacts to soils from the adjacent Relief Holder No. 2 to support the feasibility study activities for the holder on the parcel.	GP-10 (16-20)	Sample to evaluate soils with heavily tar-coated grains and strong tar odor.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			
		GP-10 (40-45)	Sample to evaluate soils with a slight naphthalene/tar odor.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			
GP-11	Located on 40 Willow Avenue parcel to evaluate potential lateral and vertical impacts to soils from the adjacent Relief Holder No. 2 to support the feasibility study activities for the holder on the parcel.	GP-11 (16-20)	Sample to evaluate soils with heavy tar coating, strong tar odor, and elevated PID reading.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			
		GP-11 (40-45) [Duplicate is GP-111 (0-5)]	Sample to evaluate soils with a slight naphthalene/tar odor.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			
GP-12	Located on 40 Willow Avenue parcel to evaluate potential lateral and vertical impacts to soils from the adjacent Relief Holder No. 2 to support the feasibility study activities for the holder on the parcel.	GP-12 (20-24)	Sample to evaluate soils with trace naphthalene odor.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			
		GP-12 (40-45)	Sample to evaluate soils with black stains, tar in veins and sand layers.	•		• [BTEX only]	• [PAH only]	• [Lead Only]			

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
Round 5 (May 2002 to June 2002)											
SB-79/79A	Located at 63 Lynhurst Avenue to evaluate the potential lateral and vertical impacts to soils from the former MGP operations on the 40 Willow Avenue parcel.	CF-SB-79 (24-28) [Duplicate is CF-SB-79 (20-24)]	Sample to evaluate soils with a slight naphthalene odor.	•		• [BTEX only]	• [PAH only]	•	•		
		CF-SB-79A (51-55)	Sample to evaluate soils with heavily tar-coated grains, liquid tar, and strong tar odor.	•		• [BTEX only]	• [PAH only]	•	•		
SB-80	Located at 51 Lynhurst Avenue to evaluate the potential lateral and vertical impacts to soils from the former MGP operations on 40 Willow Avenue parcel.	CF-SB-80 (0-4)	Sample to evaluate fill material (fill, ash and coal fragments) at the apparent groundwater table.	•		• [BTEX only]	• [PAH only]	•	•		
		CF-SB-80 (52-56)	Sample to evaluate visually clean soils at the termination of the boring.	•		• [BTEX only]	• [PAH only]	•	•		
SB-84	Located on the southern Right-of-Way of Lynhurst Avenue to evaluate the potential lateral and vertical impacts to soils from the former MGP operations located on the 40 Willow Avenue parcel.	CF-SB-84 (40-44)	Sample to evaluate soils with patchy sheen and a slight to moderate naphthalene odor.	•		• [BTEX only]	• [PAH only]	•	•		
		CF-SB-84 (48-52)	Sample to evaluate visually clean soils at the termination of the boring.	•		• [BTEX only]	• [PAH only]	•	•		
SB-85	Located on the southern Right-of-Way of Lynhurst Avenue to evaluate the potential lateral and vertical impacts to soils from the former MGP operations located on the 40 Willow Avenue parcel.	CF-SB-85 (40-44)	Sample to evaluate potential lateral and vertical extent of impacts.	•		• [BTEX only]	• [PAH only]	•	•		
		CF-SB-85 (48-51.5)	Sample to evaluate potential lateral and vertical extent of impacts.	•		• [BTEX only]	• [PAH only]	•	•		

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
SB-86	Located on the southern Right-of-Way of Lynhurst Avenue to evaluate the potential lateral and vertical impacts to soils from the former MGP operations located on the 40 Willow Avenue parcel.	CF-SB-86 (40-44) [Duplicate is CF-SB-86 (0-4)]	Sample to evaluate potential lateral and vertical extent of impacts.	•		• [BTEX only]	• [PAH only]	•	•		
		CF-SB-86 (48-52)	Sample to evaluate potential lateral and vertical extent of impacts.	•		• [BTEX only]	• [PAH only]	•	•		
SB-87	Located at 53 Lynhurst Avenue to evaluate the potential lateral and vertical impacts to soils from the former MGP operations on the 40 Willow Avenue parcel.	CF-SB-87 (48-52)	Sample to evaluate soils with heavily tar-coated grains, liquid tar and moderate to strong tar odors.	•		• [BTEX only]	• [PAH only]	•	•		
		CF-SB-87 (60-64)	Sample to evaluate soils with a trace naphthalene odor at the termination of the boring.	•		• [BTEX only]	• [PAH only]	•	•		
GP-13	Located on 40 Willow Avenue parcel to evaluate the contents of Relief Holder No. 2 to support feasibility study activities for the holder.	No analytical sample collected	No analytical sample collected								
GP-14	Located on 40 Willow Avenue parcel to evaluate the contents of Relief Holder No. 2 to support feasibility study activities for the holder.	No analytical sample collected	No analytical sample collected								
GP-15	Located on 40 Willow Avenue parcel to evaluate the contents of Relief Holder No. 2 to support feasibility study activities for the holder.	No analytical sample collected	No analytical sample collected								
GP-16	Located on 40 Willow Avenue parcel to evaluate the contents of Relief Holder No. 2 to support feasibility study activities for the holder.	No analytical sample collected	No analytical sample collected								

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
GP-17	Located on 40 Willow Avenue parcel to evaluate the contents of Relief Holder No. 2 to support feasibility study activities for the holder.	No analytical sample collected	No analytical sample collected								
GP-18	Located on 40 Willow Avenue parcel to evaluate the contents of Relief Holder No. 2 to support feasibility study activities for the holder.	No analytical sample collected	No analytical sample collected								
			Test Pits								
			Round 1 (February 1999 to April 1999)								
TP-10	Located within and adjacent to the former Relief Holder No. 2 on the 40 Willow Avenue parcel to evaluate its presence, contents, and integrity, and to support feasibility study activities for the holder.	CF-TP-10 (3)	Sample to evaluate soils at the observed water table within the 40 Willow Avenue holder.	•		• [BTEX only]	•	•	•		
TP-10A	Located within and adjacent to the former Relief Holder No. 2 on the 40 Willow Avenue parcel to evaluate its presence, contents, and integrity, and to support feasibility study activities for the holder.	CF-TP-10A (3)	Sample to evaluate soils at a perched water table and to evaluate tar-impacted soils within the former Relief Holder No.2.	•		• [BTEX only]	•	•	•		
			Round 2 (July 1999 to October 1999)								
No monitoring wells installed		No analytical sample collected	No analytical sample collected								
			Round 3 (November 1999 to December 1999)								
No monitoring wells installed		No analytical sample collected	No analytical sample collected								

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
Round 4 (November 2001 to January 2002)											
TP-12	Located within and adjacent to the former Relief Holder No. 2 on the 40 Willow Avenue parcel to evaluate its presence, contents, and integrity, and to support feasibility study activities for the holder.	No analytical sample collected	No analytical sample collected								
TP-13	Located within and adjacent to the former Relief Holder No. 2 on the 40 Willow Avenue parcel to evaluate its presence, contents, and integrity, and to support feasibility study activities for the holder.	No analytical sample collected	No analytical sample collected								
TP-14	Located within and adjacent to the former Relief Holder No. 2 on the 40 Willow Avenue parcel to evaluate its presence, contents, and integrity, and to support feasibility study activities for the holder.	No analytical sample collected	No analytical sample collected								
Round 5 (May 2002 to June 2002)											
No monitoring wells installed		No analytical sample collected	No analytical sample collected								
Surface-Soil Samples											
Round 1 (February to April 1999)											
SS-1, SS-2, SS-3, SS-4, SS-5	Surface soils to evaluate surface-soil conditions (0-6") on the unpaved portion of the 40 Willow Avenue parcel.	CF-SS-1 (0-0.5), CF-SS-2 (0-0.5), CF-SS-3 (0-0.5), CF-SS-4 (0-0.5) [Duplicate is CF-SS-06 (0-0.5)], CF-SS-5 (0-0.5)	Surface-soil samples were distributed around the area of the former Relief Holder No. 2.	•			•	•	•		

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
Round 2 (July to October 1999)											
SS-6	Surface-soil sample located at 63 Lynhurst Avenue to evaluate surface-soil quality on residential parcels.	CF-SS-6 (0-0.5)	Sample adjacent to chain-link fence to evaluate surface-soil conditions.	•		• [BTEX only]	•	•	•	•	•
SS-7	Surface-soil sample located at 61 Lynhurst Avenue to evaluate surface-soil quality on residential parcels.	CF-SS-7 (0-0.5)	Sample to evaluate surface-soil conditions.	•		• [BTEX only]	•	•	•	•	•
SS-8	Surface-soil sample located at 59 Lynhurst Avenue to evaluate surface-soil quality on residential parcels.	CF-SS-8 (0-0.5)	Sample to evaluate surface-soil conditions.	•		• [BTEX only]	•	•	•	•	•
SS-9	Surface-soil sample located at 55 Lynhurst Avenue to evaluate surface-soil quality on residential parcels.	CF-SS-9 (0-0.5)	Sample to evaluate surface-soil conditions.	•		• [BTEX only]	•	•	•	•	•
SS-10	Surface-soil sample located at 53 Lynhurst Avenue to evaluate surface-soil quality on residential parcels.	CF-SS-10 (0-0.5)	Sample to evaluate surface-soil conditions.	•		• [BTEX only]	•	•	•	•	•
SS-11	Surface-soil sample located at 51 Lynhurst Avenue to evaluate surface-soil quality on residential parcels.	CF-SS-11 (0-0.5)	Sample to evaluate surface-soil conditions.	•		• [BTEX only]	•	•	•	•	•
Round 3 (November-December 1999)											
SS-12, SS-14, SS-15, SS-16	Surface-soil samples that were co-located with borings SB-58, SB-60, SB-61, and SB-62 (30' from the 40 Willow Avenue parcel fence line) located on residential parcels at 49, 53, 55, and 59 Lynhurst Avenue, respectively, to further evaluate surface-soil quality on residential parcels.	CF-SS-12 (0-0.16), CF-SS-14 (0-0.16), CF-SS-15 (0-0.16), CF-SS-16 (0-0.16)	Surface-soil samples to evaluate soil conditions approximately 30' from the 40 Willow Avenue parcel fence line on the residential parcels at 49, 53, 55 and 59 Lynhurst Avenue.	•		• [BTEX only]	•	•	•		•

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
SS-19, SS-21, SS-22, SS-23	Surface-soil samples that were located approximately 60' from the 40 Willow Avenue parcel fence line on residential parcels at 49, 53, 55, and 59 Lynhurst Avenue parcels, respectively, to further evaluate the surface-soil quality on residential parcels.	CF-SS-19 (0-0.16), CF-SS-21 (0-0.16), CF-SS-22 (0-0.16), [Duplicate is CF-SS-52 (0-0.16)], CF-SS-23 (0-0.16)	Surface-soil samples to evaluate soil conditions approximately 60' from the 40 Willow Avenue parcel fence line on the residential parcels at 49, 53, 55 and 59 Lynhurst Avenue.	•		• [BTEX only]	•	•	•		•
SS-26, SS-28, SS-29, SS-30	Surface-soil samples located in the front yards of residential parcels at 49, 53, 55 and 59 Lynhurst Avenue to characterize surface-soil quality.	CF-SS-26 (0-0.16), CF-SS-28 (0-0.16), CF-SS-29 (0-0.16), CF-SS-30 (0-0.16)	Surface-soil samples to evaluate soil conditions in the front yards of the residential parcels located at 49, 53, 55 and 59 Lynhurst Avenue.	•		• [BTEX only]	•	•	•		•
SS-33, SS-34, SS-35, SS-36, SS-37, SS-38, SS-39, SS-40, SS-41, SS-42	Surface-soil samples in the vicinity of the site to establish background surface-soil conditions.	CF-SS-33 (0-0.16), CF-SS-34 (0-0.16), CF-SS-35 (0-0.16), CF-SS-36 (0-0.16), CF-SS-37 (0-0.16), CF-SS-38 (0-0.16), CF-SS-39 (0-0.16) [Duplicate is CF-SS-69 (0-0.16)], CF-SS-40 (0-0.16), CF-SS-41 (0-0.16), CF-SS-42 (0-0.16)	Surface-soil samples to evaluate background soil conditions in the vicinity of the former MGP site.	•		• [BTEX only]	•	•	•	•	•
Round 4 (November 2001 to January 2002)											
SSR-40, SSR-41, SSR-42	Surface soils located in the yard of the 61 Lynhurst Avenue parcel to characterize surface-soil quality.	CF-SS-40 (0-0.16), CF-SS-41 (0-0.16), CF-SS-42 (0-0.16) [Duplicate is CF-SS-420 (0-0.16)]	Surface-soil samples to evaluate soil conditions in the yard of the residential parcel located at 61 Lynhurst Avenue.	•				• [Lead Only]			

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
SSR-43, SSR-44, SSR-45	Surface soils located in the yard of the 63 Lynhurst Avenue parcel to characterize surface-soil quality.	CF-SS-43 (0-0.16), CF-SS-44 (0-0.16), CF-SS-45 (0-0.16)	Surface soils located in the yard of the 63 Lynhurst Avenue parcel to characterize surface-soil quality.	•				• [Lead Only]			
SSR-46, SSR-47, SSR-48	Surface soils located in the yard of the 67 Lynhurst Avenue parcel to characterize surface-soil quality.	CF-SS-46 (0-0.16), CF-SS-47 (0-0.16), CF-SS-48 (0-0.16)	Surface soils located in the yard of the 67 Lynhurst Avenue parcel to characterize surface-soil quality.	•				• [Lead Only]			
Round 5 (May 2002 to June 2002)											
SSR-43, SSR-44, SSR-59	Surface soils located in the back yard of the 63 Lynhurst Avenue parcel to characterize surface-soil quality.	SSR-43 (1) [Duplicate is SSR-430 (1)], SSR-43 (2,3), SSR-44 (1,2,3), SSR-59 (0-0.16) [Duplicate is SSR-599 (0-0.16)], SSR-59 (1,2,3)	Surface soils located in the back yard of the 63 Lynhurst Avenue parcel to characterize surface-soil quality.	•				• [Lead Only]			

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]
SSR-46, SSR-49, SSR-50, SSR-51, SSR-52, SSR-53, SSR-54, SSR-55, SSR-56, SSR-57, SSR-58	Surface soils located in the back yard of the 67 Lynhurst Avenue parcel to characterize surface-soil quality.	SSR-46 (1,2,3), SSR-49 (0-0.16), SSR-50 (0.5-0.75), SSR-50 (1,2), SSR-50 (3) [Duplicate is SSR-50 (4)], SSR-51 (0-0.16), SSR-52 (0-0.16), SSR-52 (0.5-0.75), SSR-52 (1,2,3), SSR-53 (0-0.16), SSR-54 (0.5-0.75), SSR-54 (1,2,3), SSR-55 (0-0.16), SSR-56 (0.5-0.75), SSR-56 (1,2,3), SSR-57 (0-0.16), SSR-58 (0.5-0.75)	Surface soils located in the back yard of the 67 Lynhurst Avenue parcel to characterize surface-soil quality.	•				• [Lead Only]			
SSR-60, SSR-61, SSR-62, SSR-63	Surface soils located in the back yard of the 51 Lynhurst Avenue parcel to characterize surface-soil quality.	SSR-60 (0-0.16), SSR-60 (1,2,3), SSR-61 (0-0.16), SSR-61 (1,2), SSR-61 (3) [Duplicate is SSR-611 (3)], SSR-62 (0-0.16), SSR-62 (1,2,3), SSR-63 (0-0.16), SSR-63 (1,2,3)	Surface soils located in the back yard of the 51 Lynhurst Avenue parcel to characterize surface-soil quality.	•				• [Lead Only]			

Table 2-1
Sample Collection Rationale
OU-1
Clifton Former MGP Site

Sample ID	Sample Location/Rationale	Laboratory Sample Designation (Sample Depth Feet)	Selected Soil Sample Interval Rationale	Sample Type		Analysis[1]					
				Soil	Water	VOCs[2]	SVOCs[3]	Metals[4]	TCN[5]	Grain Size[6]	TOC[7]

Notes:

1. All test methods specified are from EPA SW-846.
2. VOCs refer to volatile organic compounds (EPA Method 8260A/8260B).
3. SVOCs refer to semivolatile organic compounds (EPA Method 8270B/8270C).
4. RCRA 8 Metals analyzed are as follows: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver (both mass analysis and EPA Method 6010).
5. TCN stands for total cyanide (EPA Method 9012A).
6. Grain size was analyzed by ASTM Method D-422.
7. TOC stands for total organic carbon (EPA Method 9060).
8. Polychlorinated biphenyl (PCB) and pesticide analyses were completed by EPA Method 8081. Salinity was analyzed by EPA Method 2520B. Total dissolved solids were analyzed by EPA Method 160.1 during Round 1.
9. Dewatering parameters completed within Round 5 include hexavalent chromium, copper, nickel, zinc (EPA Method 6010), PCBs (EPA Method 8082), amenable cyanide (EPA Method 335.1), total petroleum hydrocarbons (EPA Method 418.1), hardness (EPA Method A2340B), total suspended solids (EPA 160.2), total dissolved solids (EPA Method (60.1), flashpoint (EPA Method 1010), and pH (EPA Method 9040).
10. Round 1 groundwater samples were collected from RI-installed monitoring wells RW-4 and RW-7. Groundwater samples were analyzed for VOCs, SVOCs, RCRA 8 metals, TCN, PCBs, salinity, and total dissolved solids.
11. Round 2 groundwater samples were collected from RI-installed monitoring wells RW-4 and RW-14. Groundwater samples were analyzed for VOCs, SVOCs, RCRA-8 metals, and TCN.
12. Round 4 groundwater samples were collected from previously installed piezometer PZ-3 and newly installed piezometers PZ-4A, PZ-TP-13. Groundwater samples were analyzed for VOCs, SVOCs, TCN, RCRA-8 metals, and dewatering parameters.
13. Round 5 groundwater samples were collected from newly installed temporary piezometers PZ-5 through PZ-12. Samples were collected for VOCs and SVOCs.

Table 2-2
OU-1 Monitoring Well Data
Clifton Former MGP Site

Piezometer	Location	Measuring Point (NAVD 88 and NGVD 83)	Ground Surface	Screened Interval	Well Diameter	Round 1 - April 1999				Round 2 - October 1999				Round 4	Round 5
						High Tide		Low Tide		High Tide		Low Tide			
						3/31/2002	4/1/2002	3/31/2002	4/1/2002	10/12/2002	10/13/2002	10/12/2002	10/13/2002	1/17/2002	6/14/2002
RW-4	40 Willow Avenue	10.15	10.15	-69.85 to -78.85	2"	NM	NM	NM	NM	13.03	13.13	12.44	12.54	NM	NM
RW-7	40 Willow Avenue	12.8	12.8	-52.20 to -62.20	2"	NM	NM	NM	NM	13.62	13.5	13.42	13.24	NM	NM
RW-14	40 Willow Avenue	13.0	12.82	-106 to -116	4"	NM	NM	NM	NM	13.3	13.52	12.95	12.88	NM	NM
FPM-MW-01*	40 Willow Avenue	11.12	10.7	10.7 to -12.97	4"	NM	NM	NM	NM	9.31	9.25	9.31	9.29	9.1	NM
FPM-MW-02	40 Willow Avenue	11.17	10.7	10.7 to -9.41	4"	9.04	9.01	9.1	9.01	NM	NM	NM	NM	NM	9.02
FPM-MW-03	40 Willow Avenue	NM	NM	NM	4"	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
PZ-2	40 Willow Avenue	9.9	10.05	7.9 to -2.10	1"	NM	NM	NM	NM	7.46	7.42	7.46	7.39	7.04	7.8
PZ-3	40 Willow Avenue	12.59	12.8	10.59 to 0.59	1"	NM	NM	NM	NM	11.21	11.18	11.21	11.22	10.91	11.18
PZ-4A	40 Willow Avenue	14.17[2]	13.17[1]	9.17 to 4.17	1"	NI	NI	NI	NI	NI	NI	NI	NI	7.86[3]	7.78
PZ-TP-13	40 Willow Avenue	15.11	12.11[1]	0.11 to 10.11	1"	NI	NI	NI	NI	NI	NI	NI	NI	10.2	10.2
PZ-5	51 Lynhurst Avenue	16	12.56	11.00 to 6.00	1"	NI	NI	NI	NI	NI	NI	NI	NI	NI	9.5
PZ-6	53 Lynhurst Avenue	13.98	12.48[1]	10.48 to 5.48	1"	NI	NI	NI	NI	NI	NI	NI	NI	NI	10.2
PZ-7	55 Lynhurst Avenue	15.02	13.52[1]	12.02 to 6.52	1"	NI	NI	NI	NI	NI	NI	NI	NI	NI	10.61
PZ-8	59 Lynhurst Avenue	15.74	14.74[1]	12.74 to 6.34	1"	NI	NI	NI	NI	NI	NI	NI	NI	NI	10.67
PZ-9	61 Lynhurst Avenue	15.73	14.23	10.73 to 5.73	1"	NI	NI	NI	NI	NI	NI	NI	NI	NI	11.65[4]
PZ-10	63 Lynhurst Avenue	16.21	14.66	11.46 to 6.46	1"	NI	NI	NI	NI	NI	NI	NI	NI	NI	9.86
PZ-11	49 Lynhurst Avenue	13.27	11.77[1]	9.77 to 4.77	1"	NI	NI	NI	NI	NI	NI	NI	NI	NI	8.5
PZ-12	67 Lynhurst Avenue	17.5[5]	16	13.5 to 8.5	1"	NI	NI	NI	NI	NI	NI	NI	NI	NI	11.15

Notes:

Prepared by: LEW
Checked by: BL

NI- indicates not installed
NM - indicates not measured
NAVD 88 - indicates National Astronomic Vertical Datum 1988
NGVD 83 - indicates National Geodetic Vertical Datum 1983
[1] Indicates ground elevation was determined by top of riser (measuring point elevation) and piezometer construction.
[2] Indicates that measuring point elevation for PZ-4A was obtained by utilizing the ground elevation from boring GP-10 and piezometer construction.
[3] Water elevation listed was collected on January 18, 2002.
[4] Water level listed was collected on June 7, 2002.
[5] Indicates the measuring point was determined by grand elevation and piezometer construction.
*FRM - MW-1 was inaccessible during the Round 1 survey. The top of riser and ground surface elevations were estimated based on surrounding points.
Piezometers PZ-5 through PZ-12 were temporary monitoring points installed in Round 5. Following sample collection, the piezometers were abandoned.

Table 3-1
Geologic Units Encountered During the Remedial Investigation
Clifton Former MGP Site

Unit	Description
Fill	
Fill	Fill including slag, coal fragments, wood fragments, bricks, concrete fragments, steel, some sands, gravels, and silts.
Alluvial/Marsh Deposits	
Gravelly Sand	Gray to brown, gravelly-SAND, some coarse sand, silty, or with fine sand.
Sand (shallow)	Brown to red-brown SAND, few coarse to very coarse sand, trace silt.
Silt (shallow)	Tan to brown, SILT, shallow depths, trace to some fine sand.
Silt-Clay	Gray to dark brown, olive-green to black, silty-CLAY, clayey-SILT, cohesive.
Gravely-Silt	Grey, gravelly-SILT to silty-GRAVEL, trace fine sand and cobble, wet.
Peat	Brown, PEAT, including organic wood material deposited in swamps.
Glacial Deposits	
Silt (deep)	Red to red-brown, SILT, lesser amounts of sand and gravel, dense, dry to moist (Ground Moraine).
Silt-Sand	Red-brown, silty-SAND to sandy-SILT, loose to dense, moist to wet (Ground Moraine).
Sand-Silt-Clay	Red-brown, SAND-SILT-CLAY mixture, trace cobbles and gravels, dense (Harbor Hill Terminal Moraine).
Silt-Clay	Red-brown, silty-CLAY, lesser amounts of sand and trace gravels (Harbor Hill Terminal Moraine).
Sand (deep)	Red-brown, SAND, loose, located at deeper depths (Glacial fluvial).
Gravely-Sand	Gray to brown, gravelly-SAND, some coarse sand, silty, or with fine sand. (Glacial fluvial)
Cobble Zone	Inferred COBBLE ZONE encountered during drilling (Harbor Hill Terminal Moraine).
Weathered Bedrock	
Saprolite	Red-brown, CLAY with relict mineral layers, dense, dry.
Micaceous Sand	Gray, fine to medium SAND, some clay, some fine mica flakes.
Micaceous Silt	Brown, SILT, some gravel with mica flakes.

Table 3-2
Hydraulic Conductivity Values
OU-1
Clifton Former MGP Site

Well	Lithology of Screen Section	K (ft/day)	K (cm/sec)	Standard K values (cm/sec) (after Freeze and Cherry, 1979)
Single Well Slug Out Hydraulic Conductivity Test Results (Bouwer & Rice Method) [1]				
RW-03	Sandy silts and silty sands.	1.4	5.0 E-04	1 E-05 to 1 E-01
RW-06	Silty fine sand. Trace gravel.	6.9	2.4 E-03	1 E-05 to 1 E-01
RW-12	Sandy silts and silty sands.	0.9	3.2 E-04	1 E-05 to 1 E-01
Single Well Pump Test Results (Theis Method)				
RW-4	Silty fine to coarse sand.	2.4	8.7 E-04	1E-05 to 1E-01

Notes:
[1]No slug tests were completed on OU-1 within the shallow groundwater aquifer. Slug tests presented on this table were completed on OU-2 within similar groundwater aquifer materials.

Table 4-1
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		40 Willow Avenue Parcel					
Site ID:	New York Recommended	SS-01	SS-02	SS-03	SS-04	SS-04 (dup)	SS-05
Depth (ft):	Soil Cleanup	(0-0.5)	(0-0.5)	(0-0.5)	(0-0.5)	(0-0.5)	(0-0.5)
Sample ID:	Objectives	CF-SS1	CF-SS2	CF-SS3	CF-SS4	CF-SS6	CF-SS5
Constituent Date:	(RSCOs)	02/26/1999	02/26/1999	02/26/1999	02/26/1999	02/26/1999	02/26/1999
Volatile Organic Compounds (ug/kg)							
BTEX							
Benzene	60	NA	NA	NA	NA	NA	NA
Toluene	1500	NA	NA	NA	NA	NA	NA
Ethylbenzene	5500	NA	NA	NA	NA	NA	NA
Xylene	1200	NA	NA	NA	NA	NA	NA
Total BTEX		--	--	--	--	--	--
Semivolatile Organic Compounds (ug/kg)							
Non-Carcinogenic PAHs							
2-Methylnaphthalene	36400	350 J	7200 J	480 J	3800 U	410 J	3800 U
Acenaphthene	50000	450 J	1500 U	220 J	3800 U	160 J	3800 U
Acenaphthylene	41000	3700	2000 J	5800	480 J	4900	2000 J
Anthracene	50000	960	1500	2100 J	3800 U	2000 J	3800 UJ
Benzo(g,h,i)perylene	50000	850 J	2100	1800 J	9600	2400 J	2200 J
Fluoranthene	50000	1100	2800 J	4500	1200 J	8700	4000 J
Fluorene	50000	62 J	1500 U	280 J	3800 U	270 J	3800 U
Naphthalene	13000	900	7200	3100 U	3800 U	3800 U	2700 J
Phenanthrene	50000	750 U	6000	3100	3600 J	3800	26000 J
Pyrene	50000	3400	6400 J	11000	24000	15000	13000
Total Non-Carcinogenic PAHs		11,772	35,200	29,280	38,880	37,640	49,900
Carcinogenic PAHs							
Benz(a)anthracene	224	**1100**	**2800 J**	**4700**	**8100**	**7400**	**5600**
Benzo(a)pyrene	61	**1400 J**	**3400**	**5900**	**7500**	**8300**	**4600**
Benzo(b)fluoranthene	1100	**2300 J**	**1600**	**4500**	**5400**	**8400**	**3200 J**
Benzo(k)fluoranthene	1100	**3300 J**	920 J	**4500**	**3200 J**	**7400**	**1200 J**
Chrysene	400	**1600**	**3700 J**	**5400**	**9400**	**8200**	**9300**
Dibenz(a,h)anthracene	14	**270 J**	**800 J**	**770 J**	**3800**	**1100 J**	**1000 J**
Indeno(1,2,3-cd)pyrene	3200	690 J	1800	1500 J	**8400**	2500 J	2200 J
Total Carcinogenic PAHs		10,660	15,020	27,270	45,800	43,300	27,100
Total PAHs		22,432	50,220	56,550	84,680	80,940	77,000
Other Semivolatile Organic Compounds							
2,4-Dimethylphenol	NE	58 J	1500 U	3100 U	3800 U	3800 U	3800 U
3-Nitroaniline	500	3600 U	7300 U	15000 U	18000 U	18000 U	18000 U
4-Methylphenol	900	750 U	1500 U	3100 U	3800 U	3800 U	3800 U
Benzoic acid	2700	3600 U	7300 U	15000 U	18000 U	18000 U	18000 U
Benzyl alcohol	NE	750 U	1500 U	3100 U	3800 U	3800 U	3800 U
Butylbenzylphthalate	50000	750 U	1500 UJ	3100 U	3800 U	3800 U	3800 U

Table 4-1 (continued)
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		40 Willow Avenue Parcel					
Site ID:	New York Recommended	SS-01	SS-02	SS-03	SS-04	SS-04 (dup)	SS-05
Depth (ft):	Soil Cleanup	(0-0.5)	(0-0.5)	(0-0.5)	(0-0.5)	(0-0.5)	(0-0.5)
Sample ID:	Objectives	CF-SS1	CF-SS2	CF-SS3	CF-SS4	CF-SS6	CF-SS5
Constituent Date:	(RSCOs)	02/26/1999	02/26/1999	02/26/1999	02/26/1999	02/26/1999	02/26/1999
Carbazole	NE	50 J	1500 U	3100 U	3800 U	3800 J	3800 UJ
Di-n-butylphthalate	8100	750 U	1500 U	3100 U	3800 U	3800 U	3800 UJ
Dibenzofuran	6200	140 J	1500 U	3100 U	3800 U	3800 J	3800 U
Hexachlorobenzene	410	750 U	1500 U	3100 U	3800 U	3800 U	3800 UJ
Isophorone	4400	750 U	1500 U	3100 U	3800 U	3800 U	3800 U
bis(2-Ethylhexyl)phthalate	50000	79 J	1500 J	3100 U	3800 U	3800 J	3800 U
Metals (mg/kg)							
Arsenic	7.5*	**12.9**	5.9 J	3.5 J	6.5 J	6.9 J	**9.7**
Barium	300*	66.8	70.0	59.9	74.1	85.1	97.6
Cadmium	1*	0.71 J	0.57 J	0.3 J	0.55 J	0.58 J	0.42 J
Chromium	10*	**26.9**	**36.7**	**34.6**	**32.2**	**29.6**	**26.4**
Lead	500*	187	113	98.6	186	179	383
Mercury	0.1	**0.38**	**0.16**	**0.47**	**0.52**	**0.59**	**0.28**
Selenium	2*	**2.6**	1.7	0.82 B	1.9	**2.3**	**3.0**
Silver	NE*	0.35 U	0.36 U	0.37 U	0.41 U	0.36 U	0.28 U
Total Cyanide (mg/kg)							
Cyanide (Total)	NE*	33.6	7.39	0.575 U	12 J	4.86 J	11.6
Total Organic Carbon (mg/kg)							
TOC	NE*	NA	NA	NA	NA	NA	NA

Table 4-1
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		49 Lynhurst Avenue			51 Lynhurst Avenue		
Site ID:	New York Recommended	SS-12	SS-19	SS-26	SS-11	SSR-60	SSR-60
Depth (ft):	Soil Cleanup	(0-0.16)	(0-0.16)	(0-0.16)	(0-0.5)	(0-0.16)	(1)
Sample ID:	Objectives	CF-SS-12	CF-SS-19	CF-SS-26	SS-11 0-6	SSR-60	SSR-60
Constituent Date:	(RSCOs)	11/30/1999	11/30/1999	11/30/1999	07/29/1999	5/6/2002	6/6/2002
Volatile Organic Compounds (ug/kg)							
BTEX							
Benzene	60	0.6 J	8 U	7 U	6 U	NA	NA
Toluene	1500	0.3 J	8 UJ	7 U	6 U	NA	NA
Ethylbenzene	5500	6 U	8 UJ	7 U	6 U	NA	NA
Xylene	1200	6 U	8 UJ	7 U	6 U	NA	NA
Total BTEX		0.9	0	0	0	–	–
Semivolatile Organic Compounds (ug/kg)							
Non-Carcinogenic PAHs							
2-Methylnaphthalene	36400	25 J	970 U	970 U	9 J	NA	NA
Acenaphthene	50000	30 J	970 U	970 U	13 J	NA	NA
Acenaphthylene	41000	310 J	120 J	220 J	59 J	NA	NA
Anthracene	50000	280 J	150 J	240 J	50 J	NA	NA
Benzo(g,h,i)perylene	50000	110 J	160 J	200 J	160 J	NA	NA
Fluoranthene	50000	1200	870 J	1800	380 J	NA	NA
Fluorene	50000	51 J	970 U	64 J	5 J	NA	NA
Naphthalene	13000	27 J	31 J	29 J	12 J	NA	NA
Phenanthrene	50000	780	520 J	730 J	180 J	NA	NA
Pyrene	50000	1400	910 J	1900	480 J	NA	NA
Total Non-Carcinogenic PAHs		4,213	2,761	5,183	1,348	–	–
Carcinogenic PAHs							
Benz(a)anthracene	224	**810**	**390 J**	**980**	**280 J**	NA	NA
Benzo(a)pyrene	61	**740**	**470 J**	**1100**	**340 J**	NA	NA
Benzo(b)fluoranthene	1100	620	440 J	**1100**	460 J	NA	NA
Benzo(k)fluoranthene	1100	**1200 J**	760 J	**1800 J**	380 J	NA	NA
Chrysene	400	**940**	**640 J**	**1400**	360 J	NA	NA
Dibenz(a,h)anthracene	14	**61 J**	**83 J**	**87 J**	**46 J**	NA	NA
Indeno(1,2,3-cd)pyrene	3200	170 J	200 J	280 J	140 J	NA	NA
Total Carcinogenic PAHs		4,541	2,983	6,747	2,006	–	–
Total PAHs		8,754	5,744	11,930	3,354	–	–
Other Semivolatile Organic Compounds							
2,4-Dimethylphenol	NE	400 U	970 U	970 U	740 U	NA	NA
3-Nitroaniline	500	2000 U	4700 U	4700 U	3600 UR	NA	NA
4-Methylphenol	900	400 U	970 U	970 U	740 U	NA	NA
Benzoic acid	2700	72 J	200 J	280 J	23 J	NA	NA
Benzyl alcohol	NE	400 U	140 J	970 U	740 U	NA	NA
Butylbenzylphthalate	50000	29 J	220 J	170 J	40 J	NA	NA

Table 4-1 (continued)
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		49 Lynhurst Avenue			51 Lynhurst Avenue		
Site ID:	New York Recommended	SS-12	SS-19	SS-26	SS-11	SSR-60	SSR-60
Depth (ft):	Soil Cleanup	(0-0.16)	(0-0.16)	(0-0.16)	(0-0.5)	(0-0.16)	(1)
Sample ID:	Objectives	CF-SS-12	CF-SS-19	CF-SS-26	SS-11 0-6	SSR-60	SSR-60
Constituent Date:	(RSCOs)	11/30/1999	11/30/1999	11/30/1999	07/29/1999	5/6/2002	6/6/2002
Carbazole	NE	95 J	92 J	150 J	29 J	NA	NA
Di-n-butylphthalate	8100	400 U	1300 B	970 U	740 U	NA	NA
Dibenzofuran	6200	23 J	970 U	970 U	8 J	NA	NA
Hexachlorobenzene	410	400 U	970 U	970 U	740 U	NA	NA
Isophorone	4400	400 U	970 U	970 U	740 U	NA	NA
bis(2-Ethylhexyl)phthalate	50000	400 U	3300 B	1200 B	740 U	NA	NA
Metals (mg/kg)							
Arsenic	7.5*	**13.2**	7.4	6.5	5.9	NA	NA
Barium	300*	**537**	273	97.2	110	NA	NA
Cadmium	1*	**2.1**	**2.2**	0.84 B	**1.8 J**	NA	NA
Chromium	10*	**41.2**	**34.1**	**23**	**23.5 J**	NA	NA
Lead	500*	**2740 J**	**948 J**	362 J	307 J	**566**	217
Mercury	0.1	**0.41 J**	**0.73 J**	**0.3 J**	**0.33**	NA	NA
Selenium	2*	1.9	**2.7**	**2.7**	0.84 UJ	NA	NA
Silver	NE*	0.45 J	0.74 J	0.25 U	0.17 U	NA	NA
Total Cyanide (mg/kg)							
Cyanide (Total)	NE*	0.59 UJ	0.71 UJ	0.72 UJ	0.775 U	NA	NA
Total Organic Carbon (mg/kg)							
TOC	NE*	50200 J	118000 J	71700 J	49800	NA	NA

Table 4-1
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		51 Lynhurst Avenue							
Site ID:	New York Recommended	SSR-60	SSR-60	SSR-61	SSR-61	SSR-61	SSR-61	SSR-61 (dup)	SSR-62
Depth (ft):	Soil Cleanup	(2)	(3)	(0-0.16)	(1)	(2)	(3)	(3)	(0-0.16)
Sample ID:	Objectives	SSR-60	SSR-60	SSR-61	SSR-61	SSR-61	SSR-61	SSR-611	SSR-62
Constituent Date:	(RSCOs)	6/6/2002	6/6/2002	5/6/2002	6/6/2002	6/6/2002	6/6/2002	6/6/2002	5/6/2002
Volatile Organic Compounds (ug/kg)									
BTEX									
Benzene	60	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	1500	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	5500	NA	NA	NA	NA	NA	NA	NA	NA
Xylene	1200	NA	NA	NA	NA	NA	NA	NA	NA
Total BTEX		–	–	–	–	–	–	–	–
Semivolatile Organic Compounds (ug/kg)									
Non-Carcinogenic PAHs									
2-Methylnaphthalene	36400	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	50000	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	41000	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	50000	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	50000	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	50000	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	50000	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	13000	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	50000	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	50000	NA	NA	NA	NA	NA	NA	NA	NA
Total Non-Carcinogenic PAHs		–	–	–	–	–	–	–	–
Carcinogenic PAHs									
Benz(a)anthracene	224	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	61	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1100	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	1100	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	400	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	14	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	3200	NA	NA	NA	NA	NA	NA	NA	NA
Total Carcinogenic PAHs		–	–	–	–	–	–	–	–
Total PAHs		–	–	–	–	–	–	–	–
Other Semivolatile Organic Compounds									
2,4-Dimethylphenol	NE	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	500	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	900	NA	NA	NA	NA	NA	NA	NA	NA
Benzoic acid	2700	NA	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NE	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	50000	NA	NA	NA	NA	NA	NA	NA	NA

Table 4-1 (continued)
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		51 Lynhurst Avenue							
Site ID:	New York Recommended	SSR-60	SSR-60	SSR-61	SSR-61	SSR-61	SSR-61	SSR-61 (dup)	SSR-62
Depth (ft):	Soil Cleanup	(2)	(3)	(0-0.16)	(1)	(2)	(3)	(3)	(0-0.16)
Sample ID:	Objectives	SSR-60	SSR-60	SSR-61	SSR-61	SSR-61	SSR-61	SSR-611	SSR-62
Constituent Date:	(RSCOs)	6/6/2002	6/6/2002	5/6/2002	6/6/2002	6/6/2002	6/6/2002	6/6/2002	5/6/2002
Carbazole	NE	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	8100	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	6200	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	410	NA	NA	NA	NA	NA	NA	NA	NA
Isophorone	4400	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	50000	NA	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)									
Arsenic	7.5*	NA	NA	NA	NA	NA	NA	NA	NA
Barium	300*	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	1*	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	10*	NA	NA	NA	NA	NA	NA	NA	NA
Lead	500*	**639**	21.3	**696**	**864**	**1010**	385	273	414
Mercury	0.1	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	2*	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NE*	NA	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)									
Cyanide (Total)	NE*	NA	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon (mg/kg)									
TOC	NE*	NA	NA	NA	NA	NA	NA	NA	NA

Table 4-1
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		51 Lynhurst Avenue						
Site ID:	New York Recommended	SSR-62	SSR-62	SSR-62	SSR-63	SSR-63	SSR-63	SSR-63
Depth (ft):	Soil Cleanup	(1)	(2)	(3)	(0-0.16)	(1)	(2)	(3)
Sample ID:	Objectives	SSR-62	SSR-62	SSR-62	SSR-63	SSR-63	SSR-63	SSR-63
Constituent Date:	(RSCOs)	6/6/2002	6/6/2002	6/6/2002	5/6/2002	6/6/2002	6/6/2002	6/6/2002
Volatile Organic Compounds (ug/kg)								
BTEX								
Benzene	60	NA	NA	NA	NA	NA	NA	NA
Toluene	1500	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	5500	NA	NA	NA	NA	NA	NA	NA
Xylene	1200	NA	NA	NA	NA	NA	NA	NA
Total BTEX		–	–	–	–	–	–	–
Semivolatile Organic Compounds (ug/kg)								
Non-Carcinogenic PAHs								
2-Methylnaphthalene	36400	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	50000	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	41000	NA	NA	NA	NA	NA	NA	NA
Anthracene	50000	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	50000	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	50000	NA	NA	NA	NA	NA	NA	NA
Fluorene	50000	NA	NA	NA	NA	NA	NA	NA
Naphthalene	13000	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	50000	NA	NA	NA	NA	NA	NA	NA
Pyrene	50000	NA	NA	NA	NA	NA	NA	NA
Total Non-Carcinogenic PAHs		–	–	–	–	–	–	–
Carcinogenic PAHs								
Benz(a)anthracene	224	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	61	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1100	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	1100	NA	NA	NA	NA	NA	NA	NA
Chrysene	400	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	14	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	3200	NA	NA	NA	NA	NA	NA	NA
Total Carcinogenic PAHs		–	–	–	–	–	–	–
Total PAHs		–	–	–	–	–	–	–
Other Semivolatile Organic Compounds								
2,4-Dimethylphenol	NE	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	500	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	900	NA	NA	NA	NA	NA	NA	NA
Benzoic acid	2700	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NE	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	50000	NA	NA	NA	NA	NA	NA	NA

Table 4-1 (continued)
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		51 Lynhurst Avenue						
Site ID:	New York Recommended	SSR-62	SSR-62	SSR-62	SSR-63	SSR-63	SSR-63	SSR-63
Depth (ft):	Soil Cleanup	(1)	(2)	(3)	(0-0.16)	(1)	(2)	(3)
Sample ID:	Objectives	SSR-62	SSR-62	SSR-62	SSR-63	SSR-63	SSR-63	SSR-63
Constituent Date:	(RSCOs)	6/6/2002	6/6/2002	6/6/2002	5/6/2002	6/6/2002	6/6/2002	6/6/2002
Carbazole	NE	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	8100	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	6200	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	410	NA	NA	NA	NA	NA	NA	NA
Isophorone	4400	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	50000	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)								
Arsenic	7.5*	NA	NA	NA	NA	NA	NA	NA
Barium	300*	NA	NA	NA	NA	NA	NA	NA
Cadmium	1*	NA	NA	NA	NA	NA	NA	NA
Chromium	10*	NA	NA	NA	NA	NA	NA	NA
Lead	500*	**1510**	**949**	89.3	346	**1450**	**908**	**1240**
Mercury	0.1	NA	NA	NA	NA	NA	NA	NA
Selenium	2*	NA	NA	NA	NA	NA	NA	NA
Silver	NE*	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)								
Cyanide (Total)	NE*	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon (mg/kg)								
TOC	NE*	NA	NA	NA	NA	NA	NA	NA

Table 4-1
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		53 Lynhurst Avenue				55 Lynhurst Avenue		
Site ID:	New York Recommended	SS-10	SS-14	SS-21	SS-28	SS-09	SS-15	SS-22
Depth (ft):	Soil Cleanup	(0-0.5)	(0-0.16)	(0-0.16)	(0-0.16)	(0-0.5)	(0-0.16)	(0-0.16)
Sample ID:	Objectives	SS-10	CF-SS-14	CF-SS-21	CF-SS-28	SS-9 0-6	CF-SS-15	CF-SS-22
Constituent Date:	(RSCOs)	07/29/1999	11/30/1999	11/30/1999	11/30/1999	07/29/1999	11/30/1999	11/30/1999
Volatile Organic Compounds (ug/kg)								
BTEX								
Benzene	60	5 U	7 UJ	0.7 J	6 U	0.5 J	6 U	6 U
Toluene	1500	5 U	7 UJ	6 U	6 U	0.4 J	6 U	0.4 J
Ethylbenzene	5500	5 U	7 UJ	6 U	6 U	5 U	6 U	6 U
Xylene	1200	5 U	7 UJ	6 U	6 U	5 U	6 U	5 U
Total BTEX		0	0	0.7	0	0.9	0	0.4
Semivolatile Organic Compounds (ug/kg)								
Non-Carcinogenic PAHs								
2-Methylnaphthalene	36400	45 J	84 J	18 J	380 U	68 J	45 J	45 J
Acenaphthene	50000	32 J	76 J	22 J	380 U	24 J	26 J	410 U
Acenaphthylene	41000	160 J	330 J	95 J	30 J	300 J	140 J	160 J
Anthracene	50000	130 J	380 J	120 J	29 J	190 J	110 J	110 J
Benzo(g,h,i)perylene	50000	480 J	130 J	66 J	50 J	600 J	170 J	160 J
Fluoranthene	50000	1000	1500	500	140 J	1900	510	490
Fluorene	50000	25 J	67 J	19 J	380 U	48 J	24 J	410 U
Naphthalene	13000	52 J	68 J	20 J	380 U	82 J	56 J	46 J
Phenanthrene	50000	600 J	1100	410	100 J	1300	460	330 J
Pyrene	50000	1800 J	1600	880 J	250 J	2900	830 J	740 J
Total Non-Carcinogenic PAHs		4,324	5,335	2,150	599	7,412	2,371	2,081
Carcinogenic PAHs								
Benz(a)anthracene	224	**560 J**	**940**	**400 J**	120 J	**1100**	**340 J**	**330 J**
Benzo(a)pyrene	61	**650 J**	**1000**	**370 J**	**110 J**	**1100 J**	**320 J**	**320 J**
Benzo(b)fluoranthene	1100	850 J	**1100**	270 J	75 J	**1400 J**	250 J	260 J
Benzo(k)fluoranthene	1100	1000 J	**1600 J**	280 J	93 J	**1300 J**	280 J	350 J
Chrysene	400	**870 J**	**1300**	**640 J**	190 J	**1600**	**590 J**	**640 J**
Dibenz(a,h)anthracene	14	**130 J**	**67 J**	**32 J**	380 UJ	**200 J**	**83 J**	**72 J**
Indeno(1,2,3-cd)pyrene	3200	360 J	190 J	82 J	50 J	530 J	180 J	170 J
Total Carcinogenic PAHs		4,420	6,197	2,074	638	7,230	2,043	2,142
Total PAHs		8,744	11,532	4,224	1,237	14,642	4,414	4,223
Other Semivolatile Organic Compounds								
2,4-Dimethylphenol	NE	750 U	460 U	400 U	380 U	780 U	420 U	410 U
3-Nitroaniline	500	3600 U	2200 U	2000 U	1800 U	3800 UR	2000 U	2000 U
4-Methylphenol	900	750 U	460 U	400 U	380 U	8 J	420 U	410 U
Benzoic acid	2700	70 J	290 J	31 J	1800 U	3800 U	2000 U	45 J
Benzyl alcohol	NE	750 U	460 U	400 U	380 U	780 U	420 U	410 U
Butylbenzylphthalate	50000	260 J	160 J	400 UJ	380 UJ	22 J	420 UJ	53 J

Table 4-1 (continued)
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		53 Lynhurst Avenue				55 Lynhurst Avenue		
Site ID:	New York Recommended	SS-10	SS-14	SS-21	SS-28	SS-09	SS-15	SS-22
Depth (ft):	Soil Cleanup	(0-0.5)	(0-0.16)	(0-0.16)	(0-0.16)	(0-0.5)	(0-0.16)	(0-0.16)
Sample ID:	Objectives	SS-10	CF-SS-14	CF-SS-21	CF-SS-28	SS-9 0-6	CF-SS-15	CF-SS-22
Constituent Date:	(RSCOs)	07/29/1999	11/30/1999	11/30/1999	11/30/1999	07/29/1999	11/30/1999	11/30/1999
Carbazole	NE	77 J	130 J	24 J	380 U	95 J	28 J	26 J
Di-n-butylphthalate	8100	750 U	460 U	400 U	380 U	780 UJ	420 U	410 U
Dibenzofuran	6200	23 J	52 J	10 J	380 U	26 J	16 J	17 J
Hexachlorobenzene	410	400 J	460 U	400 U	380 U	780 U	420 U	410 U
Isophorone	4400	750 U	460 U	400 U	380 U	780 U	420 U	410 U
bis(2-Ethylhexyl)phthalate	50000	1400 J	1400 B	300 J	270 J	780 U	240 J	360 J
Metals (mg/kg)								
Arsenic	7.5*	**7.7**	**9.0**	**13.1**	5.0	**10.4**	**12.9**	**13.5**
Barium	300*	264	205	123	61.3	199	230	132
Cadmium	1*	**4.7 J**	**1.9**	**1.1 J**	0.22 UR	**2.9 J**	0.21 UR	0.2 UR
Chromium	10*	**38 J**	**44.7**	**26.0**	**25.9**	**42.6 J**	**39.5**	**40.0**
Lead	500*	**2400 J**	**1410 J**	439	162	**584 J**	483	435
Mercury	0.1	**0.46**	**0.43 J**	**0.59 J**	**0.13 J**	**0.45**	**0.4 J**	**0.48 J**
Selenium	2*	1.3 J	**3.0**	**2.2**	1.3	1.3 J	**2.0**	**3.1**
Silver	NE*	0.38 J	0.31 J	0.21 UJ	0.22 UJ	0.2 J	0.21 UJ	0.2 UJ
Total Cyanide (mg/kg)								
Cyanide (Total)	NE*	1.40	0.68 UJ	0.61 UJ	0.59 UJ	1.94	0.64 UJ	0.65 UJ
Total Organic Carbon (mg/kg)								
TOC	NE*	128000	83000 J	106000 J	22000 J	71200	74900 J	59200 J

Table 4-1
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		55 Lynhurst Avenue			59 Lynhurst Avenue			
Site ID:	New York Recommended	SS-22 (dup)	SS-22 (dup)	SS-29	SS-08	SS-16	SS-23	SS-30
Depth (ft):	Soil Cleanup	(0-0.16)	(0-0.16)	(0-0.16)	(0-0.5)	(0-0.16)	(0-0.16)	(0-0.16)
Sample ID:	Objectives	CF-SS-52	CF-SS-52RE	CF-SS-29	SS-8 0-6	CF-SS-16	CF-SS-23	CF-SS-30
Constituent Date:	(RSCOs)	11/30/1999	11/30/1999	11/30/1999	07/29/1999	11/30/1999	11/30/1999	11/30/1999
Volatile Organic Compounds (ug/kg)								
BTEX								
Benzene	60	6 U	NA	0.6 J	5 U	0.7 J	6 U	8 UJ
Toluene	1500	6 U	NA	0.4 J	5 UJ	1 J	6 U	8 UJ
Ethylbenzene	5500	6 U	NA	0.5 J	5 UJ	0.7 J	6 U	8 UJ
Xylene	1200	6 U	NA	6 U	5 UJ	6 U	6 U	8 UJ
Total BTEX		0	–	1.5	0	2.4	0	0
Semivolatile Organic Compounds (ug/kg)								
Non-Carcinogenic PAHs								
2-Methylnaphthalene	36400	51 J	43 J	780 U	68 J	40 J	52 J	57 J
Acenaphthene	50000	830 U	830	780 U	21 J	17 J	100 J	62 J
Acenaphthylene	41000	270 J	190 J	61 J	240 J	200 J	720 J	900
Anthracene	50000	230 J	220 J	78 J	180 J	120 J	760 J	900 J
Benzo(g,h,i)perylene	50000	200 J	290 J	120 J	520 J	110 J	1600 J	130 J
Fluoranthene	50000	730 J	720 J	280 J	1500	520	4100	3600 J
Fluorene	50000	26 J	830 U	780 U	30 J	21 J	60 J	890 U
Naphthalene	13000	46 J	44 J	780 U	83 J	45 J	110 J	74 J
Phenanthrene	50000	520 J	570 J	240 J	770	390 J	1200 J	1200 J
Pyrene	50000	970 J	1200 J	490 J	2400	810 J	6700	2600 J
Total Non-Carcinogenic PAHs		3,043	4,107	1,269	5,812	2,273	15,402	9,523
Carcinogenic PAHs								
Benz(a)anthracene	224	**510 J**	**530 J**	190 J	**950**	**390 J**	**3600**	**2200 J**
Benzo(a)pyrene	61	**470 J**	**460 J**	**210 J**	**900 J**	**370 J**	**2900**	**2100**
Benzo(b)fluoranthene	1100	420 J	370 J	160 J	**1100 J**	300 J	**2000**	**2500**
Benzo(k)fluoranthene	1100	480 J	500 J	180 J	**1200 J**	310 J	**2600**	**2600**
Chrysene	400	**910 J**	**960 J**	360 J	**1200**	**670 J**	**4700**	**3400 J**
Dibenz(a,h)anthracene	14	**92 J**	**120 J**	780 UJ	**110 J**	**46 J**	**770 J**	**70 J**
Indeno(1,2,3-cd)pyrene	3200	210 J	300 J	110 J	430 J	120 J	2000 J	180 J
Total Carcinogenic PAHs		3,092	3,240	1,210	5,890	2,206	18,570	13,050
Total PAHs		6,135	7,347	2,479	11,702	4,479	33,972	22,573
Other Semivolatile Organic Compounds								
2,4-Dimethylphenol	NE	820 U	820 U	780 U	360 U	430 U	1600 U	890 U
3-Nitroaniline	500	4000 U	4000 U	3800 U	1700 U	2100 U	8000 U	4300 U
4-Methylphenol	900	820 U	820 U	780 U	7 J	430 U	1600 U	890 U
Benzoic acid	2700	4000 U	4000 U	3800 U	68 J	37 J	8000 U	160 J
Benzyl alcohol	NE	820 U	820 U	780 U	360 U	430 U	1600 U	890 U
Butylbenzylphthalate	50000	820 UJ	820 U	780 UJ	59 J	430 UJ	1600 U	190 J

Table 4-1 (continued)
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		55 Lynhurst Avenue			59 Lynhurst Avenue			
Site ID:	New York Recommended	SS-22 (dup)	SS-22 (dup)	SS-29	SS-08	SS-16	SS-23	SS-30
Depth (ft):	Soil Cleanup	(0-0.16)	(0-0.16)	(0-0.16)	(0-0.5)	(0-0.16)	(0-0.16)	(0-0.16)
Sample ID:	Objectives	CF-SS-52	CF-SS-52RE	CF-SS-29	SS-8 0-6	CF-SS-16	CF-SS-23	CF-SS-30
Constituent Date:	(RSCOs)	11/30/1999	11/30/1999	11/30/1999	07/29/1999	11/30/1999	11/30/1999	11/30/1999
Carbazole	NE	820 J	820 J	780 U	57 J	24 J	74 J	120 J
Di-n-butylphthalate	8100	820 U	820 JB	780 U	360 U	430 U	1600 U	890 U
Dibenzofuran	6200	820 J	820 U	780 U	26 J	15 J	53 J	48 J
Hexachlorobenzene	410	820 U	820 U	780 U	360 U	430 U	1600 U	890 UJ
Isophorone	4400	820 U	820 U	780 U	360 U	430 U	1600 U	890 U
bis(2-Ethylhexyl)phthalate	50000	820 J	820 JB	440 J	360 U	430 UJ	1600 U	600 J
Metals (mg/kg)								
Arsenic	7.5*	**12.2**	NA	**10.9**	**11.9**	**12.2**	**12.3**	**12.8**
Barium	300*	125	NA	117	224	**362**	**330**	**370**
Cadmium	1*	0.23 UR	NA	0.22 UR	**2.9 J**	0.53 J	**1.9 J**	0.3 UR
Chromium	10*	**49.1**	NA	**49.2**	**138 J**	**58.4**	**119**	**110**
Lead	500*	449	NA	390	**593 J**	**959**	**929**	**1250**
Mercury	0.1	**0.51 J**	NA	**0.35 J**	**0.52**	**0.52 J**	**0.75 J**	**0.52 J**
Selenium	2*	**2.6**	NA	1.1 U	1.7 J	**2.2**	1.8	**2.2**
Silver	NE*	0.23 UJ	NA	0.22 UJ	0.29 J	0.21 UJ	0.22 UJ	0.3 UJ
Total Cyanide (mg/kg)								
Cyanide (Total)	NE*	0.61 UJ	NA	0.62 UJ	0.830	0.66 UJ	0.65 UJ	1.38 J
Total Organic Carbon (mg/kg)								
TOC	NE*	81800 J	NA	36000 J	125000	73000 J	83600 J	142000 J

Table 4-1
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		61 Lynhurst Avenue					
Site ID:	New York Recommended	SS-07	SS-07	SSR-40	SSR-41	SSR-42	SSR-42 (dup)
Depth (ft):	Soil Cleanup	(0-0.5)	(0-0.5)	(0-0.16)	(0-0.16)	(0-0.16)	CF-SS-420
Sample ID:	Objectives	SS-7	SS-7 0-6RE	CF-SS-40	CF-SS-41	CF-SS-42	(0-0.16)
Constituent Date:	(RSCOs)	07/29/1999	07/29/1999	11/20/2001	11/20/2001	11/20/2001	11/20/2001
Volatile Organic Compounds (ug/kg)							
BTEX							
Benzene	60	NA	0.4 J	NA	NA	NA	NA
Toluene	1500	NA	0.5 J	NA	NA	NA	NA
Ethylbenzene	5500	NA	5	NA	NA	NA	NA
Xylene	1200	NA	5 U	NA	NA	NA	NA
Total BTEX		–	5.9	–	–	–	–
Semivolatile Organic Compounds (ug/kg)							
Non-Carcinogenic PAHs							
2-Methylnaphthalene	36400	30 J	NA	NA	NA	NA	NA
Acenaphthene	50000	10 J	NA	NA	NA	NA	NA
Acenaphthylene	41000	110 J	NA	NA	NA	NA	NA
Anthracene	50000	98 J	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	50000	310 J	NA	NA	NA	NA	NA
Fluoranthene	50000	1000	NA	NA	NA	NA	NA
Fluorene	50000	19 J	NA	NA	NA	NA	NA
Naphthalene	13000	32 J	NA	NA	NA	NA	NA
Phenanthrene	50000	660	NA	NA	NA	NA	NA
Pyrene	50000	1600 J	NA	NA	NA	NA	NA
Total Non-Carcinogenic PAHs		3,869	–	–	–	–	–
Carcinogenic PAHs							
Benz(a)anthracene	224	**670 J**	NA	NA	NA	NA	NA
Benzo(a)pyrene	61	**540 J**	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1100	630 J	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	1100	720 J	NA	NA	NA	NA	NA
Chrysene	400	**810 J**	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	14	**120 J**	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	3200	300 J	NA	NA	NA	NA	NA
Total Carcinogenic PAHs		3,790	–	–	–	–	–
Total PAHs		7,659	–	–	–	–	–
Other Semivolatile Organic Compounds							
2,4-Dimethylphenol	NE	340 U	NA	NA	NA	NA	NA
3-Nitroaniline	500	1700 R	NA	NA	NA	NA	NA
4-Methylphenol	900	340 U	NA	NA	NA	NA	NA
Benzoic acid	2700	1700 U	NA	NA	NA	NA	NA
Benzyl alcohol	NE	340 U	NA	NA	NA	NA	NA
Butylbenzylphthalate	50000	23 J	NA	NA	NA	NA	NA

Table 4-1 (continued)
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		61 Lynhurst Avenue					
Site ID:	New York Recommended	SS-07	SS-07	SSR-40	SSR-41	SSR-42	SSR-42 (dup)
Depth (ft):	Soil Cleanup	(0-0.5)	(0-0.5)	(0-0.16)	(0-0.16)	(0-0.16)	CF-SS-420
Sample ID:	Objectives	SS-7	SS-7 0-6RE	CF-SS-40	CF-SS-41	CF-SS-42	(0-0.16)
Constituent Date:	(RSCOs)	07/29/1999	07/29/1999	11/20/2001	11/20/2001	11/20/2001	11/20/2001
Carbazole	NE	32 J	NA	NA	NA	NA	NA
Di-n-butylphthalate	8100	340 U	NA	NA	NA	NA	NA
Dibenzofuran	6200	12 J	NA	NA	NA	NA	NA
Hexachlorobenzene	410	340 U	NA	NA	NA	NA	NA
Isophorone	4400	340 U	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	50000	340 UJ	NA	NA	NA	NA	NA
Metals (mg/kg)							
Arsenic	7.5*	**12.5**	NA	NA	NA	NA	NA
Barium	300*	201	NA	NA	NA	NA	NA
Cadmium	1*	**3.1 J**	NA	NA	NA	NA	NA
Chromium	10*	**39.3 J**	NA	NA	NA	NA	NA
Lead	500*	474 J	NA	445 J	**996 J**	202 J	256 J
Mercury	0.1	**0.97**	NA	NA	NA	NA	NA
Selenium	2*	0.92 UJ	NA	NA	NA	NA	NA
Silver	NE*	0.24 J	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)							
Cyanide (Total)	NE*	NA	0.775 U	NA	NA	NA	NA
Total Organic Carbon (mg/kg)							
TOC	NE*	NA	83100	NA	NA	NA	NA

Table 4-1
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		63 Lynhurst Avenue							
Site ID:	New York Recommended	SS-06	SSR-43	SSR-43	SSR-430 (dup) SSR-43	SSR-43	SSR-43	SSR-44	SSR-44
Depth (ft):	Soil Cleanup	(0-0.5)	(0-0.16)	(1)	(1)	(2)	(3)	(0-0.16)	(1)
Sample ID:	Objectives	CF-SS-6	CF-SS-43	SSR-43	SSR-43	SSR-43	SSR-43	CF-SS-44	SSR-44
Constituent Date:	(RSCOs)	07/29/1999	11/20/2001	6/7/2002	6/7/2002	6/7/2002	6/7/2002	11/20/2001	6/7/2002
Volatile Organic Compounds (ug/kg)									
BTEX									
Benzene	60	7 U	NA	NA	NA	NA	NA	NA	NA
Toluene	1500	7 U	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	5500	7 U	NA	NA	NA	NA	NA	NA	NA
Xylene	1200	7 U	NA	NA	NA	NA	NA	NA	NA
Total BTEX		0	–	–	–	–	–	–	–
Semivolatile Organic Compounds (ug/kg)									
Non-Carcinogenic PAHs									
2-Methylnaphthalene	36400	94 J	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	50000	63 J	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	41000	740 J	NA	NA	NA	NA	NA	NA	NA
Anthracene	50000	460 J	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	50000	1200 J	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	50000	6900	NA	NA	NA	NA	NA	NA	NA
Fluorene	50000	120 J	NA	NA	NA	NA	NA	NA	NA
Naphthalene	13000	100 J	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	50000	3900	NA	NA	NA	NA	NA	NA	NA
Pyrene	50000	7000	NA	NA	NA	NA	NA	NA	NA
Total Non-Carcinogenic PAHs		20577	–	–	–	–	–	–	–
Carcinogenic PAHs									
Benz(a)anthracene	224	**2800**	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	61	**3000**	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1100	**3400**	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	1100	**3000**	NA	NA	NA	NA	NA	NA	NA
Chrysene	400	**3800**	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	14	**450 J**	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	3200	1100 J	NA	NA	NA	NA	NA	NA	NA
Total Carcinogenic PAHs		17,550	–	–	–	–	–	–	–
Total PAHs		38,127	–	–	–	–	–	–	–
Other Semivolatile Organic Compounds									
2,4-Dimethylphenol	NE	2000 U	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	500	9700U U	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	900	23 J	NA	NA	NA	NA	NA	NA	NA
Benzoic acid	2700	9700 U	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NE	2000 U	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	50000	33 J	NA	NA	NA	NA	NA	NA	NA

Table 4-1 (continued)
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		63 Lynhurst Avenue							
Site ID:	New York Recommended	SS-06	SSR-43	SSR-43	SSR-430 (dup) SSR-43	SSR-43	SSR-43	SSR-44	SSR-44
Depth (ft):	Soil Cleanup	(0-0.5)	(0-0.16)	(1)	(1)	(2)	(3)	(0-0.16)	(1)
Sample ID:	Objectives	CF-SS-6	CF-SS-43	SSR-43	SSR-43	SSR-43	SSR-43	CF-SS-44	SSR-44
Constituent Date:	(RSCOs)	07/29/1999	11/20/2001	6/7/2002	6/7/2002	6/7/2002	6/7/2002	11/20/2001	6/7/2002
Carbazole	NE	520 J	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	8100	2000 U	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	6200	92 J	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	410	2000 U	NA	NA	NA	NA	NA	NA	NA
Isophorone	4400	2000 U	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	50000	2000 U	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)									
Arsenic	7.5*	**16.1**	NA	NA	NA	NA	NA	NA	NA
Barium	300*	**306**	NA	NA	NA	NA	NA	NA	NA
Cadmium	1*	**4.4 J**	NA	NA	NA	NA	NA	NA	NA
Chromium	10*	**47.8 J**	NA	NA	NA	NA	NA	NA	NA
Lead	500*	**996 J**	352 J	320 J	**812 J**	**1010**	38.3	320	**691**
Mercury	0.1	**0.63**	NA	NA	NA	NA	NA	NA	NA
Selenium	2*	**4.7 J**	NA	NA	NA	NA	NA	NA	NA
Silver	NE*	0.38 J	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)									
Cyanide (Total)	NE*	1.74	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon (mg/kg)									
TOC	NE*	54600	NA	NA	NA	NA	NA	NA	NA

Table 4-1
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		63 Lynhurst Avenue							
Site ID:	New York Recommended	SSR-44	SSR-44	SSR-45	SSR-59	SSR-59 (dup)	SSR-59	SSR-59	SSR-59
Depth (ft):	Soil Cleanup	(2)	(3)	(0-0.16)	(0-0.16)	(0-0.16)	(1)	(2)	(3)
Sample ID:	Objectives	SSR-44	SSR-44	CF-SS-45	SSR-59	SSR-599	SSR-59	SSR-59	SSR-59
Constituent Date:	(RSCOs)	6/7/2002	6/7/2002	11/20/2001	5/6/2002	5/6/2002	6/7/2002	6/7/2002	6/7/2002
Volatile Organic Compounds (ug/kg)									
BTEX									
Benzene	60	NA	NA	NA	NA	NA	NA	NA	NA
Toluene	1500	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	5500	NA	NA	NA	NA	NA	NA	NA	NA
Xylene	1200	NA	NA	NA	NA	NA	NA	NA	NA
Total BTEX		–	–	–	–	–	–	–	–
Semivolatile Organic Compounds (ug/kg)									
Non-Carcinogenic PAHs									
2-Methylnaphthalene	36400	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	50000	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	41000	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	50000	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	50000	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	50000	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	50000	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	13000	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	50000	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	50000	NA	NA	NA	NA	NA	NA	NA	NA
Total Non-Carcinogenic PAHs		–	–	–	–	–	–	–	–
Carcinogenic PAHs									
Benz(a)anthracene	224	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	61	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1100	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	1100	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	400	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	14	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	3200	NA	NA	NA	NA	NA	NA	NA	NA
Total Carcinogenic PAHs		–	–	–	–	–	–	–	–
Total PAHs		–	–	–	–	–	–	–	–
Other Semivolatile Organic Compounds									
2,4-Dimethylphenol	NE	NA	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	500	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	900	NA	NA	NA	NA	NA	NA	NA	NA
Benzoic acid	2700	NA	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NE	NA	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	50000	NA	NA	NA	NA	NA	NA	NA	NA

Table 4-1 (continued)
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		63 Lynhurst Avenue							
Site ID:	New York Recommended	SSR-44	SSR-44	SSR-45	SSR-59	SSR-59 (dup)	SSR-59	SSR-59	SSR-59
Depth (ft):	Soil Cleanup	(2)	(3)	(0-0.16)	(0-0.16)	(0-0.16)	(1)	(2)	(3)
Sample ID:	Objectives	SSR-44	SSR-44	CF-SS-45	SSR-59	SSR-599	SSR-59	SSR-59	SSR-59
Constituent Date:	(RSCOs)	6/7/2002	6/7/2002	11/20/2001	5/6/2002	5/6/2002	6/7/2002	6/7/2002	6/7/2002
Carbazole	NE	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	8100	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	6200	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	410	NA	NA	NA	NA	NA	NA	NA	NA
Isophorone	4400	NA	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	50000	NA	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)									
Arsenic	7.5*	NA	NA	NA	NA	NA	NA	NA	NA
Barium	300*	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	1*	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	10*	NA	NA	NA	NA	NA	NA	NA	NA
Lead	500*	486	59.4	386	**516**	461	**810**	226	61.1
Mercury	0.1	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	2*	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NE*	NA	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)									
Cyanide (Total)	NE*	NA	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon (mg/kg)									
TOC	NE*	NA	NA	NA	NA	NA	NA	NA	NA

Table 4-1
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		67 Lynhurst Avenue					
Site ID:	New York Recommended	SSR-46	SSR-46	SSR-46	SSR-46	SSR-47	SSR-48
Depth (ft):	Soil Cleanup	(0-0.16)	(1)	(2)	(3)	(0-0.16)	(0-0.16)
Sample ID:	Objectives	CF-SS-46	SSR-46	SSR-46	SSR-46	CF-SS-47	CF-SS-48
Constituent Date:	(RSCOs)	11/20/2001	6/7/2002	6/7/2002	6/7/2002	11/20/2001	11/20/2001
Volatile Organic Compounds (ug/kg)							
BTEX							
Benzene	60	NA	NA	NA	NA	NA	NA
Toluene	1500	NA	NA	NA	NA	NA	NA
Ethylbenzene	5500	NA	NA	NA	NA	NA	NA
Xylene	1200	NA	NA	NA	NA	NA	NA
Total BTEX		–	–	–	–	–	–
Semivolatile Organic Compounds (ug/kg)							
Non-Carcinogenic PAHs							
2-Methylnaphthalene	36400	NA	NA	NA	NA	NA	NA
Acenaphthene	50000	NA	NA	NA	NA	NA	NA
Acenaphthylene	41000	NA	NA	NA	NA	NA	NA
Anthracene	50000	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	50000	NA	NA	NA	NA	NA	NA
Fluoranthene	50000	NA	NA	NA	NA	NA	NA
Fluorene	50000	NA	NA	NA	NA	NA	NA
Naphthalene	13000	NA	NA	NA	NA	NA	NA
Phenanthrene	50000	NA	NA	NA	NA	NA	NA
Pyrene	50000	NA	NA	NA	NA	NA	NA
Total Non-Carcinogenic PAHs		–	–	–	–	–	–
Carcinogenic PAHs							
Benz(a)anthracene	224	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	61	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1100	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	1100	NA	NA	NA	NA	NA	NA
Chrysene	400	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	14	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	3200	NA	NA	NA	NA	NA	NA
Total Carcinogenic PAHs		–	–	–	–	–	–
Total PAHs		–	–	–	–	–	–
Other Semivolatile Organic Compounds							
2,4-Dimethylphenol	NE	NA	NA	NA	NA	NA	NA
3-Nitroaniline	500	NA	NA	NA	NA	NA	NA
4-Methylphenol	900	NA	NA	NA	NA	NA	NA
Benzoic acid	2700	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NE	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	50000	NA	NA	NA	NA	NA	NA

Table 4-1 (continued)
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		67 Lynhurst Avenue					
Site ID:	New York Recommended	SSR-46	SSR-46	SSR-46	SSR-46	SSR-47	SSR-48
Depth (ft):	Soil Cleanup	(0-0.16)	(1)	(2)	(3)	(0-0.16)	(0-0.16)
Sample ID:	Objectives	CF-SS-46	SSR-46	SSR-46	SSR-46	CF-SS-47	CF-SS-48
Constituent Date:	(RSCOs)	11/20/2001	6/7/2002	6/7/2002	6/7/2002	11/20/2001	11/20/2001
Carbazole	NE	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	8100	NA	NA	NA	NA	NA	NA
Dibenzofuran	6200	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	410	NA	NA	NA	NA	NA	NA
Isophorone	4400	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	50000	NA	NA	NA	NA	NA	NA
Metals (mg/kg)							
Arsenic	7.5*	NA	NA	NA	NA	NA	NA
Barium	300*	NA	NA	NA	NA	NA	NA
Cadmium	1*	NA	NA	NA	NA	NA	NA
Chromium	10*	NA	NA	NA	NA	NA	NA
Lead	500*	320	387	1.69 J	1.26 UJ	426	**707 J**
Mercury	0.1	NA	NA	NA	NA	NA	NA
Selenium	2*	NA	NA	NA	NA	NA	NA
Silver	NE*	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)							
Cyanide (Total)	NE*	NA	NA	NA	NA	NA	NA
Total Organic Carbon (mg/kg)							
TOC	NE*	NA	NA	NA	NA	NA	NA

Table 4-1
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		67 Lynhurst Avenue						
Site ID:	New York Recommended	SSR-49	SSR-50	SSR-50	SSR-50	SSR-50	SSR-50 (dup)	SSR-51
Depth (ft):	Soil Cleanup	(0-0.16)	(0.5-0.75)	(1)	(2)	(3)	(3)	(0-0.16)
Sample ID:	Objectives	SSR-49	SSR-50	SSR-50	SSR-50	SSR-50	SSR-50 (4)	SSR-51
Constituent Date:	(RSCOs)	5/6/2002	5/6/2002	6/7/2002	6/7/2002	6/7/2002	6/7/2002	5/6/2002
Volatile Organic Compounds (ug/kg)								
BTEX								
Benzene	60	NA	NA	NA	NA	NA	NA	NA
Toluene	1500	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	5500	NA	NA	NA	NA	NA	NA	NA
Xylene	1200	NA	NA	NA	NA	NA	NA	NA
Total BTEX		–	–	–	–	–	–	–
Semivolatile Organic Compounds (ug/kg)								
Non-Carcinogenic PAHs								
2-Methylnaphthalene	36400	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	50000	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	41000	NA	NA	NA	NA	NA	NA	NA
Anthracene	50000	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	50000	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	50000	NA	NA	NA	NA	NA	NA	NA
Fluorene	50000	NA	NA	NA	NA	NA	NA	NA
Naphthalene	13000	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	50000	NA	NA	NA	NA	NA	NA	NA
Pyrene	50000	NA	NA	NA	NA	NA	NA	NA
Total Non-Carcinogenic PAHs		–	–	–	–	–	–	–
Carcinogenic PAHs								
Benz(a)anthracene	224	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	61	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1100	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	1100	NA	NA	NA	NA	NA	NA	NA
Chrysene	400	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	14	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	3200	NA	NA	NA	NA	NA	NA	NA
Total Carcinogenic PAHs		–	–	–	–	–	–	–
Total PAHs		–	–	–	–	–	–	–
Other Semivolatile Organic Compounds								
2,4-Dimethylphenol	NE	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	500	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	900	NA	NA	NA	NA	NA	NA	NA
Benzoic acid	2700	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NE	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	50000	NA	NA	NA	NA	NA	NA	NA

Table 4-1 (continued)
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		67 Lynhurst Avenue						
Site ID:	New York Recommended	SSR-49	SSR-50	SSR-50	SSR-50	SSR-50	SSR-50 (dup)	SSR-51
Depth (ft):	Soil Cleanup	(0-0.16)	(0.5-0.75)	(1)	(2)	(3)	(3)	(0-0.16)
Sample ID:	Objectives	SSR-49	SSR-50	SSR-50	SSR-50	SSR-50	SSR-50 (4)	SSR-51
Constituent Date:	(RSCOs)	5/6/2002	5/6/2002	6/7/2002	6/7/2002	6/7/2002	6/7/2002	5/6/2002
Carbazole	NE	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	8100	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	6200	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	410	NA	NA	NA	NA	NA	NA	NA
Isophorone	4400	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	50000	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)								
Arsenic	7.5*	NA	NA	NA	NA	NA	NA	NA
Barium	300*	NA	NA	NA	NA	NA	NA	NA
Cadmium	1*	NA	NA	NA	NA	NA	NA	NA
Chromium	10*	NA	NA	NA	NA	NA	NA	NA
Lead	500*	**546**	**1280**	**564**	**635**	**756 J**	261 J	479
Mercury	0.1	NA	NA	NA	NA	NA	NA	NA
Selenium	2*	NA	NA	NA	NA	NA	NA	NA
Silver	NE*	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)								
Cyanide (Total)	NE*	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon (mg/kg)								
TOC	NE*	NA	NA	NA	NA	NA	NA	NA

Table 4-1
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		67 Lynhurst Avenue						
Site ID:	New York Recommended	SSR-52	SSR-52	SSR-52	SSR-52	SSR-52	SSR-53	SSR-54
Depth (ft):	Soil Cleanup	(0-0.16)	(0.5-0.75)	(1)	(2)	(3)	(0-0.16)	(0.5-0.75)
Sample ID:	Objectives	SSR-52	SSR-52	SSR-52	SSR-52	SSR-52	SSR-53	SSR-54
Constituent Date:	(RSCOs)	5/6/2002	5/6/2002	6/7/2002	6/7/2002	6/7/2002	6/7/2002	5/6/2002
Volatile Organic Compounds (ug/kg)								
BTEX								
Benzene	60	NA	NA	NA	NA	NA	NA	NA
Toluene	1500	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	5500	NA	NA	NA	NA	NA	NA	NA
Xylene	1200	NA	NA	NA	NA	NA	NA	NA
Total BTEX		–	–	–	–	–	–	–
Semivolatile Organic Compounds (ug/kg)								
Non-Carcinogenic PAHs								
2-Methylnaphthalene	36400	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	50000	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	41000	NA	NA	NA	NA	NA	NA	NA
Anthracene	50000	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	50000	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	50000	NA	NA	NA	NA	NA	NA	NA
Fluorene	50000	NA	NA	NA	NA	NA	NA	NA
Naphthalene	13000	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	50000	NA	NA	NA	NA	NA	NA	NA
Pyrene	50000	NA	NA	NA	NA	NA	NA	NA
Total Non-Carcinogenic PAHs		–	–	–	–	–	–	–
Carcinogenic PAHs								
Benz(a)anthracene	224	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	61	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1100	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	1100	NA	NA	NA	NA	NA	NA	NA
Chrysene	400	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	14	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	3200	NA	NA	NA	NA	NA	NA	NA
Total Carcinogenic PAHs		–	–	–	–	–	–	–
Total PAHs		–	–	–	–	–	–	–
Other Semivolatile Organic Compounds								
2,4-Dimethylphenol	NE	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	500	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	900	NA	NA	NA	NA	NA	NA	NA
Benzoic acid	2700	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NE	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	50000	NA	NA	NA	NA	NA	NA	NA

Table 4-1 (continued)
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		67 Lynhurst Avenue						
Site ID:	New York Recommended	SSR-52	SSR-52	SSR-52	SSR-52	SSR-52	SSR-53	SSR-54
Depth (ft):	Soil Cleanup	(0-0.16)	(0.5-0.75)	(1)	(2)	(3)	(0-0.16)	(0.5-0.75)
Sample ID:	Objectives	SSR-52	SSR-52	SSR-52	SSR-52	SSR-52	SSR-53	SSR-54
Constituent Date:	(RSCOs)	5/6/2002	5/6/2002	6/7/2002	6/7/2002	6/7/2002	6/7/2002	5/6/2002
Carbazole	NE	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	8100	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	6200	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	410	NA	NA	NA	NA	NA	NA	NA
Isophorone	4400	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	50000	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)								
Arsenic	7.5*	NA	NA	NA	NA	NA	NA	NA
Barium	300*	NA	NA	NA	NA	NA	NA	NA
Cadmium	1*	NA	NA	NA	NA	NA	NA	NA
Chromium	10*	NA	NA	NA	NA	NA	NA	NA
Lead	500*	**674**	**546**	292	**577**	352	**674**	**739**
Mercury	0.1	NA	NA	NA	NA	NA	NA	NA
Selenium	2*	NA	NA	NA	NA	NA	NA	NA
Silver	NE*	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)								
Cyanide (Total)	NE*	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon (mg/kg)								
TOC	NE*	NA	NA	NA	NA	NA	NA	NA

Table 4-1
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		67 Lynhurst Avenue					
Site ID:	New York Recommended	SSR-54	SSR-54	SSR-54	SSR-55	SSR-56	SSR-56
Depth (ft):	Soil Cleanup	(1)	(2)	(3)	(0-0.16)	(0.5-0.75)	(1)
Sample ID:	Objectives	SSR-54	SSR-54	SSR-54	SSR-55	SSR-56	SSR-56
Constituent Date:	(RSCOs)	6/7/2002	6/7/2002	6/7/2002	5/6/2002	5/6/2002	6/7/2002
Volatile Organic Compounds (ug/kg)							
BTEX							
Benzene	60	NA	NA	NA	NA	NA	NA
Toluene	1500	NA	NA	NA	NA	NA	NA
Ethylbenzene	5500	NA	NA	NA	NA	NA	NA
Xylene	1200	NA	NA	NA	NA	NA	NA
Total BTEX		–	–	–	–	–	–
Semivolatile Organic Compounds (ug/kg)							
Non-Carcinogenic PAHs							
2-Methylnaphthalene	36400	NA	NA	NA	NA	NA	NA
Acenaphthene	50000	NA	NA	NA	NA	NA	NA
Acenaphthylene	41000	NA	NA	NA	NA	NA	NA
Anthracene	50000	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	50000	NA	NA	NA	NA	NA	NA
Fluoranthene	50000	NA	NA	NA	NA	NA	NA
Fluorene	50000	NA	NA	NA	NA	NA	NA
Naphthalene	13000	NA	NA	NA	NA	NA	NA
Phenanthrene	50000	NA	NA	NA	NA	NA	NA
Pyrene	50000	NA	NA	NA	NA	NA	NA
Total Non-Carcinogenic PAHs		–	–	–	–	–	–
Carcinogenic PAHs							
Benz(a)anthracene	224	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	61	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1100	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	1100	NA	NA	NA	NA	NA	NA
Chrysene	400	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	14	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	3200	NA	NA	NA	NA	NA	NA
Total Carcinogenic PAHs		–	–	–	–	–	–
Total PAHs		–	–	–	–	–	–
Other Semivolatile Organic Compounds							
2,4-Dimethylphenol	NE	NA	NA	NA	NA	NA	NA
3-Nitroaniline	500	NA	NA	NA	NA	NA	NA
4-Methylphenol	900	NA	NA	NA	NA	NA	NA
Benzoic acid	2700	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NE	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	50000	NA	NA	NA	NA	NA	NA

Table 4-1 (continued)
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		67 Lynhurst Avenue					
Site ID:	New York Recommended	SSR-54	SSR-54	SSR-54	SSR-55	SSR-56	SSR-56
Depth (ft):	Soil Cleanup	(1)	(2)	(3)	(0-0.16)	(0.5-0.75)	(1)
Sample ID:	Objectives	SSR-54	SSR-54	SSR-54	SSR-55	SSR-56	SSR-56
Constituent Date:	(RSCOs)	6/7/2002	6/7/2002	6/7/2002	5/6/2002	5/6/2002	6/7/2002
Carbazole	NE	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	8100	NA	NA	NA	NA	NA	NA
Dibenzofuran	6200	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	410	NA	NA	NA	NA	NA	NA
Isophorone	4400	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	50000	NA	NA	NA	NA	NA	NA
Metals (mg/kg)							
Arsenic	7.5*	NA	NA	NA	NA	NA	NA
Barium	300*	NA	NA	NA	NA	NA	NA
Cadmium	1*	NA	NA	NA	NA	NA	NA
Chromium	10*	NA	NA	NA	NA	NA	NA
Lead	500*	**1230**	377	76.3	485	204	219
Mercury	0.1	NA	NA	NA	NA	NA	NA
Selenium	2*	NA	NA	NA	NA	NA	NA
Silver	NE*	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)							
Cyanide (Total)	NE*	NA	NA	NA	NA	NA	NA
Total Organic Carbon (mg/kg)							
TOC	NE*	NA	NA	NA	NA	NA	NA

Table 4-1
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		67 Lynhurst Avenue						
Site ID:	New York Recommended	SSR-56	SSR-56	SSR-57	SSR-58	SSR-58	SSR-58	SSR-58
Depth (ft):	Soil Cleanup	(2)	(3)	(0-0.16)	(0.5-0.75)	(1)	(2)	(3)
Sample ID:	Objectives	SSR-56	SSR-56	SSR-57	SSR-58	SSR-58	SSR-58	SSR-58
Constituent Date:	(RSCOs)	6/7/2002	6/7/2002	5/6/2002	5/6/2002	6/7/2002	6/7/2002	6/7/2002
Volatile Organic Compounds (ug/kg)								
BTEX								
Benzene	60	NA	NA	NA	NA	NA	NA	NA
Toluene	1500	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	5500	NA	NA	NA	NA	NA	NA	NA
Xylene	1200	NA	NA	NA	NA	NA	NA	NA
Total BTEX		–	–	–	–	–	–	–
Semivolatile Organic Compounds (ug/kg)								
Non-Carcinogenic PAHs								
2-Methylnaphthalene	36400	NA	NA	NA	NA	NA	NA	NA
Acenaphthene	50000	NA	NA	NA	NA	NA	NA	NA
Acenaphthylene	41000	NA	NA	NA	NA	NA	NA	NA
Anthracene	50000	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	50000	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	50000	NA	NA	NA	NA	NA	NA	NA
Fluorene	50000	NA	NA	NA	NA	NA	NA	NA
Naphthalene	13000	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	50000	NA	NA	NA	NA	NA	NA	NA
Pyrene	50000	NA	NA	NA	NA	NA	NA	NA
Total Non-Carcinogenic PAHs		–	–	–	–	–	–	–
Carcinogenic PAHs								
Benz(a)anthracene	224	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	61	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1100	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	1100	NA	NA	NA	NA	NA	NA	NA
Chrysene	400	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	14	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	3200	NA	NA	NA	NA	NA	NA	NA
Total Carcinogenic PAHs		–	–	–	–	–	–	–
Total PAHs		–	–	–	–	–	–	–
Other Semivolatile Organic Compounds								
2,4-Dimethylphenol	NE	NA	NA	NA	NA	NA	NA	NA
3-Nitroaniline	500	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	900	NA	NA	NA	NA	NA	NA	NA
Benzoic acid	2700	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NE	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	50000	NA	NA	NA	NA	NA	NA	NA

Table 4-1 (continued)
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		67 Lynhurst Avenue						
Site ID:	New York Recommended	SSR-56	SSR-56	SSR-57	SSR-58	SSR-58	SSR-58	SSR-58
Depth (ft):	Soil Cleanup	(2)	(3)	(0-0.16)	(0.5-0.75)	(1)	(2)	(3)
Sample ID:	Objectives	SSR-56	SSR-56	SSR-57	SSR-58	SSR-58	SSR-58	SSR-58
Constituent Date:	(RSCOs)	6/7/2002	6/7/2002	5/6/2002	5/6/2002	6/7/2002	6/7/2002	6/7/2002
Carbazole	NE	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	8100	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	6200	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	410	NA	NA	NA	NA	NA	NA	NA
Isophorone	4400	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	50000	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)								
Arsenic	7.5*	NA	NA	NA	NA	NA	NA	NA
Barium	300*	NA	NA	NA	NA	NA	NA	NA
Cadmium	1*	NA	NA	NA	NA	NA	NA	NA
Chromium	10*	NA	NA	NA	NA	NA	NA	NA
Lead	500*	182	394	68.7	**2810**	**2340**	82.7	261
Mercury	0.1	NA	NA	NA	NA	NA	NA	NA
Selenium	2*	NA	NA	NA	NA	NA	NA	NA
Silver	NE*	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)								
Cyanide (Total)	NE*	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon (mg/kg)								
TOC	NE*	NA	NA	NA	NA	NA	NA	NA

Table 4-1
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		Background Samples						
Site ID:	New York Recommended	SS-33	SS-34	SS-35	SS-36	SS-37	SS-38	SS-39
Depth (ft):	Soil Cleanup	(0-0.16)	(0-0.16)	(0-0.16)	(0-0.16)	(0-0.16)	(0-0.16)	(0-0.16)
Sample ID:	Objectives	CF-SS-33	CF-SS-34	CF-SS-35	CF-SS-36	CF-SS-37	CF-SS-38	CF-SS-39
Constituent Date:	(RSCOs)	11/30/1999	11/30/1999	11/30/1999	11/30/1999	11/30/1999	11/30/1999	11/30/1999
Volatile Organic Compounds (ug/kg)								
BTEX								
Benzene	60	6 U	0.2 J	6 U	6 U	6 U	6 U	0.5 J
Toluene	1500	0.2 J	0.4 J	0.8 J	6 U	6 UJ	6 U	6 U
Ethylbenzene	5500	6 U	6 U	6 U	6 U	6 UJ	6 U	6 U
Xylene	1200	6 U	6 U	6 U	6 U	6 UJ	6 U	6 U
Total BTEX		0.2	0.6	0.8	0	0	0	0.5
Semivolatile Organic Compounds (ug/kg)								
Non-Carcinogenic PAHs								
2-Methylnaphthalene	36400	19 J	160 J	53 J	64 J	93 J	83 J	8200 U
Acenaphthene	50000	46 J	250 J	110 J	60 J	120 J	43 J	8100 U
Acenaphthylene	41000	61 J	1800 J	470	540	1000	640 J	730 J
Anthracene	50000	160 J	1900 J	590	440	1200	460 J	610 J
Benzo(g,h,i)perylene	50000	110 J	3100 J	240 J	160 J	320 J	200 J	1200 J
Fluoranthene	50000	640	12000	1900	1400	3800	1100	2500 J
Fluorene	50000	60 J	320 J	130 J	74 J	170 J	42 J	8200 U
Naphthalene	13000	17 J	210 J	65 J	94 J	94 J	78 J	8100 U
Phenanthrene	50000	520	5200	1200	900	1700	460 J	1400 J
Pyrene	50000	870	13000	2100	1400	4300	1300	2600 J
Total Non-Carcinogenic PAHs		2,503	37,940	6,858	5,132	12,797	4,406	9,040
Carcinogenic PAHs								
Benz(a)anthracene	224	**540**	**9400**	**1600**	**1000**	**3000**	**780 J**	**1100 J**
Benzo(a)pyrene	61	**530**	**8800**	**1300**	**1000**	**2800**	**740 J**	**1400 J**
Benzo(b)fluoranthene	1100	520	**8200**	**1200**	1000	**2500**	710 J	**1300 J**
Benzo(k)fluoranthene	1100	850 J	**10000 J**	**1700 J**	**1400 J**	**4000 J**	**1300 J**	**2100 J**
Chrysene	400	**590**	**12000**	**1700**	**1200**	**3200**	**990**	**1700 J**
Dibenz(a,h)anthracene	14	**46 J**	**1600 J**	**140 J**	**80 J**	**170 J**	**95 J**	**490 J**
Indeno(1,2,3-cd)pyrene	3200	140 J	**4000**	360 J	240 J	490 J	260 J	1200 J
Total Carcinogenic PAHs		3,216	54,000	8,000	5,920	16,160	4,875	9,290
Total PAHs		5,719	91,940	14,858	11,052	28,957	9,281	18,330
Other Semivolatile Organic Compounds								
2,4-Dimethylphenol	NE	380 U	3300 U	410 U	420 U	800 U	840 U	8100 U
3-Nitroaniline	500	1800 U	16000 U	260 J	2000 U	3900 U	4000 U	40000 U
4-Methylphenol	900	380 UJ	3300 U	410 U	420 U	800 U	840 U	8100 U
Benzoic acid	2700	37 J	16000 U	120 J	310 J	310 J	1400 J	40000 U
Benzyl alcohol	NE	380 U	3300 U	410 U	420 U	130 J	4200	8100 U
Butylbenzylphthalate	50000	1300	210 J	61 J	65 J	150 J	62 J	510 J

Table 4-1 (continued)
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		Background Samples						
Site ID:	New York Recommended	SS-33	SS-34	SS-35	SS-36	SS-37	SS-38	SS-39
Depth (ft):	Soil Cleanup	(0-0.16)	(0-0.16)	(0-0.16)	(0-0.16)	(0-0.16)	(0-0.16)	(0-0.16)
Sample ID:	Objectives	CF-SS-33	CF-SS-34	CF-SS-35	CF-SS-36	CF-SS-37	CF-SS-38	CF-SS-39
Constituent Date:	(RSCOs)	11/30/1999	11/30/1999	11/30/1999	11/30/1999	11/30/1999	11/30/1999	11/30/1999
Carbazole	NE	69 J	710 J	160 J	120 J	170 J	87 J	220 J
Di-n-butylphthalate	8100	380 U	3300 U	410 U	420 U	800 U	840 U	8100 U
Dibenzofuran	6200	29 J	140 J	56 J	37 J	68 J	52 J	8100 U
Hexachlorobenzene	410	380 U	3300 U	410 U	420 U	800 U	840 U	8100 U
Isophorone	4400	380 U	3300 U	410 U	420 U	800 U	33 J	8100 U
bis(2-Ethylhexyl)phthalate	50000	380 U	3300 U	410 U	420 U	800 U	840 U	29000 J
Metals (mg/kg)								
Arsenic	7.5*	6.7	**7.9**	**9.3**	**8.4**	**10.3**	**10.1**	5.6
Barium	300*	106	94.8	110	124	140	160	76
Cadmium	1*	0.21 UN	0.63 B	0.32 B	0.53 B	**1.7**	**1.4**	**1.4**
Chromium	10*	**36**	**31.3**	**19.3**	**19.9**	**31.8**	**31.9**	**45.4**
Lead	500*	169 J	225 J	251 J	382 J	**744 J**	**350 J**	283 J
Mercury	0.1	**0.23**	**0.29 J**	**0.64 J**	**0.62 J**	**0.63 J**	**0.22 J**	**0.2 J**
Selenium	2*	1.6 J	**2**	**2.2**	1.5	1.3	**2.2**	1.6
Silver	NE*	0.21 U	0.22 U	0.21 U	0.2 J	0.31 J	0.24 J	0.47 J
Total Cyanide (mg/kg)								
Cyanide (Total)	NE*	0.57 UJ	0.6 UJ	0.61 UJ	0.64 UJ	0.61 UJ	0.63 UJ	1.18 J
Total Organic Carbon (mg/kg)								
TOC	NE*	15000 J	37800 J	37700 J	48400 J	65500 J	105000 J	60000 J

Table 4-1
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		Background Samples					
Site ID:	New York Recommended	SS-39 (dup)	SS-39 (dup)	SS-40	SS-41	SS-42	Frequency
Depth (ft):	Soil Cleanup	(0-0.16)	(0-0.16)	(0-0.16)	(0-0.16)	(0-0.16)	of
Sample ID:	Objectives	CF-SS-69	CF-SS-69DL	CF-SS-40	CF-SS-41	CF-SS-42	Exceedance
Constituent Date:	(RSCOs)	11/30/1999	11/30/1999	11/30/1999	11/30/1999	11/30/1999	of RSCOs
Volatile Organic Compounds (ug/kg)							
BTEX							
Benzene	60	6 U	NA	0.5 J	6 U	6 U	0
Toluene	1500	0.4 J	NA	0.5 J	6 UJ	0.3 J	0
Ethylbenzene	5500	6 U	NA	6 U	6 UJ	6 U	0
Xylene	1200	6 U	NA	6 U	6 UJ	6 U	0
Total BTEX		0.4	–	1	0	0.3	
Semivolatile Organic Compounds (ug/kg)							
Non-Carcinogenic PAHs							
2-Methylnaphthalene	36400	42 J	8100 U	190 J	90 J	47 J	0
Acenaphthene	50000	810 UJ	8100 U	280 J	23 J	62 J	0
Acenaphthylene	41000	360 J	300 J	3900	240 J	340 J	0
Anthracene	50000	440 J	320 J	2800	230 J	420	0
Benzo(g,h,i)perylene	50000	71 J	8100 UJ	840 J	61 J	89 J	0
Fluoranthene	50000	1800 J	1200 J	6300	540	1100	0
Fluorene	50000	56 J	8100 U	380 J	28 J	70 J	0
Naphthalene	13000	51 J	8100 U	220 J	60 J	60 J	0
Phenanthrene	50000	1100 J	930 J	5000	390	680	0
Pyrene	50000	1100 J	2000 J	6700	600	1100	0
Total Non-Carcinogenic PAHs		5,020	4,750	26,610	2,262	3,968	
Carcinogenic PAHs							
Benz(a)anthracene	224	**1000 J**	**780 J**	**5400**	**380 J**	**800**	36
Benzo(a)pyrene	61	**1200**	**770 J**	**5200**	**450 J**	**840 J**	38
Benzo(b)fluoranthene	1100	**1600**	730 J	**4800**	680 J	1100 J	19
Benzo(k)fluoranthene	1100	**1500**	740 J	**6600 J**	940 J	**1800 J**	22
Chrysene	400	**1800 J**	**1400 J**	**6000**	**550**	**1100**	35
Dibenz(a,h)anthracene	14	810 UJ	8100 UJ	**500 J**	390 UJ	**56 J**	33
Indeno(1,2,3-cd)pyrene	3200	82 J	8100 UJ	1200 J	72 J	130 J	2
Total Carcinogenic PAHs		7,182	4420	29,700	3,072	5,826	
Total PAHs		12,202	9170	56,310	5,334	9,794	
Other Semivolatile Organic Compounds							
2,4-Dimethylphenol	NE	810 U	8100 U	1500 U	390 U	410 U	0
3-Nitroaniline	500	4000 UJ	40000 U	7300 U	1900 U	2000 U	0
4-Methylphenol	900	810 U	8100 U	1500 U	38 J	410 U	0
Benzoic acid	2700	150 J	40000 U	180 J	170 J	160 J	0
Benzyl alcohol	NE	810 U	8100 U	1500 U	390 U	410 U	0
Butylbenzylphthalate	50000	610 J	8100 UJ	1500 U	1000	100 J	0

Table 4-1 (continued)
Surface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
February 1999 to May 2002

Parcel:		Background Samples					
Site ID:	New York Recommended	SS-39 (dup)	SS-39 (dup)	SS-40	SS-41	SS-42	Frequency
Depth (ft):	Soil Cleanup	(0-0.16)	(0-0.16)	(0-0.16)	(0-0.16)	(0-0.16)	of
Sample ID:	Objectives	CF-SS-69	CF-SS-69DL	CF-SS-40	CF-SS-41	CF-SS-42	Exceedance
Constituent Date:	(RSCOs)	11/30/1999	11/30/1999	11/30/1999	11/30/1999	11/30/1999	of RSCOs
Carbazole	NE	150 J	8100 U	660 J	71 J	140 J	0
Di-n-butylphthalate	8100	820 U	8100 U	1500 U	390 U	410 U	0
Dibenzofuran	6200	40 J	8100 U	280 J	26 J	40 J	0
Hexachlorobenzene	410	810 UJ	8100 U	1500 U	390 U	410 U	0
Isophorone	4400	810 U	8100 U	1500 U	390 U	410 U	0
bis(2-Ethylhexyl)phthalate	50000	4000 JB	4400 JB	1500 U	470 B	410 U	0
Metals (mg/kg)							
Arsenic	7.5*	7.1	NA	**26.4**	**11.6**	**8.5**	25
Barium	300*	83.8	NA	59.9	131	126	5
Cadmium	1*	**1.3 NJ**	NA	0.23 B	**1.1**	0.35 B	16
Chromium	10*	**36.7**	NA	19.6	18.8	**66.1**	34
Lead	500*	337	NA	352 J	400 J	226 J	42
Mercury	0.1	**0.27 NJ**	NA	**0.82 NJ**	**0.18 NJ**	**0.2 NJ**	36
Selenium	2*	1.2	NA	1.1	**2.4**	1.8	17
Silver	NE*	0.26 JB	NA	0.2 U	0.16 U	0.19 U	0
Total Cyanide (mg/kg)							
Cyanide (Total)	NE*	0.64 UJ	NA	0.59 UJ	0.6 UJ	2.74 J	0
Total Organic Carbon (mg/kg)							
TOC	NE*	53400 J	NA	36700 J	73800 J	32500 J	0

Notes:

Only detected analytes are shown on the table.
* site background
NE - not established
NA - not analyzed
J - estimated value
U - indicates not detected to the reporting limit for organic analysis and the method detection limit for inorganic analysis
– unable to calculate because it was non-detected or not analyzed
(dup) - indicates duplicate sample
Shading/bolding indicates an exceedance of established New York State Recommended Soil Cleanup Objectives for residential soils.
R - the reported results or detection limits are estimated or rejected based upon the recovery
B - analyte was found within the laboratory method blank 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 (organics); or indicates analyte result was between IDL and contract required detection limit (metals)

mg/kg - milligrams/kilogram or parts per million (ppm)
ug/kg - micrograms/kilogram or parts per billion (ppb)
JB - estimated detection limit/analyte was found within laboratory method blank
N - spiked sample recovery was not within control limits (metals)

Prepared By AMM/SJG
Checked By: PHH

Table 4-2
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:	New York	40 Willow Avenue Parcel					
Site ID:	Recommended	FPM-MW-01	FPM-MW-01	FPM-MW-02	FPM-MW-02	FPM-MW-03	FPM-MW-03
Sample ID:	Soil Cleanup	MW-1	MW-1	MW-2	MW-2	MW-3	MW-3
Depth (feet):	Objectives	(10-12)	(16-18)	(5-7)	(20-22)	(0-2)	(6-8)
Constituent Date:	(RSCOs)	04/01/1993	04/01/1993	04/01/1993	04/01/1993	04/05/1993	04/05/1993
Volatile Organic Compounds (VOCs) (ug/kg)							
Benzene	60	11 U	11 U	11 U	11 U	**8000 DJ**	13 U
Toluene	1500	11 U	11 U	11 U	11 U	**26000 D**	13 U
Ethylbenzene	5500	11 U	11 U	11 U	11 U	**9200 D**	13 U
Xylenes (total)	1200	11 U	11 U	11 U	11 U	**86000 D**	13
Total BTEX		0	0	0	0	129,200	13
Other Volatile Organic Compounds							
1,2,4-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA
2-Butanone	300	11 U	11 U	11 U	11 U	13 U	13 U
4-Methyl-2-Pentanone	1000	11 U	11 U	11 U	11 U	13 U	13 U
Acetone	200	11 U	11 U	11 U	11 U	31	24
Carbon Tetrachloride	600	11 U	11 U	11 U	11 U	13 U	13 U
Isopropylbenzene	NE	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	11 U	11 U	11 U	11 U	13 U	13 U
Styrene	NE	11 U	11 U	11 U	11 U	80000 D	13 U
n-Butylbenzene	NE	NA	NA	NA	NA	NA	NA
n-Propylbenzene	NE	NA	NA	NA	NA	NA	NA
p-Isopropyltoluene	NE	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NE	NA	NA	NA	NA	NA	NA
tert-Butylbenzene	NE	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (SVOCs) (ug/kg)							
Non-Carcinogenic PAHs							
Naphthalene	13000	370 U	370 U	390 U	370 U	**1100000**	6900 D
2-Methylnaphthalene	36400	370 U	370 U	390 U	370 U	**860000**	4800 D
Acenaphthylene	41000	370 U	370 U	390 U	370 U	**210000**	2000
Acenaphthene	50000	370 U	370 U	390 U	370 U	**37000**	460
Fluorene	50000	370 U	370 U	390 U	370 U	**160000**	1300
Phenanthrene	50000	370 U	370 U	390 U	370 U	**420000**	2500
Benzo(g,h,i)perylene	50000	370 U	370 U	390 U	370 U	**8200**	430 U
Anthracene	50000	370 U	370 U	390 U	370 U	**94000**	660
Fluoranthene	50000	370 U	370 U	390 U	370 U	**140000**	600
Pyrene	50000	370 U	370 U	390 U	370 U	**200000**	1500
Total Non-Carcinogenic PAHs		0	0	0	0	3,229,200	20,720
Carcinogenic PAHs							
Benz(a)anthracene	224	370 U	370 U	390 U	370 U	**96000**	**430**
Chrysene	400	370 U	370 U	390 U	370 U	**61000**	**420 J**
Benzo(b)fluoranthene	1100	370 U	370 U	390 U	370 U	**39000**	190 J
Benzo(k)fluoranthene	1100	370 U	370 U	390 U	370 U	**32000**	290 J
Benzo(a)pyrene	61	370 U	370 U	390 U	370 U	**53000**	**350 J**
Indeno(1,2,3-cd)pyrene	3200	370 U	370 U	390 U	370 U	**9300**	430 U
Dibenz(a,h)anthracene	14	370 U	370 U	390 U	370 U	**4000 J**	430 U
Total Carcinogenic PAHs		0	0	0	0	294,300	1,680
Total PAHs		0	0	0	0	3,523,500	22,400

Table 4-2
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel					
Site ID:	New York Recommended	FPM-MW-01	FPM-MW-01	FPM-MW-02	FPM-MW-02	FPM-MW-03	FPM-MW-03
Sample ID:	Soil Cleanup	MW-1	MW-1	MW-2	MW-2	MW-3	MW-3
Depth (feet):	Objectives	(10-12)	(16-18)	(5-7)	(20-22)	(0-2)	(6-8)
Constituent Date:	(RSCOs)	04/01/1993	04/01/1993	04/01/1993	04/01/1993	04/05/1993	04/05/1993
Other Semivolatile Organic Compounds							
2,4-Dimethylphenol	400	370 U	370 U	390 U	370 U	4300 U	430 U
2-Methylphenol	100	370 U	370 U	390 U	370 U	4300 U	430 U
4-Chloroaniline	220	370 U	370 U	390 U	370 U	4300 U	430 U
4-Methylphenol	900	370 U	370 U	390 U	370 U	4300 U	430 U
Benzoic acid	2700	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NE	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	50000	370 U	370 U	390 U	370 U	4300 U	430 U
Carbazole	NE	370 U	370 U	390 U	370 U	16000	430 U
Di-n-butylphthalate	8100	370 U	370 U	390 U	370 U	4300 U	430 U
Di-n-octylphthalate	50000	370 U	370 U	390 U	370 U	4300 U	430 U
Dibenzofuran	6200	370 U	370 U	390 U	370 U	**19000**	430 U
Diethylphthalate	7100	370 U	370 U	390 U	370 U	4300 U	430 U
N-Nitrosodiphenylamine (1)	NE	370 U	370 U	390 U	370 U	4300 U	430 U
Phenol	30	370 U	370 U	390 U	370 U	4300 U	430 U
bis(2-Ethylhexyl)phthalate	50000	370 U	370 U	390 U	180 JB	4300 U	230 JB
Pesticides/Polychlorinated Biphenyls (ug/kg)							
4,4'-DDE	2100	NA	NA	NA	NA	NA	NA
4,4'-DDT	2100	NA	NA	NA	NA	NA	NA
Dieldrin	44	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	1000	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	20	NA	NA	NA	NA	NA	NA
Heptachlor	100	NA	NA	NA	NA	NA	NA
gamma-Chlordane	540	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)							
Cyanide	NE	NA	NA	NA	NA	NA	NA
Metals (mg/kg)							
Aluminum	NE	NA	NA	NA	NA	NA	NA
Antimony	NE	NA	NA	NA	NA	NA	NA
Arsenic	7.5	NA	NA	NA	NA	NA	NA
Barium	300	NA	NA	NA	NA	NA	NA
Beryllium	0.16	NA	NA	NA	NA	NA	NA
Cadmium	1	NA	NA	NA	NA	NA	NA
Calcium	NE	NA	NA	NA	NA	NA	NA
Chromium	10	NA	NA	NA	NA	NA	NA
Cobalt	30	NA	NA	NA	NA	NA	NA
Copper	25	NA	NA	NA	NA	NA	NA
Iron	2000	NA	NA	NA	NA	NA	NA
Lead	500	NA	NA	NA	NA	NA	NA
Magnesium	NE	NA	NA	NA	NA	NA	NA
Manganese	NE	NA	NA	NA	NA	NA	NA
Mercury	0.1	NA	NA	NA	NA	NA	NA
Nickel	13	NA	NA	NA	NA	NA	NA
Potassium	NE	NA	NA	NA	NA	NA	NA
Selenium	2	NA	NA	NA	NA	NA	NA
Silver	NE	NA	NA	NA	NA	NA	NA
Sodium	NE	NA	NA	NA	NA	NA	NA
Thallium	NE	NA	NA	NA	NA	NA	NA
Vanadium	150	NA	NA	NA	NA	NA	NA
Zinc	20	NA	NA	NA	NA	NA	NA

Table 4-2
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Constituent	Parcel: / Site ID: / Sample ID: / Depth (feet): / Date:	New York Recommended Soil Cleanup Objectives (RSCOs)	40 Willow Avenue Parcel					
			FPM-MW-01 MW-1 (10-12) 04/01/1993	FPM-MW-01 MW-1 (16-18) 04/01/1993	FPM-MW-02 MW-2 (5-7) 04/01/1993	FPM-MW-02 MW-2 (20-22) 04/01/1993	FPM-MW-03 MW-3 (0-2) 04/05/1993	FPM-MW-03 MW-3 (6-8) 04/05/1993
Total Organic Carbon (TOC) (mg/kg)								
TOC		NE	NA	NA	NA	NA	NA	NA
Toxicity Characteristic Leaching Procedure (mg/L)								
2-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA
4-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA
Acenaphthene (TCLP)		NE	NA	NA	NA	NA	NA	NA
Naphthalene (TCLP)		NE	NA	NA	NA	NA	NA	NA
Pyridine (TCLP)		NE	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel							
Site ID:	New York Recommended	FPM-MW-03	FPM-BS-01	FPM-SS-01	FPM-SS-02	FPM-SS-03	RW-04	RW-04	RW-07
Sample ID:	Soil Cleanup	MW-3	BS-1	SS-1	SS-2	SS-3	CF-RW4	CF-RW4	CF-SB17
Depth (feet):	Objectives	(20-22)					(88-90)	(88-92)	(13-16)
Constituent Date:	(RSCOs)	04/05/1993	06/15/1994	06/15/1994	06/15/1994	06/15/1994	03/11/1999	03/11/1999	02/26/1999
Volatile Organic Compounds (VOCs) (ug/kg)									
Benzene	60	44	3 U	2 U	2 U	3 U	6 U	6 U	**3500 J**
Toluene	1500	200	3 U	2 U	2 U	3 U	6 U	6 U	**9200 J**
Ethylbenzene	5500	45	3 U	4	2 U	2 J	6 U	6 U	**22000**
Xylenes (total)	1200	380	3 U	27	6	8	6 U	6 U	**25000**
Total BTEX		669	0	31	6	10	0	0	59,700
Other Volatile Organic Compounds									
1,2,4-Trimethylbenzene	NE	NA	2 U	31	3	5	NA	NA	NA
1,3,5-Trimethylbenzene	NE	NA	2	23	2	5	NA	NA	NA
2-Butanone	300	12 U	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	1000	12 U	NA	NA	NA	NA	NA	NA	NA
Acetone	200	12 U	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	600	12 U	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	NE	NA	2 U	3	1 U	1 U	NA	NA	NA
Methylene Chloride	100	12 U	NA	NA	NA	NA	NA	NA	NA
Styrene	NE	960 D	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	NE	NA	2 U	1 U	1 U	1 U	NA	NA	NA
n-Propylbenzene	NE	NA	2 U	1 U	1 U	1 U	NA	NA	NA
p-Isopropyltoluene	NE	NA	2 U	1	1 U	1 U	NA	NA	NA
sec-Butylbenzene	NE	NA	2 U	1 U	1 U	1 U	NA	NA	NA
tert-Butylbenzene	NE	NA	2 U	1 U	1 U	1 U	NA	NA	NA
Semivolatile Organic Compounds (SVOCs) (ug/kg)									
Non-Carcinogenic PAHs									
Naphthalene	13000	2000	33#	2400#	500#	1400#	29 JB	29 JB	**420000 B**
2-Methylnaphthalene	36400	1600	NA	NA	NA	NA	330 U	370 U	**440000 J**
Acenaphthylene	41000	820	NA	NA	NA	NA	8 JB	8 J	**64000 J**
Acenaphthene	50000	130 J	2900	470 U	410 U	420 U	330 U	370 U	11000 J
Fluorene	50000	510	2100	1000	410 U	420 U	7 JB	7 J	3600 J
Phenanthrene	50000	390 U	500 U	2800	2500	2000	27 JB	27 JB	**69000 J**
Benzo(g,h,i)perylene	50000	390 U	500 U	740	1000	970	330 U	370 U	**54000 J**
Anthracene	50000	390 U	500 U	810	770	610	330 U	370 U	78000 U
Fluoranthene	50000	390 U	500 U	2400	3300 D	2400	330 U	370 U	78000 U
Pyrene	50000	390 U	500 U	2900	3400 D	3100	330 U	370 U	37000 J
Total Non-Carcinogenic PAHs		5,060	5,033	13,050	11,470	10,480	71	71	1,098,600
Carcinogenic PAHs									
Benz(a)anthracene	224	390 U	500 U	**1400**	**2500**	**1400**	330 U	370 U	**16000 J**
Chrysene	400	390 U	500 U	**1600**	**2600**	**1800**	330 U	370 U	**15000 J**
Benzo(b)fluoranthene	1100	390 U	500 U	**1300**	**1900**	**1900**	330 U	370 U	**4700 J**
Benzo(k)fluoranthene	1100	390 U	500 U	**1500**	**2800**	**1800**	330 U	370 U	78000 U
Benzo(a)pyrene	61	390 U	500 U	**1500**	**2700**	**2000**	330 U	370 U	**14000 J**
Indeno(1,2,3-cd)pyrene	3200	390 U	500 U	770	1100	1100	330 U	370 U	**47000 J**
Dibenz(a,h)anthracene	14	390 U	500 U	470 U	410 U	420 U	330 U	370 U	78000 U
Total Carcinogenic PAHs		0	0	8,070	13,600	10,000	0	0	96,700
Total PAHs		5,060	5,033	21,120	25,070	20,480	71	71	1,195,300

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:	New York	40 Willow Avenue Parcel							
Site ID:	Recommended	FPM-MW-03	FPM-BS-01	FPM-SS-01	FPM-SS-02	FPM-SS-03	RW-04	RW-04	RW-07
Sample ID:	Soil Cleanup	MW-3	BS-1	SS-1	SS-2	SS-3	CF-RW4	CF-RW4	CF-SB17
Depth (feet):	Objectives	(20-22)					(88-90)	(88-92)	(13-16)
Constituent Date:	(RSCOs)	04/05/1993	06/15/1994	06/15/1994	06/15/1994	06/15/1994	03/11/1999	03/11/1999	02/26/1999
Other Semivolatile Organic Compounds									
2,4-Dimethylphenol	400	390 U	NA	NA	NA	NA	330 U	370 U	78000 U
2-Methylphenol	100	390 U	NA	NA	NA	NA	330 U	370 U	78000 U
4-Chloroaniline	220	530	NA	NA	NA	NA	330 U	370 U	78000 U
4-Methylphenol	900	390 U	NA	NA	NA	NA	330 U	370 U	78000 U
Benzoic acid	2700	NA	NA	NA	NA	NA	1600 UJ	1800 U	380000 U
Benzyl alcohol	NE	NA	NA	NA	NA	NA	330 U	370 UJ	78000 U
Butylbenzylphthalate	50000	390 U	NA	NA	NA	NA	330 U	370 U	78000 U
Carbazole	NE	390 U	NA	NA	NA	NA	330 U	370 U	78000 U
Di-n-butylphthalate	8100	390 U	NA	NA	NA	NA	330 U	370 U	78000 U
Di-n-octylphthalate	50000	390 U	NA	NA	NA	NA	330 U	370 U	78000 U
Dibenzofuran	6200	60 J	NA	NA	NA	NA	330 U	1800 U	7000 J
Diethylphthalate	7100	390 U	NA	NA	NA	NA	330 U	370 U	78000 U
N-Nitrosodiphenylamine (1)	NE	390 U	NA	NA	NA	NA	330 U	370 U	78000 U
Phenol	30	390 U	NA	NA	NA	NA	330 U	370 U	78000 U
bis(2-Ethylhexyl)phthalate	50000	390 U	NA	NA	NA	NA	330 U	370 U	78000 U
Pesticides/Polychlorinated Biphenyls (ug/kg)									
4,4'-DDE	2100	NA	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	2100	NA	NA	NA	NA	NA	NA	NA	NA
Dieldrin	44	NA	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	1000	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	20	NA	NA	NA	NA	NA	NA	NA	NA
Heptachlor	100	NA	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	540	NA	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)									
Cyanide	NE	NA	NA	NA	NA	NA	0.775 U	0.560 U	0.600 UJ
Metals (mg/kg)									
Aluminum	NE	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NE	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	7.5	NA	NA	NA	NA	NA	2.5	2.5	2.8 J
Barium	300	NA	NA	NA	NA	NA	43.6 J	43.6 J	105
Beryllium	0.16	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	1	NA	NA	NA	NA	NA	0.29 U	0.17 U	0.34 U
Calcium	NE	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	10	NA	NA	NA	NA	NA	14.7	14.7	28.9 J
Cobalt	30	NA	NA	NA	NA	NA	NA	NA	NA
Copper	25	NA	NA	NA	NA	NA	NA	NA	NA
Iron	2000	NA	NA	NA	NA	NA	NA	NA	NA
Lead	500	NA	NA	NA	NA	NA	7.8 J	7.8J	9.2 J
Magnesium	NE	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	NE	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	0.1	NA	NA	NA	NA	NA	0.056 U	0.022 U	0.033 U
Nickel	13	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	NE	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	2	NA	NA	NA	NA	NA	1.2 UJ	0.69 UJ	1.5 J
Silver	NE	NA	NA	NA	NA	NA	0.58 UJ	0.34 UJ	0.42 U
Sodium	NE	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	NE	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	150	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	20	NA	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:			40 Willow Avenue Parcel							
Site ID:		New York Recommended	FPM-MW-03	FPM-BS-01	FPM-SS-01	FPM-SS-02	FPM-SS-03	RW-04	RW-04	RW-07
Sample ID:		Soil Cleanup	MW-3	BS-1	SS-1	SS-2	SS-3	CF-RW4	CF-RW4	CF-SB17
Depth (feet):		Objectives	(20-22)					(88-90)	(88-92)	(13-16)
Constituent	Date:	(RSCOs)	04/05/1993	06/15/1994	06/15/1994	06/15/1994	06/15/1994	03/11/1999	03/11/1999	02/26/1999
Total Organic Carbon (TOC) (mg/kg)										
TOC		NE	NA	NA	NA	NA	NA	581	581	NA
Toxicity Characteristic Leaching Procedure (mg/L)										
2-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA	NA
Acenaphthene (TCLP)		NE	NA	0.002	0.001 U	0.001 U	0.001 U	NA	NA	NA
Naphthalene (TCLP)		NE	NA	0.001 U	0.012	0.001 U	0.002	NA	NA	NA
Pyridine (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel						
Site ID:	New York Recommended	RW-07	RW-14	RW-14	RW-14	RW-14	RW-14	SB-18
Sample ID:	Soil Cleanup	CF-SB17	CF-SB-42	CF-SB-42	CF-SB-42	CF-SB-42	CF-SB-42	CF-SB18
Depth (feet):	Objectives	(76-78)	(24-25)	(58-61)	(78-78.5)	(119-119.5)	(126-126.5)	(4-7.5)
Constituent Date:	(RSCOs)	03/03/1999	08/23/1999	08/24/1999	08/24/1999	08/26/1999	08/26/1999	03/02/1999
Volatile Organic Compounds (VOCs) (ug/kg)								
Benzene	60	**80000**	**62000**	**570 J**	**90000**	72	6 U	4 J
Toluene	1500	**170000**	**110000**	340 J	**190000**	320	6 U	2 J
Ethylbenzene	5500	**21000 J**	**68000**	32	**28000**	120	6 U	6 U
Xylenes (total)	1200	**210000**	**110000**	210	**200000**	870	6 U	6 U
Total BTEX		481,000	350,000	1,152	508,000	1,382	0	6
Other Volatile Organic Compounds								
1,2,4-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
2-Butanone	300	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	1000	NA	NA	NA	NA	NA	NA	NA
Acetone	200	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	600	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	NA	NA	NA	NA	NA	NA	NA
Styrene	NE	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
p-Isopropyltoluene	NE	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
tert-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (SVOCs) (ug/kg)								
Non-Carcinogenic PAHs								
Naphthalene	13000	**3500000**	**290000**	8800	**880000**	8900	100 J	170 J
2-Methylnaphthalene	36400	**2600000**	**200000**	6700	**600000**	9300	130 J	380 U
Acenaphthylene	41000	**780000**	**49000**	2400	**220000**	3800	430 U	190 J
Acenaphthene	50000	**96000 J**	5400 J	310 J	29000 J	550 J	26 J	230 J
Fluorene	50000	**230000 J**	30000 J	1500	**180000**	2600	72 J	220 J
Phenanthrene	50000	**960000**	**65000**	3000	**230000**	4700	240 J	500
Benzo(g,h,i)perylene	50000	22000 J	4800 J	100 J	8400 J	200 J	430 U	1000
Anthracene	50000	580000 U	19000 J	770 J	**58000 J**	1300 J	41 J	330 J
Fluoranthene	50000	580000 U	20000 J	850 J	**63000 J**	1300 J	74 J	2900 J
Pyrene	50000	**400000 J**	42000	1300 J	**110000 J**	2500	110 J	2400
Total Non-Carcinogenic PAHs		8,588,000	725,200	25,730	2,378,400	35,150	793	7,940
Carcinogenic PAHs								
Benz(a)anthracene	224	580000 U	**14000 J**	**450 J**	**38000 J**	**780 J**	40 J	**1900**
Chrysene	400	580000 U	**14000 J**	**440 J**	**37000 J**	**830 J**	430 U	**1700**
Benz(b)fluoranthene	1100	580000 U	**4100 J**	150 J	**22000 J**	220 J	12 J	1000 J
Benzo(k)fluoranthene	1100	580000 U	**6300 J**	240 J	**20000 J**	470 J	26 J	**1600 J**
Benzo(a)pyrene	61	**130000 J**	**10000 J**	**350 J**	**25000 J**	**600 J**	26 J	**1800**
Indeno(1,2,3-cd)pyrene	3200	**27000 J**	3000 J	100 J	**7800 J**	190 J	430 U	1200
Dibenz(a,h)anthracene	14	580000 U	38000 U	1500 U	150000 U	1600 U	430 U	**400**
Total Carcinogenic PAHs		157,000	51,400	1,730	149,800	3,090	104	9,600
Total PAHs		8,745,000	776,600	27,460	2,528,200	38,240	897	17,540

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel						
Site ID:	New York Recommended	RW-07	RW-14	RW-14	RW-14	RW-14	RW-14	SB-18
Sample ID:	Soil Cleanup	CF-SB17	CF-SB-42	CF-SB-42	CF-SB-42	CF-SB-42	CF-SB-42	CF-SB18
Depth (feet):	Objectives	(76-78)	(24-25)	(58-61)	(78-78.5)	(119-119.5)	(126-126.5)	(4-7.5)
Constituent Date:	(RSCOs)	03/03/1999	08/23/1999	08/24/1999	08/24/1999	08/26/1999	08/26/1999	03/02/1999
Other Semivolatile Organic Compounds								
2,4-Dimethylphenol	400	580000 U	38000 U	1500 U	150000 U	1600 U	430 U	380 UR
2-Methylphenol	100	580000 U	38000 U	1500 U	150000 U	1600 U	430 U	380 U
4-Chloroaniline	220	580000 U	38000 U	1500 U	150000 U	1600 U	430 U	380 U
4-Methylphenol	900	580000 U	38000 U	78 J	150000 U	1600 U	430 U	380 U
Benzoic acid	2700	2800000 U	180000 U	7100 U	710000 U	7700 U	2100 U	1900 U
Benzyl alcohol	NE	580000 U	38000 U	1500 U	150000 U	1600 U	430 U	380 U
Butylbenzylphthalate	50000	580000 U	38000 U	1500 U	150000 U	1600 U	430 U	380 U
Carbazole	NE	580000 U	1000 J	56 J	5000 J	95 J	430 U	380 U
Di-n-butylphthalate	8100	580000 U	38000 U	1500 U	150000 U	1600 U	430 U	380 U
Di-n-octylphthalate	50000	580000 U	38000 U	1500 U	150000 U	1600 U	430 U	380 U
Dibenzofuran	6200	580000 U	6000 J	200 J	**17000 J**	340 J	430 U	380 U
Diethylphthalate	7100	580000 U	38000 U	1500 U	150000 U	1600 U	430 U	380 U
N-Nitrosodiphenylamine (1)	NE	580000 U	38000 U	1500 U	150000 U	1600 U	430 U	380 U
Phenol	30	580000 U	38000 U	**120 J**	150000 U	1600 U	430 U	380 U
bis(2-Ethylhexyl)phthalate	50000	580000 U	38000 U	1500 U	150000 U	1600 U	29 J	380 U
Pesticides/Polychlorinated Biphenyls (ug/kg)								
4,4'-DDE	2100	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	2100	NA	NA	NA	NA	NA	NA	NA
Dieldrin	44	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	1000	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	20	NA	NA	NA	NA	NA	NA	NA
Heptachlor	100	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	540	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)								
Cyanide	NE	0.562 UJ	0.56 UJ	0.55 U	0.54 U	0.66 U	0.58 U	0.586 UJ
Metals (mg/kg)								
Aluminum	NE	NA	NA	NA	NA	NA	NA	NA
Antimony	NE	NA	NA	NA	NA	NA	NA	NA
Arsenic	7.5	2.0	3.6 J	2.5 J	2.1 J	2.2 J	2.7 J	6.1
Barium	300	42	61.4	61.7	50.4	23.8 B	37	50.5
Beryllium	0.16	NA	NA	NA	NA	NA	NA	NA
Cadmium	1	0.15 U	0.14 UJ	0.18 UJ	0.14 UJ	0.23 UJ	0.15 UJ	0.21 U
Calcium	NE	NA	NA	NA	NA	NA	NA	NA
Chromium	10	**11.5**	**37.4 J**	**14.4 J**	**16.8 J**	7.4 J	**60.2 J**	**38.2**
Cobalt	30	NA	NA	NA	NA	NA	NA	NA
Copper	25	NA	NA	NA	NA	NA	NA	NA
Iron	2000	NA	NA	NA	NA	NA	NA	NA
Lead	500	5.1	10.6	9.2	8.3	4.9	6.9	56.6
Magnesium	NE	NA	NA	NA	NA	NA	NA	NA
Manganese	NE	NA	NA	NA	NA	NA	NA	NA
Mercury	0.1	0.019 U	0.0069 U	0.0064 U	0.0038 U	**0.11**	0.014 U	0.05 B
Nickel	13	NA	NA	NA	NA	NA	NA	NA
Potassium	NE	NA	NA	NA	NA	NA	NA	NA
Selenium	2	0.61 UJ	1.1 UJ	0.93 UJ	0.71 UJ	1.1 UJ	0.78 UJ	0.83 UJ
Silver	NE	0.31 UJ	1.7 J	0.18 UJ	0.14 UJ	0.23 UJ	0.15 UJ	0.41 UJ
Sodium	NE	NA	NA	NA	NA	NA	NA	NA
Thallium	NE	NA	NA	NA	NA	NA	NA	NA
Vanadium	150	NA	NA	NA	NA	NA	NA	NA
Zinc	20	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel						
Site ID:	New York Recommended	RW-07	RW-14	RW-14	RW-14	RW-14	RW-14	SB-18
Sample ID:	Soil Cleanup	CF-SB17	CF-SB-42	CF-SB-42	CF-SB-42	CF-SB-42	CF-SB-42	CF-SB18
Depth (feet):	Objectives	(76-78)	(24-25)	(58-61)	(78-78.5)	(119-119.5)	(126-126.5)	(4-7.5)
Constituent Date:	(RSCOs)	03/03/1999	08/23/1999	08/24/1999	08/24/1999	08/26/1999	08/26/1999	03/02/1999
Total Organic Carbon (TOC) (mg/kg)								
TOC	NE	NA	NA	NA	NA	NA	NA	NA
Toxicity Characteristic Leaching Procedure (mg/L)								
2-Methylphenol (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA
Acenaphthene (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA
Naphthalene (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA
Pyridine (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel						
Site ID:	New York Recommended	SB-18	SB-18 (dup)	SB-21	SB-22	SB-22	SB-23	SB-23
Sample ID:	Soil Cleanup	CF-SB18	CF-DUP3	CF-SB2I	CF-SB22	CF-SB22	CF-SB23	CF-SB23
Depth (feet):	Objectives	(73-76)	(73-76)	(5-7)	(2-3)	(20-21)	(4-8)	(29-31)
Constituent Date:	(RSCOs)	03/09/1999	03/09/1999	02/25/1999	02/25/1999	02/26/1999	03/02/1999	03/04/1999
Volatile Organic Compounds (VOCs) (ug/kg)								
Benzene	60	1100 U	**100 J**	**1500**	**2600 J**	**2000 J**	6 J	NA
Toluene	1500	720 J	560 J	110 J	**32000**	860 J	1 J	NA
Ethylbenzene	5500	590 J	470 J	**5800**	**150000**	390 J	4 J	NA
Xylenes (total)	1200	**7200**	**5500**	**1900**	**150000**	580 J	16	NA
Total BTEX		8,510	6,630	9,310	334,600	3,830	27	--
Other Volatile Organic Compounds								
1,2,4-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
2-Butanone	300	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	1000	NA	NA	NA	NA	NA	NA	NA
Acetone	200	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	600	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	NA	NA	NA	NA	NA	NA	NA
Styrene	NE	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
p-Isopropyltoluene	NE	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
tert-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (SVOCs) (ug/kg)								
Non-Carcinogenic PAHs								
Naphthalene	13000	**58000 J**	**120000 J**	**430000 B**	NA	**16000 B**	410 U	NA
2-Methylnaphthalene	36400	**69000 J**	**140000 J**	**420000 J**	NA	19000 J	410 U	NA
Acenaphthylene	41000	29000	**54000**	9600 J	NA	4000	46 J	NA
Acenaphthene	50000	4000 J	7500 J	**73000 J**	NA	500 J	410 U	NA
Fluorene	50000	19000	32000	13000 J	NA	140 J	410 U	NA
Phenanthrene	50000	33000 B	**66000 B**	**120000**	NA	3800	410 U	NA
Benzo(g,h,i)perylene	50000	1100 JB	2400 JB	**57000 J**	NA	2600 J	30 J	NA
Anthracene	50000	7500 J	15000 J	76000 U	NA	3700 U	410 U	NA
Fluoranthene	50000	12000 B	23000 B	76000 U	NA	3700 U	410 U	NA
Pyrene	50000	15000 B	30000 B	**61000 J**	NA	1800 J	250 J	NA
Total Non-Carcinogenic PAHs		247,600	489,900	1,183,600	--	47,840	326	--
Carcinogenic PAHs								
Benz(a)anthracene	224	**6900 JB**	**14000 JB**	**24000 J**	NA	**670 J**	410 U	NA
Chrysene	400	**6100 JB**	**12000 JB**	**25000 J**	NA	**640 J**	410 U	NA
Benzo(b)fluoranthene	1100	**2000 JB**	**3600 JB**	**10000 J**	NA	270 J	410 U	NA
Benzo(k)fluoranthene	1100	**3200 JB**	**7000 JB**	76000 U	NA	3700 U	410 U	NA
Benzo(a)pyrene	61	**4500 JB**	**9400 JB**	**24000 J**	NA	**570 J**	**130 J**	NA
Indeno(1,2,3-cd)pyrene	3200	1200 JB	2400 JB	**49000 J**	NA	2200 J	33 J	NA
Dibenz(a,h)anthracene	14	**480 JB**	**900 JB**	**34000 J**	NA	3700 U	**14 J**	NA
Total Carcinogenic PAHs		24,380	49,300	166,000	--	4,350	177	--
Total PAHs		271,980	539,200	1,349,600	--	52,190	503	--

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel						
Site ID:	New York Recommended	SB-18	SB-18 (dup)	SB-21	SB-22	SB-22	SB-23	SB-23
Sample ID:	Soil Cleanup	CF-SB18	CF-DUP3	CF-SB2I	CF-SB22	CF-SB22	CF-SB23	CF-SB23
Depth (feet):	Objectives	(73-76)	(73-76)	(5-7)	(2-3)	(20-21)	(4-8)	(29-31)
Constituent Date:	(RSCOs)	03/09/1999	03/09/1999	02/25/1999	02/25/1999	02/26/1999	03/02/1999	03/04/1999
Other Semivolatile Organic Compounds								
2,4-Dimethylphenol	400	9100 U	18000 U	76000 U	NA	240 J	410 U	NA
2-Methylphenol	100	9100 U	18000 U	76000 U	NA	**220 J**	410 U	NA
4-Chloroaniline	220	9100 U	18000 U	76000 U	NA	3700 U	410 U	NA
4-Methylphenol	900	9100 U	18000 U	76000 U	NA	3700 U	410 U	NA
Benzoic acid	2700	44000 UJ	89000 UJ	370000 U	NA	18000 U	2000 U	NA
Benzyl alcohol	NE	9100 U	18000 U	76000 U	NA	3700 U	410 U	NA
Butylbenzylphthalate	50000	9100 U	18000 U	76000 U	NA	3700 U	410 U	NA
Carbazole	NE	9100 U	18000 U	76000 U	NA	3700 U	410 U	NA
Di-n-butylphthalate	8100	9100 U	18000 U	76000 U	NA	3700 U	24 J	NA
Di-n-octylphthalate	50000	9100 U	18000 U	76000 U	NA	3700 U	410 U	NA
Dibenzofuran	6200	2800 J	5500 J	**8500 J**	NA	460 J	410 U	NA
Diethylphthalate	7100	9100 U	18000 U	76000 U	NA	3700 U	410 U	NA
N-Nitrosodiphenylamine (1)	NE	9100 U	18000 U	76000 U	NA	3700 U	410 U	NA
Phenol	30	9100 U	18000 U	76000 U	NA	**510 J**	410 U	NA
bis(2-Ethylhexyl)phthalate	50000	9100 U	18000 U	76000 U	NA	3700 U	410 U	NA
Pesticides/Polychlorinated Biphenyls (ug/kg)								
4,4'-DDE	2100	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	2100	NA	NA	NA	NA	NA	NA	NA
Dieldrin	44	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	1000	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	20	NA	NA	NA	NA	NA	NA	NA
Heptachlor	100	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	540	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)								
Cyanide	NE	0.559 U	0.554 U	0.542 UJ	NA	0.608 UJ	0.54 UJ	NA
Metals (mg/kg)								
Aluminum	NE	NA	NA	NA	NA	NA	NA	NA
Antimony	NE	NA	NA	NA	NA	NA	NA	NA
Arsenic	7.5	3.6	6.4	3 J	NA	4.2 J	3.2	NA
Barium	300	57.6 J	51.9 J	43.7	NA	70.1	89	NA
Beryllium	0.16	NA	NA	NA	NA	NA	NA	NA
Cadmium	1	0.17 J	0.18 U	0.16 U	NA	0.69 U	0.18 U	NA
Calcium	NE	NA	NA	NA	NA	NA	NA	NA
Chromium	10	**18.8**	**16.7**	**13.4 J**	NA	**26.9 J**	**25.7**	NA
Cobalt	30	NA	NA	NA	NA	NA	NA	NA
Copper	25	NA	NA	NA	NA	NA	NA	NA
Iron	2000	NA	NA	NA	NA	NA	NA	NA
Lead	500	8.8 J	12.5 J	34.5 J	NA	5.8 J	162	NA
Magnesium	NE	NA	NA	NA	NA	NA	NA	NA
Manganese	NE	NA	NA	NA	NA	NA	NA	NA
Mercury	0.1	0.023 U	0.026 U	0.025 U	NA	0.019 U	**0.24**	NA
Nickel	13	NA	NA	NA	NA	NA	NA	NA
Potassium	NE	NA	NA	NA	NA	NA	NA	NA
Selenium	2	0.69 UJ	0.72 UJ	0.68 J	NA	0.77 J	1.6 J	NA
Silver	NE	0.34 UJ	0.36 UJ	0.26 U	NA	0.26 U	0.36 UJ	NA
Sodium	NE	NA	NA	NA	NA	NA	NA	NA
Thallium	NE	NA	NA	NA	NA	NA	NA	NA
Vanadium	150	NA	NA	NA	NA	NA	NA	NA
Zinc	20	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel						
Site ID:	New York Recommended	SB-18	SB-18 (dup)	SB-21	SB-22	SB-22	SB-23	SB-23
Sample ID:	Soil Cleanup	CF-SB18	CF-DUP3	CF-SB21	CF-SB22	CF-SB22	CF-SB23	CF-SB23
Depth (feet):	Objectives	(73-76)	(73-76)	(5-7)	(2-3)	(20-21)	(4-8)	(29-31)
Constituent Date:	(RSCOs)	03/09/1999	03/09/1999	02/25/1999	02/25/1999	02/26/1999	03/02/1999	03/04/1999
Total Organic Carbon (TOC) (mg/kg)								
TOC	NE	4980	3450	NA	NA	NA	NA	1730
Toxicity Characteristic Leaching Procedure (mg/L)								
2-Methylphenol (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA
Acenaphthene (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA
Naphthalene (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA
Pyridine (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel						
Site ID:	New York Recommended	SB-23	SB-23	SB-36	SB-36	SB-40	SB-40	SB-40
Sample ID:	Soil Cleanup	CF-23	CF-SB23	CF-RW4	CF-RW4	CF-SB-40	CF-SB-40	CF-SB-40
Depth (feet):	Objectives	(92-94)	(109-111)	(4-8)	(16-20)	(4-6)	(16-18)	(18-20)
Constituent Date:	(RSCOs)	03/10/1999	03/11/1999	03/02/1999	03/02/1999	07/27/1999	07/27/1999	07/27/1999
Volatile Organic Compounds (VOCs) (ug/kg)								
Benzene	60	23 J	18	2 J	10	**10000**	**63000**	**5400000**
Toluene	1500	16 JB	11 U	1 J	3 J	**18000**	**26000**	**3700000**
Ethylbenzene	5500	6 J	2 J	3 J	2 J	**22000**	**42000**	**170000 J**
Xylenes (total)	1200	41	6 J	12	4 J	**24000**	**26000**	**1400000**
Total BTEX		86	26	18	19	74,000	157,000	10,670,000
Other Volatile Organic Compounds								
1,2,4-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
2-Butanone	300	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	1000	NA	NA	NA	NA	NA	NA	NA
Acetone	200	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	600	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	NA	NA	NA	NA	NA	NA	NA
Styrene	NE	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
p-Isopropyltoluene	NE	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
tert-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (SVOCs) (ug/kg)								
Non-Carcinogenic PAHs								
Naphthalene	13000	**19000 B**	190 JB	65 J	370 U	**240000 B**	**120000 B**	NA
2-Methylnaphthalene	36400	25000	380 U	380 U	370 U	**120000**	**65000**	NA
Acenaphthylene	41000	12000	49 J	58 J	8 J	30000 J	6500 J	NA
Acenaphthene	50000	2000 J	8 J	380 U	370 U	3600 J	12000 J	NA
Fluorene	50000	7800	20 J	380 U	370 U	15000 J	14000 J	NA
Phenanthrene	50000	15000 B	380 U	120 J	18 J	**56000**	32000	NA
Benzo(g,h,i)perylene	50000	1000 JB	380 U	200 J	370 U	6200 J	4300 J	NA
Anthracene	50000	3800	380 U	380 U	370 U	13000 J	8100 J	NA
Fluoranthene	50000	5200 B	380 U	380 U	370 U	18000 J	9400 J	NA
Pyrene	50000	7800 B	380 U	63 J	7 J	38000	19000 J	NA
Total Non-Carcinogenic PAHs		98,600	267	506	33	539,800	290,300	--
Carcinogenic PAHs								
Benz(a)anthracene	224	**3400 JB**	380 U	33 J	370 U	**13000 J**	**5200 J**	NA
Chrysene	400	**2900 JB**	380 U	46 J	370 U	**12000 J**	**5300 J**	NA
Benzo(b)fluoranthene	1100	880 JB	380 U	380 U	370 U	**4400 J**	**2600 J**	NA
Benzo(k)fluoranthene	1100	**1400 JB**	380 U	380 U	370 U	**4200 J**	**2900 J**	NA
Benzo(a)pyrene	61	**2400 JB**	380 U	43 J	370 U	**10000 J**	**5400 J**	NA
Indeno(1,2,3-cd)pyrene	3200	1000 JB	380 U	24 J	370 U	**4000 J**	3000 J	NA
Dibenz(a,h)anthracene	14	3800 U	380 U	380 U	370 U	38000 U	**1000 J**	NA
Total Carcinogenic PAHs		11,980	0	146	0	47,600	25,400	--
Total PAHs		110,580	267	652	33	587,400	315,700	--

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel						
Site ID:	New York Recommended	SB-23	SB-23	SB-36	SB-36	SB-40	SB-40	SB-40
Sample ID:	Soil Cleanup	CF-23	CF-SB23	CF-RW4	CF-RW4	CF-SB-40	CF-SB-40	CF-SB-40
Depth (feet):	Objectives	(92-94)	(109-111)	(4-8)	(16-20)	(4-6)	(16-18)	(18-20)
Constituent Date:	(RSCOs)	03/10/1999	03/11/1999	03/02/1999	03/02/1999	07/27/1999	07/27/1999	07/27/1999
Other Semivolatile Organic Compounds								
2,4-Dimethylphenol	400	3800 U	380 U	380 U	370 U	38000 U	21000 U	NA
2-Methylphenol	100	3800 U	380 U	380 U	370 U	38000 U	21000 U	NA
4-Chloroaniline	220	3800 U	380 U	380 U	370 U	38000 U	21000 U	NA
4-Methylphenol	900	3800 U	380 U	380 U	370 U	38000 U	860 J	NA
Benzoic acid	2700	18000 U	1900 U	1800 U	1800 U	180000 U	100000 U	NA
Benzyl alcohol	NE	3800 UJ	380 UJ	380 U	370 U	38000 UJ	21000 U	NA
Butylbenzylphthalate	50000	3800 U	380 U	380 U	370 U	38000 U	21000 U	NA
Carbazole	NE	3800 U	380 U	380 U	370 U	38000 U	590 J	NA
Di-n-butylphthalate	8100	3800 U	380 U	380 U	370 U	38000 U	21000 U	NA
Di-n-octylphthalate	50000	3800 U	380 U	380 U	370 U	38000 U	21000 U	NA
Dibenzofuran	6200	1200 J	380 U	380 U	370 U	2700 J	1700 J	NA
Diethylphthalate	7100	3800 U	380 U	380 U	370 U	38000 U	21000 U	NA
N-Nitrosodiphenylamine (1)	NE	3800 U	380 U	380 U	370 U	38000 U	21000 U	NA
Phenol	30	3800 U	380 U	380 U	370 U	38000 U	**710 J**	NA
bis(2-Ethylhexyl)phthalate	50000	3800 U	380 U	380 U	370 U	38000 U	21000 U	NA
Pesticides/Polychlorinated Biphenyls (ug/kg)								
4,4'-DDE	2100	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	2100	NA	NA	NA	NA	NA	NA	NA
Dieldrin	44	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	1000	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	20	NA	NA	NA	NA	NA	NA	NA
Heptachlor	100	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	540	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)								
Cyanide	NE	0.58 U	0.597 U	0.583 UJ	0.559 UJ	0.56 U	1.69 J	NA
Metals (mg/kg)								
Aluminum	NE	NA	NA	NA	NA	NA	NA	NA
Antimony	NE	NA	NA	NA	NA	NA	NA	NA
Arsenic	7.5	1.3	1.2	3.3	3.1	5 J	5.1 J	NA
Barium	300	35.8 J	26.8 J	61.4	56.3	41.3	128.	NA
Beryllium	0.16	NA	NA	NA	NA	NA	NA	NA
Cadmium	1	0.12 U	0.13 J	0.2 U	0.16 U	2.8 UJ	**4.4 J**	NA
Calcium	NE	NA	NA	NA	NA	NA	NA	NA
Chromium	10	**19.0**	9.7	**53.7**	**67.5**	**18.8 J**	**33.7 J**	NA
Cobalt	30	NA	NA	NA	NA	NA	NA	NA
Copper	25	NA	NA	NA	NA	NA	NA	NA
Iron	2000	NA	NA	NA	NA	NA	NA	NA
Lead	500	3.6 J	2.4 U	27.9	6 J	23.2	370	NA
Magnesium	NE	NA	NA	NA	NA	NA	NA	NA
Manganese	NE	NA	NA	NA	NA	NA	NA	NA
Mercury	0.1	0.02 U	0.018 U	0.037 B	0.022 U	0.011 B	**0.45**	NA
Nickel	13	NA	NA	NA	NA	NA	NA	NA
Potassium	NE	NA	NA	NA	NA	NA	NA	NA
Selenium	2	0.48 UJ	0.53 UJ	0.82 UJ	1 J	2.2 UJ	0.73 UJ	NA
Silver	NE	0.24 UJ	0.26 UJ	0.41 UJ	0.33 UJ	0.2 U	0.15 U	NA
Sodium	NE	NA	NA	NA	NA	NA	NA	NA
Thallium	NE	NA	NA	NA	NA	NA	NA	NA
Vanadium	150	NA	NA	NA	NA	NA	NA	NA
Zinc	20	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Constituent	Parcel: / Site ID: / Sample ID: / Depth (feet): / Date:	New York Recommended Soil Cleanup Objectives (RSCOs)	40 Willow Avenue Parcel						
			SB-23 CF-23 (92-94) 03/10/1999	SB-23 CF-SB23 (109-111) 03/11/1999	SB-36 CF-RW4 (4-8) 03/02/1999	SB-36 CF-RW4 (16-20) 03/02/1999	SB-40 CF-SB-40 (4-6) 07/27/1999	SB-40 CF-SB-40 (16-18) 07/27/1999	SB-40 CF-SB-40 (18-20) 07/27/1999
Total Organic Carbon (TOC) (mg/kg)									
TOC		NE	279	100 U	NA	NA	NA	NA	NA
Toxicity Characteristic Leaching Procedure (mg/L)									
2-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
Acenaphthene (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
Naphthalene (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
Pyridine (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel						
Site ID:	New York Recommended	SB-41	SB-41	SB-41	SB-43	SB-43	SB-44	SB-44
Sample ID:	Soil Cleanup	CF-SB-41	CF-SB-41	CF-SB-41	CF-SB-43	CF-SB-43	CF-SB-44	CF-SB-44
Depth (feet):	Objectives	(10-12)	(18-20)	(28-30)	(6-8)	(28-30)	(3-5)	(29-31)
Constituent Date:	(RSCOs)	07/28/1999	07/28/1999	07/28/1999	07/28/1999	07/28/1999	07/26/1999	07/27/1999
Volatile Organic Compounds (VOCs) (ug/kg)								
Benzene	60	6 U	0.5 J	**88 J**	**90**	**7300 J**	6 U	0.8 J
Toluene	1500	6 U	6 U	260 J	31	**12000**	6 U	6 U
Ethylbenzene	5500	6 U	0.4 J	400 J	210	**7000 J**	6 U	6 U
Xylenes (total)	1200	6 U	0.8 J	**2100**	210	**13000**	6 U	6 U
Total BTEX		0	2	2,848	541	39,300	0	1
Other Volatile Organic Compounds								
1,2,4-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
2-Butanone	300	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	1000	NA	NA	NA	NA	NA	NA	NA
Acetone	200	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	600	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	NA	NA	NA	NA	NA	NA	NA
Styrene	NE	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
p-Isopropyltoluene	NE	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
tert-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (SVOCs) (ug/kg)								
Non-Carcinogenic PAHs								
Naphthalene	13000	370 U	520 JB	**130000 B**	**91000 B**	**430000 B**	190 JB	330 U
2-Methylnaphthalene	36400	7 J	26 J	**92000**	21000	**250000**	130 J	330 U
Acenaphthylene	41000	6 J	1300	24000	10000 J	**46000 J**	870	330 U
Acenaphthene	50000	370 U	110 J	3000 J	12000 J	8400 J	32 J	330 U
Fluorene	50000	370 U	120 J	13000 J	7700 J	35000 J	88 J	330 U
Phenanthrene	50000	20 J	4200	37000	23000	**100000**	1200	330 U
Benzo(g,h,i)perylene	50000	370 U	340 J	1500 J	19000 U	5900 J	3700	330 U
Anthracene	50000	370 U	1300	6200 J	5600 J	17000 J	440 J	330 U
Fluoranthene	50000	8 J	2500	9200 J	4500 J	26000 J	2500	330 U
Pyrene	50000	15 J	4100	15000 J	7700 J	**54000 J**	3700	330 U
Total Non-Carcinogenic PAHs		56	14,516	330,900	182,500	972,300	12,850	0
Carcinogenic PAHs								
Benz(a)anthracene	224	6 J	**1400**	**4400 J**	**2800 J**	**16000 J**	**1900**	330
Chrysene	400	370 U	**1700**	**4800 J**	**3200 J**	**18000 J**	**2300**	330 U
Benzo(b)fluoranthene	1100	370 U	530 J	880 J	560 J	**3800 J**	**2100**	330 U
Benzo(k)fluoranthene	1100	370 UJ	890	**2200 J**	820 J	**8400 J**	**1800**	330 UJ
Benzo(a)pyrene	61	370 U	**1200**	**3300 J**	**1400 J**	**13000 J**	**2800**	330 U
Indeno(1,2,3-cd)pyrene	3200	370 U	320 J	1300 J	19000 U	**4500 J**	**3200**	330 U
Dibenz(a,h)anthracene	14	370 U	**190 J**	18000 U	19000 U	73000 U	**1000**	330 U
Total Carcinogenic PAHs		6	6,230	16,880	8,780	63,700	15,100	0
Total PAHs		62	20,746	347,780	191,280	1,036,000	27,950	0

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel						
Site ID:	New York Recommended	SB-41	SB-41	SB-41	SB-43	SB-43	SB-44	SB-44
Sample ID:	Soil Cleanup	CF-SB-41	CF-SB-41	CF-SB-41	CF-SB-43	CF-SB-43	CF-SB-44	CF-SB-44
Depth (feet):	Objectives	(10-12)	(18-20)	(28-30)	(6-8)	(28-30)	(3-5)	(29-31)
Constituent Date:	(RSCOs)	07/28/1999	07/28/1999	07/28/1999	07/28/1999	07/28/1999	07/26/1999	07/27/1999
Other Semivolatile Organic Compounds								
2,4-Dimethylphenol	400	370 U	720 U	18000 U	19000 U	73000 U	22 J	330 U
2-Methylphenol	100	370 U	720 U	18000 U	19000 U	73000 U	720 U	330 U
4-Chloroaniline	220	370 U	720 U	18000 U	19000 U	73000 U	720 U	330 U
4-Methylphenol	900	370 U	720 U	18000 U	19000 U	73000 U	63 J	330 U
Benzoic acid	2700	1800 U	3500 U	89000 U	92000 U	360000 U	3500 U	1600 U
Benzyl alcohol	NE	370 U	720 U	18000 UJ	19000 UJ	73000 U	720 U	330 U
Butylbenzylphthalate	50000	370 U	720 U	18000 U	19000 U	73000 U	720 U	330 U
Carbazole	NE	370 UJ	720 U	440 J	19000 U	1200 J	230 J	330 UJ
Di-n-butylphthalate	8100	370 U	720 U	18000 U	19000 U	73000 U	720 U	330 U
Di-n-octylphthalate	50000	370 U	720 U	18000 U	19000 U	73000 U	720 U	330 U
Dibenzofuran	6200	370 U	46 J	1400 J	1100 J	**6200 J**	56 J	330 U
Diethylphthalate	7100	370 U	720 U	18000 U	19000 U	73000 U	720 U	330 U
N-Nitrosodiphenylamine (1)	NE	370 U	720 U	18000 U	19000 U	73000 U	720 U	330 U
Phenol	30	370 U	720 U	18000 U	19000 U	73000 U	24 J	330 U
bis(2-Ethylhexyl)phthalate	50000	370 U	720 U	18000 U	19000 U	73000 U	720 U	330 U
Pesticides/Polychlorinated Biphenyls (ug/kg)								
4,4'-DDE	2100	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	2100	NA	NA	NA	NA	NA	NA	NA
Dieldrin	44	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	1000	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	20	NA	NA	NA	NA	NA	NA	NA
Heptachlor	100	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	540	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)								
Cyanide	NE	0.54 U	2.33 J	0.52 UJ	0.56 UJ	0.55 UJ	1.81 J	0.58 UJ
Metals (mg/kg)								
Aluminum	NE	NA	NA	NA	NA	NA	NA	NA
Antimony	NE	NA	NA	NA	NA	NA	NA	NA
Arsenic	7.5	3.5 J	1.8 J	2.5 J	2.3 J	5.5 J	**8.0**	3.9 J
Barium	300	39.4	60.6	81.4	77.3	95.3	158	67.8
Beryllium	0.16	NA	NA	NA	NA	NA	NA	NA
Cadmium	1	**3.7 J**	2.6 U	**2.9 J**	**3.7 J**	**3.6 J**	**7.7**	**3.4 J**
Calcium	NE	NA	NA	NA	NA	NA	NA	NA
Chromium	10	**58 J**	**41.1 J**	**15.6 J**	**33.5 J**	**29.8 J**	**36.7 J**	**46.2 J**
Cobalt	30	NA	NA	NA	NA	NA	NA	NA
Copper	25	NA	NA	NA	NA	NA	NA	NA
Iron	2000	NA	NA	NA	NA	NA	NA	NA
Lead	500	8.3	10	10.8	11.7	13.7	**558**	12.8
Magnesium	NE	NA	NA	NA	NA	NA	NA	NA
Manganese	NE	NA	NA	NA	NA	NA	NA	NA
Mercury	0.1	0.0073 B	0.0087 B	0.0057 U	0.0085 U	0.013 U	0.099	0.0068 U
Nickel	13	NA	NA	NA	NA	NA	NA	NA
Potassium	NE	NA	NA	NA	NA	NA	NA	NA
Selenium	2	3.1 UJ	2.5 U	1 U	0.93 UJ	0.95 UJ	2.5 U	1.7 U
Silver	NE	0.17 U	0.2 U	0.15 U	0.19 U	0.19 U	0.16 U	0.14 U
Sodium	NE	NA	NA	NA	NA	NA	NA	NA
Thallium	NE	NA	NA	NA	NA	NA	NA	NA
Vanadium	150	NA	NA	NA	NA	NA	NA	NA
Zinc	20	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Constituent / Parcel / Site ID / Sample ID / Depth (feet) / Date	New York Recommended Soil Cleanup Objectives (RSCOs)	40 Willow Avenue Parcel						
		SB-41 CF-SB-41 (10-12) 07/28/1999	SB-41 CF-SB-41 (18-20) 07/28/1999	SB-41 CF-SB-41 (28-30) 07/28/1999	SB-43 CF-SB-43 (6-8) 07/28/1999	SB-43 CF-SB-43 (28-30) 07/28/1999	SB-44 CF-SB-44 (3-5) 07/26/1999	SB-44 CF-SB-44 (29-31) 07/27/1999
Total Organic Carbon (TOC) (mg/kg)								
TOC	NE	NA	NA	NA	NA	NA	NA	NA
Toxicity Characteristic Leaching Procedure (mg/L)								
2-Methylphenol (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA
Acenaphthene (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA
Naphthalene (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA
Pyridine (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel						
Site ID:	New York Recommended	TP-10	TP-10A	GP-01B	GP-01B	GP-02	GP-02	GP-03A
Sample ID:	Soil Cleanup	CF-TP10	CF-TP10A	GP-01	GP-01	GP-02	GP-02	GP-03
Depth (feet):	Objectives	(3)	(3)	(34-38)	(42-45)	(24-28)	(43-45)	(16-20)
Constituent Date:	(RSCOs)	02/24/1999	02/25/1999	11/13/01	11/13/01	11/12/01	11/12/01	11/12/01
Volatile Organic Compounds (VOCs) (ug/kg)								
Benzene	60	6 U	5 U	**9700**	**650 J**	240 U	**100 J**	**9000**
Toluene	1500	6 U	5 U	**170000**	**3400**	**3500**	270 J	**34000**
Ethylbenzene	5500	6 U	2 J	**13000**	300 J	**7500**	550 UJ	**49000**
Xylenes (total)	1200	6 U	3 J	**170000**	**4100**	**12000**	430 J	**81000**
Total BTEX		0	5	362,700	8,450	23,000	800	173,000
Other Volatile Organic Compounds								
1,2,4-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
2-Butanone	300	NA	11 U	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	1000	NA	11 U	NA	NA	NA	NA	NA
Acetone	200	NA	11 U	NA	NA	NA	NA	NA
Carbon Tetrachloride	600	NA	5 U	NA	NA	NA	NA	NA
Isopropylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	NA	5 U	NA	NA	NA	NA	NA
Styrene	NE	NA	5 U	NA	NA	NA	NA	NA
n-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
p-Isopropyltoluene	NE	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
tert-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (SVOCs) (ug/kg)								
Non-Carcinogenic PAHs								
Naphthalene	13000	740	750 U	**480000**	**39000**	**97000**	2600	**870000**
2-Methylnaphthalene	36400	1300	750 U	**370000**	34000	**75000**	2000	**600000**
Acenaphthylene	41000	400 U	75 J	**120000**	14000	16000	570	**100000 J**
Acenaphthene	50000	5 J	750 U	13000 J	1400 J	3700 J	59 J	15000 J
Fluorene	50000	35 J	750 U	**61000 J**	6700 J	10000 J	190 J	**55000 J**
Phenanthrene	50000	2000	750 U	**140000**	16000	25000	420	**140000 J**
Benzo(g,h,i)perylene	50000	580	680 J	72000 U	7400 U	15000 U	360 U	15000 U
Anthracene	50000	220 J	750 U	32000 J	4200 J	6600 J	110 J	31000 J
Fluoranthene	50000	840 J	750 U	36000 J	4100 J	6600 J	87 J	34000 J
Pyrene	50000	1700 J	490 J	**51000 J**	6000 J	9400 J	120 J	**58000 J**
Total Non-Carcinogenic PAHs		7,420	1,245	1,303,000	125,400	249,300	6,156	1,901,000
Carcinogenic PAHs								
Benz(a)anthracene	224	**860 J**	**250 J**	**19000 J**	**2100 J**	**3500 J**	37 J	**20000 J**
Chrysene	400	**1200 J**	320 J	**20000 J**	**2200 J**	**3800 J**	360 J	**21000 J**
Benzo(b)fluoranthene	1100	860	250 J	72000 U	7400 U	15000 U	360 U	15000 U
Benzo(k)fluoranthene	1100	580	750 U	72000 U	920 J	1800 U	360 U	15000 U
Benzo(a)pyrene	61	**1100**	**300 J**	**11000 J**	**1300 J**	**2200 J**	22 J	**12000 J**
Indeno(1,2,3-cd)pyrene	3200	670	640 J	72000 U	7400 U	15000 U	360 U	15000 U
Dibenz(a,h)anthracene	14	**300 J**	**390 J**	72000 U	7400 U	15000 U	360 U	15000 U
Total Carcinogenic PAHs		5,570	2,150	50,000	6,520	9,500	419	53,000
Total PAHs		12,990	3,395	1,353,000	131,920	258,800	6,575	1,954,000

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel						
Site ID:	New York Recommended	TP-10	TP-10A	GP-01B	GP-01B	GP-02	GP-02	GP-03A
Sample ID:	Soil Cleanup	CF-TP10	CF-TP10A	GP-01	GP-01	GP-02	GP-02	GP-03
Depth (feet):	Objectives	(3)	(3)	(34-38)	(42-45)	(24-28)	(43-45)	(16-20)
Constituent Date:	(RSCOs)	02/24/1999	02/25/1999	11/13/01	11/13/01	11/12/01	11/12/01	11/12/01
Other Semivolatile Organic Compounds								
2,4-Dimethylphenol	400	400 U	750 U	NA	NA	NA	NA	NA
2-Methylphenol	100	400 U	750 U	NA	NA	NA	NA	NA
4-Chloroaniline	220	400 U	750 U	NA	NA	NA	NA	NA
4-Methylphenol	900	400 U	750 U	NA	NA	NA	NA	NA
Benzoic acid	2700	37 J	2500 J	NA	NA	NA	NA	NA
Benzyl alcohol	NE	400 U	430 J	NA	NA	NA	NA	NA
Butylbenzylphthalate	50000	400 UJ	750 U	NA	NA	NA	NA	NA
Carbazole	NE	400 U	750 U	NA	NA	NA	NA	NA
Di-n-butylphthalate	8100	400 U	750 U	NA	NA	NA	NA	NA
Di-n-octylphthalate	50000	400 U	750 U	NA	NA	NA	NA	NA
Dibenzofuran	6200	400 U	22 J	NA	NA	NA	NA	NA
Diethylphthalate	7100	400 U	31 J	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine (1)	NE	400 U	750 U	NA	NA	NA	NA	NA
Phenol	30	400 U	750 U	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	50000	400 UJ	750 U	NA	NA	NA	NA	NA
Pesticides/Polychlorinated Biphenyls (ug/kg)								
4,4'-DDE	2100	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	2100	NA	NA	NA	NA	NA	NA	NA
Dieldrin	44	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	1000	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	20	NA	NA	NA	NA	NA	NA	NA
Heptachlor	100	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	540	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)								
Cyanide	NE	0.618 U	0.548 UJ	NA	NA	NA	NA	NA
Metals (mg/kg)								
Aluminum	NE	NA	NA	NA	NA	NA	NA	NA
Antimony	NE	NA	NA	NA	NA	NA	NA	NA
Arsenic	7.5	**16.8**	1.6 J	NA	NA	NA	NA	NA
Barium	300	208	42.2	NA	NA	NA	NA	NA
Beryllium	0.16	NA	NA	NA	NA	NA	NA	NA
Cadmium	1	**1.3 J**	0.26 U	NA	NA	NA	NA	NA
Calcium	NE	NA	NA	NA	NA	NA	NA	NA
Chromium	10	**28**	**14.8 J**	NA	NA	NA	NA	NA
Cobalt	30	NA	NA	NA	NA	NA	NA	NA
Copper	25	NA	NA	NA	NA	NA	NA	NA
Iron	2000	NA	NA	NA	NA	NA	NA	NA
Lead	500	**669**	6.5 J	7.5	7.1	8.2	11.8	8.6
Magnesium	NE	NA	NA	NA	NA	NA	NA	NA
Manganese	NE	NA	NA	NA	NA	NA	NA	NA
Mercury	0.1	**0.32**	0.02 U	NA	NA	NA	NA	NA
Nickel	13	NA	NA	NA	NA	NA	NA	NA
Potassium	NE	NA	NA	NA	NA	NA	NA	NA
Selenium	2	**2.5**	0.63 J	NA	NA	NA	NA	NA
Silver	NE	0.38 U	0.26 U	NA	NA	NA	NA	NA
Sodium	NE	NA	NA	NA	NA	NA	NA	NA
Thallium	NE	NA	NA	NA	NA	NA	NA	NA
Vanadium	150	NA	NA	NA	NA	NA	NA	NA
Zinc	20	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel						
Site ID:	New York Recommended	TP-10	TP-10A	GP-01B	GP-01B	GP-02	GP-02	GP-03A
Sample ID:	Soil Cleanup	CF-TP10	CF-TP10A	GP-01	GP-01	GP-02	GP-02	GP-03
Depth (feet):	Objectives	(3)	(3)	(34-38)	(42-45)	(24-28)	(43-45)	(16-20)
Constituent Date:	(RSCOs)	02/24/1999	02/25/1999	11/13/01	11/13/01	11/12/01	11/12/01	11/12/01
Total Organic Carbon (TOC) (mg/kg)								
TOC	NE	NA	NA	NA	NA	NA	NA	NA
Toxicity Characteristic Leaching Procedure (mg/L)								
2-Methylphenol (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA
Acenaphthene (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA
Naphthalene (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA
Pyridine (TCLP)	NE	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel						
Site ID:	New York Recommended	GP-3A (dup)	GP-03A	GP-04	GP-04	GP-05	GP-05	GP-06
Sample ID:	Soil Cleanup	GP-033	GP-03	GP-04	GP-04	GP-05	GP-05	GP-06
Depth (feet):	Objectives	(16-20)	(28-32)	(12-16)	(16-20')	(16-20)	(32-35)	(28-32)
Constituent Date:	(RSCOs)	11/12/01	11/13/01	11/13/01	11/13/01	11/14/01	11/14/01	11/16/01
Volatile Organic Compounds (VOCs) (ug/kg)								
Benzene	60	**8400**	**4300 J**	**2200000**	**3700000**	**23000**	**8900**	**1100000**
Toluene	1500	**38000**	**18000**	**1700000**	**3000000**	**31000**	**49000**	**1100000**
Ethylbenzene	5500	**51000**	**18000**	**780000**	**1000000**	**150000**	**38000**	**380000**
Xylenes (total)	1200	**88000**	**60000**	**940000**	**1600000**	**190000**	**78000**	**1000000**
Total BTEX		185,400	100,300	5,620,000	9,300,000	394,000	173,900	3,580,000
Other Volatile Organic Compounds								
1,2,4-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
2-Butanone	300	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	1000	NA	NA	NA	NA	NA	NA	NA
Acetone	200	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	600	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	NA	NA	NA	NA	NA	NA	NA
Styrene	NE	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
p-Isopropyltoluene	NE	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
tert-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (SVOCs) (ug/kg)								
Non-Carcinogenic PAHs								
Naphthalene	13000	**1100000**	**45000**	**16000000**	NA	**1200000**	**880000**	**8200000**
2-Methylnaphthalene	36400	**730000**	**42000**	**10000000**	NA	**780000**	**600000**	**5000000**
Acenaphthylene	41000	**120000 J**	11000	**2000000**	NA	**72000 J**	**120000 J**	**970000 J**
Acenaphthene	50000	18000 J	1800 J	**670000 J**	NA	**79000 J**	13000 J	**130000 J**
Fluorene	50000	**70000 J**	6700 J	**1400000 J**	NA	**68000 J**	**54000 J**	**570000 J**
Phenanthrene	50000	**160000**	17000	**4300000**	NA	**160000**	**140000 J**	**1600000**
Benzo(g,h,i)perylene	50000	16000 U	7300 U	**320000 J**	NA	150000 U	150000 U	1500000 U
Anthracene	50000	36000 J	4700 J	**1100000 J**	NA	41000 J	32000 J	**380000 J**
Fluoranthene	50000	44000 J	4600 J	**1400000 J**	NA	45000 J	36000 J	**500000 J**
Pyrene	50000	**70000 J**	6400 J	**2400000**	NA	**79000 J**	**59000 J**	**830000 J**
Total Non-Carcinogenic PAHs		2,348,000	139,200	39,590,000	---	2,522,000	1,934,000	18,180,000
Carcinogenic PAHs								
Benz(a)anthracene	224	**25000 J**	**2400 J**	**900000 J**	NA	**27000 J**	**21000 J**	**310000 J**
Chrysene	400	**28000 J**	**2600 J**	**1000000 J**	NA	**30000 J**	**23000 J**	**320000 J**
Benzo(b)fluoranthene	1100	16000 U	7300 U	**310000 J**	NA	150000 U	150000 U	1500000 U
Benzo(k)fluoranthene	1100	16000 U	**1100 J**	**470000 J**	NA	150000 U	150000 U	1500000 U
Benzo(a)pyrene	61	**16000 J**	**1600 J**	**740000 J**	NA	**19000 J**	**13000 J**	**240000 J**
Indeno(1,2,3-cd)pyrene	3200	16000 U	7300 U	**200000 J**	NA	150000 U	150000 U	1500000 U
Dibenz(a,h)anthracene	14	16000 U	7300 U	2000000 U	NA	150000 U	150000 U	1500000 U
Total Carcinogenic PAHs		69,000	7,700	3,620,000	---	76,000	57,000	870,000
Total PAHs		2,417,000	146,900	43,210,000	---	2,598,000	1,991,000	19,050,000

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel						
Site ID:	New York Recommended	GP-3A (dup)	GP-03A	GP-04	GP-04	GP-05	GP-05	GP-06
Sample ID:	Soil Cleanup	GP-033	GP-03	GP-04	GP-04	GP-05	GP-05	GP-06
Depth (feet):	Objectives	(16-20)	(28-32)	(12-16)	(16-20')	(16-20)	(32-35)	(28-32)
Constituent Date:	(RSCOs)	11/12/01	11/13/01	11/13/01	11/13/01	11/14/01	11/14/01	11/16/01
Other Semivolatile Organic Compounds								
2,4-Dimethylphenol	400	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	100	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	220	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	900	NA	NA	NA	NA	NA	NA	NA
Benzoic acid	2700	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NE	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	50000	NA	NA	NA	NA	NA	NA	NA
Carbazole	NE	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	8100	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	50000	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	6200	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	7100	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine (1)	NE	NA	NA	NA	NA	NA	NA	NA
Phenol	30	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	50000	NA	NA	NA	NA	NA	NA	NA
Pesticides/Polychlorinated Biphenyls (ug/kg)								
4,4'-DDE	2100	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	2100	NA	NA	NA	NA	NA	NA	NA
Dieldrin	44	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	1000	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	20	NA	NA	NA	NA	NA	NA	NA
Heptachlor	100	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	540	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)								
Cyanide	NE	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)								
Aluminum	NE	NA	NA	NA	NA	NA	NA	NA
Antimony	NE	NA	NA	NA	NA	NA	NA	NA
Arsenic	7.5	NA	NA	NA	NA	NA	NA	NA
Barium	300	NA	NA	NA	NA	NA	NA	NA
Beryllium	0.16	NA	NA	NA	NA	NA	NA	NA
Cadmium	1	NA	NA	NA	NA	NA	NA	NA
Calcium	NE	NA	NA	NA	NA	NA	NA	NA
Chromium	10	NA	NA	NA	NA	NA	NA	NA
Cobalt	30	NA	NA	NA	NA	NA	NA	NA
Copper	25	NA	NA	NA	NA	NA	NA	NA
Iron	2000	NA	NA	NA	NA	NA	NA	NA
Lead	500	11.6	7.6	216	NA	4.1	8.1	4.9 J
Magnesium	NE	NA	NA	NA	NA	NA	NA	NA
Manganese	NE	NA	NA	NA	NA	NA	NA	NA
Mercury	0.1	NA	NA	NA	NA	NA	NA	NA
Nickel	13	NA	NA	NA	NA	NA	NA	NA
Potassium	NE	NA	NA	NA	NA	NA	NA	NA
Selenium	2	NA	NA	NA	NA	NA	NA	NA
Silver	NE	NA	NA	NA	NA	NA	NA	NA
Sodium	NE	NA	NA	NA	NA	NA	NA	NA
Thallium	NE	NA	NA	NA	NA	NA	NA	NA
Vanadium	150	NA	NA	NA	NA	NA	NA	NA
Zinc	20	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Constituent	Parcel: / Site ID: / Sample ID: / Depth (feet): / Date:	New York Recommended Soil Cleanup Objectives (RSCOs)	40 Willow Avenue Parcel						
			GP-3A (dup) GP-033 (16-20) 11/12/01	GP-03A GP-03 (28-32) 11/13/01	GP-04 GP-04 (12-16) 11/13/01	GP-04 GP-04 (16-20') 11/13/01	GP-05 GP-05 (16-20) 11/14/01	GP-05 GP-05 (32-35) 11/14/01	GP-06 GP-06 (28-32) 11/16/01
Total Organic Carbon (TOC) (mg/kg)									
TOC		NE	NA	NA	NA	NA	NA	NA	NA
Toxicity Characteristic Leaching Procedure (mg/L)									
2-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
Acenaphthene (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
Naphthalene (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
Pyridine (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel						
Site ID:	New York Recommended	GP-06	GP-7	GP-07	GP-08	GP-08	GP-09	GP-09
Sample ID:	Soil Cleanup	GP-06	GP-077	GP-07	GP-08	GP-08	GP-09	GP-09
Depth (feet):	Objectives	(40-44)	(12-16)	(16-20)	(12-16)	(16-20)	(4-8)	(12-16)
Constituent Date:	(RSCOs)	11/16/01	11/19/01	11/20/01	11/16/01	11/16/01	11/16/01	11/16/01
Volatile Organic Compounds (VOCs) (ug/kg)								
Benzene	60	**1700**	**5100**	**87000**	**130000**	**700000**	**16000**	**73000**
Toluene	1500	**3300**	100 U	**77000**	**170000**	**670000**	**24000**	**13000**
Ethylbenzene	5500	540 J	370 J	**97000**	**230000**	**430000**	3100 J	**73000**
Xylenes (total)	1200	**4100**	310 U	**110000**	**140000**	**460000**	**26000**	**48000**
Total BTEX		9,640	5,470	371,000	670,000	2,260,000	69,100	207,000
Other Volatile Organic Compounds								
1,2,4-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
2-Butanone	300	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	1000	NA	NA	NA	NA	NA	NA	NA
Acetone	200	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	600	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	NA	NA	NA	NA	NA	NA	NA
Styrene	NE	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
p-Isopropyltoluene	NE	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
tert-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (SVOCs) (ug/kg)								
Non-Carcinogenic PAHs								
Naphthalene	13000	**50000**	1800	**17000**	**15000**	**7000000**	**22000000**	**1600000**
2-Methylnaphthalene	36400	**38000**	190 J	11000	4600	**3800000**	**21000000**	**830000**
Acenaphthylene	41000	9700	380 U	1900 J	1300 J	**730000 J**	**1100000 J**	28000 J
Acenaphthene	50000	1200 J	53 J	390 J	900 J	**230000 J**	**980000 J**	**180000 J**
Fluorene	50000	6200 J	380 U	1300 J	880 J	**480000 J**	**4400000**	**110000 J**
Phenanthrene	50000	18000	380 U	3700	4600	**1500000**	**13000000**	**360000**
Benzo(g,h,i)perylene	50000	840 J	380 U	2900 U	2000 J	1300000 U	**720000 J**	320000 U
Anthracene	50000	4100 J	380 U	770 J	1000 J	**380000 J**	**2000000 J**	**85000 J**
Fluoranthene	50000	5100 J	34 J	1100 J	3400 J	**510000 J**	**3700000**	**120000 J**
Pyrene	50000	9300	29 J	1800 J	6600	**870000 J**	**7200000**	**210000 J**
Total Non-Carcinogenic PAHs		142,440	2,106	38,960	40,280	15,500,000	76,100,000	3,523,000
Carcinogenic PAHs								
Benz(a)anthracene	224	**3100 J**	20 J	**660 J**	**2500 J**	**300000 J**	**2300000 J**	**70000 J**
Chrysene	400	**3100 J**	380 U	**710 J**	**3300 J**	**310000 J**	**2500000 J**	**76000 J**
Benzo(b)fluoranthene	1100	1000 J	380 U	2900 U	**1500 J**	1300000 U	**790000 J**	320000 U
Benzo(k)fluoranthene	1100	**1400 J**	380 U	2900 U	**1900 J**	1300000 U	**1100000 J**	320000 U
Benzo(a)pyrene	61	**2400 J**	380 U	**500 J**	**2200 J**	**240000 J**	**1900000 J**	**58000 J**
Indeno(1,2,3-cd)pyrene	3200	600 J	380 U	2900 U	1400 J	1300000 U	**480000 J**	320000 U
Dibenz(a,h)anthracene	14	7100 UJ	380 U	2900 U	3900 UJ	1300000 U	3200000 U	320000 U
Total Carcinogenic PAHs		11,600	20	1,870	12,800	850,000	9,070,000	204,000
Total PAHs		154,040	2,126	40,830	53,080	16,350,000	85,170,000	3,727,000

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel						
Site ID:	New York Recommended	GP-06	GP-7	GP-07	GP-08	GP-08	GP-09	GP-09
Sample ID:	Soil Cleanup	GP-06	GP-077	GP-07	GP-08	GP-08	GP-09	GP-09
Depth (feet):	Objectives	(40-44)	(12-16)	(16-20)	(12-16)	(16-20)	(4-8)	(12-16)
Constituent Date:	(RSCOs)	11/16/01	11/19/01	11/20/01	11/16/01	11/16/01	11/16/01	11/16/01
Other Semivolatile Organic Compounds								
2,4-Dimethylphenol	400	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	100	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	220	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	900	NA	NA	NA	NA	NA	NA	NA
Benzoic acid	2700	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NE	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	50000	NA	NA	NA	NA	NA	NA	NA
Carbazole	NE	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	8100	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	50000	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	6200	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	7100	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine (1)	NE	NA	NA	NA	NA	NA	NA	NA
Phenol	30	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	50000	NA	NA	NA	NA	NA	NA	NA
Pesticides/Polychlorinated Biphenyls (ug/kg)								
4,4'-DDE	2100	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	2100	NA	NA	NA	NA	NA	NA	NA
Dieldrin	44	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	1000	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	20	NA	NA	NA	NA	NA	NA	NA
Heptachlor	100	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	540	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)								
Cyanide	NE	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)								
Aluminum	NE	NA	NA	NA	NA	NA	NA	NA
Antimony	NE	NA	NA	NA	NA	NA	NA	NA
Arsenic	7.5	NA	NA	NA	NA	NA	NA	NA
Barium	300	NA	NA	NA	NA	NA	NA	NA
Beryllium	0.16	NA	NA	NA	NA	NA	NA	NA
Cadmium	1	NA	NA	NA	NA	NA	NA	NA
Calcium	NE	NA	NA	NA	NA	NA	NA	NA
Chromium	10	NA	NA	NA	NA	NA	NA	NA
Cobalt	30	NA	NA	NA	NA	NA	NA	NA
Copper	25	NA	NA	NA	NA	NA	NA	NA
Iron	2000	NA	NA	NA	NA	NA	NA	NA
Lead	500	7.7 J	6.6	8	342 J	1990 J	88.3 J	193 J
Magnesium	NE	NA	NA	NA	NA	NA	NA	NA
Manganese	NE	NA	NA	NA	NA	NA	NA	NA
Mercury	0.1	NA	NA	NA	NA	NA	NA	NA
Nickel	13	NA	NA	NA	NA	NA	NA	NA
Potassium	NE	NA	NA	NA	NA	NA	NA	NA
Selenium	2	NA	NA	NA	NA	NA	NA	NA
Silver	NE	NA	NA	NA	NA	NA	NA	NA
Sodium	NE	NA	NA	NA	NA	NA	NA	NA
Thallium	NE	NA	NA	NA	NA	NA	NA	NA
Vanadium	150	NA	NA	NA	NA	NA	NA	NA
Zinc	20	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Constituent	Parcel: / Site ID: / Sample ID: / Depth (feet): / Date:	New York Recommended Soil Cleanup Objectives (RSCOs)	40 Willow Avenue Parcel						
			GP-06 GP-06 (40-44) 11/16/01	GP-7 GP-077 (12-16) 11/19/01	GP-07 GP-07 (16-20) 11/20/01	GP-08 GP-08 (12-16) 11/16/01	GP-08 GP-08 (16-20) 11/16/01	GP-09 GP-09 (4-8) 11/16/01	GP-09 GP-09 (12-16) 11/16/01
Total Organic Carbon (TOC) (mg/kg)									
TOC		NE	NA	NA	NA	NA	NA	NA	NA
Toxicity Characteristic Leaching Procedure (mg/L)									
2-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
Acenaphthene (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
Naphthalene (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
Pyridine (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel						
Site ID:	New York Recommended	GP-10	GP-10	GP-11	GP-11	GP-11 (dup)	GP-12	GP-12
Sample ID:	Soil Cleanup	GP-10	GP-10	GP-11	GP-11	GP-111	GP-12	GP-12
Depth (feet):	Objectives	(16-20)	(40-45)	(16-20)	(40-45)	(40-45)	(20-24)	(40-45)
Constituent Date:	(RSCOs)	11/15/01	11/15/01	11/15/01	11/15/01	11/15/01	11/14/01	11/14/01
Volatile Organic Compounds (VOCs) (ug/kg)								
Benzene	60	**1400**	**89**	**2100**	57 J	**190 J**	6	**73000**
Toluene	1500	1100	33	830	35 J	87 J	0.5 U	**150000**
Ethylbenzene	5500	5100	67	4200	5 J	8	1 J	**9100**
Xylenes (total)	1200	**6800**	38	**4900**	27	38	1 U	**140000**
Total BTEX		14,400	227	12,030	124	323	7	372,100
Other Volatile Organic Compounds								
1,2,4-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
2-Butanone	300	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	1000	NA	NA	NA	NA	NA	NA	NA
Acetone	200	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	600	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	NA	NA	NA	NA	NA	NA	NA
Styrene	NE	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
p-Isopropyltoluene	NE	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
tert-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (SVOCs) (ug/kg)								
Non-Carcinogenic PAHs								
Naphthalene	13000	**1400000**	110 J	**510000**	790	1200	49 J	**2000000**
2-Methylnaphthalene	36400	**750000**	58 J	**320000**	490	890	31 U	**1500000**
Acenaphthylene	41000	**57000 J**	360 U	10000 J	68 J	160 J	23 J	**230000 J**
Acenaphthene	50000	24000 J	360 U	37000 J	18 J	33 J	21 J	**54000 J**
Fluorene	50000	**51000 J**	360 U	41000 J	84 J	180 J	370 U	**250000 J**
Phenanthrene	50000	**130000 J**	38 J	**130000**	190 J	460 J	59 J	**590000**
Benzo(g,h,i)perylene	50000	290000 U	360 U	5500 J	360 U	360 U	370 U	290000 U
Anthracene	50000	16000 J	360 U	18000 J	18 J	54 J	13 U	**63000 J**
Fluoranthene	50000	32000 J	360 U	38000 J	360 U	94 J	370 U	**150000 J**
Pyrene	50000	**57000 J**	22 J	**67000 J**	29 J	130 J	370 U	**230000 J**
Total Non-Carcinogenic PAHs		2,517,000	228	1,176,500	1,687	3,201	152	5,067,000
Carcinogenic PAHs								
Benz(a)anthracene	224	**21000 J**	360 U	**23000 J**	360 U	36 J	370 U	**74000 J**
Chrysene	400	**23000 J**	360 U	**26000 J**	360 U	41 J	370 U	**83000 J**
Benzo(b)fluoranthene	1100	290000 U	360 U	74000 U	360 U	360 U	370 U	290000 U
Benzo(k)fluoranthene	1100	**34000 J**	360 U	**12000 J**	360 U	360 U	370 U	290000 U
Benzo(a)pyrene	61	290000 U	360 U	**21000 J**	360 U	25 J	370 U	**49000 J**
Indeno(1,2,3-cd)pyrene	3200	290000 U	360 U	**4300 J**	360 U	360 U	370 U	290000 U
Dibenz(a,h)anthracene	14	290000 U	360 U	74000 U	360 U	360 U	370 U	290000 U
Total Carcinogenic PAHs		78,000	0	86,300	0	102	0	206,000
Total PAHs		2,595,000	228	1,262,800	1,687	3,303	152	5,273,000

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		40 Willow Avenue Parcel						
Site ID:	New York Recommended	GP-10	GP-10	GP-11	GP-11	GP-11 (dup)	GP-12	GP-12
Sample ID:	Soil Cleanup	GP-10	GP-10	GP-11	GP-11	GP-111	GP-12	GP-12
Depth (feet):	Objectives	(16-20)	(40-45)	(16-20)	(40-45)	(40-45)	(20-24)	(40-45)
Constituent Date:	(RSCOs)	11/15/01	11/15/01	11/15/01	11/15/01	11/15/01	11/14/01	11/14/01
Other Semivolatile Organic Compounds								
2,4-Dimethylphenol	400	NA	NA	NA	NA	NA	NA	NA
2-Methylphenol	100	NA	NA	NA	NA	NA	NA	NA
4-Chloroaniline	220	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol	900	NA	NA	NA	NA	NA	NA	NA
Benzoic acid	2700	NA	NA	NA	NA	NA	NA	NA
Benzyl alcohol	NE	NA	NA	NA	NA	NA	NA	NA
Butylbenzylphthalate	50000	NA	NA	NA	NA	NA	NA	NA
Carbazole	NE	NA	NA	NA	NA	NA	NA	NA
Di-n-butylphthalate	8100	NA	NA	NA	NA	NA	NA	NA
Di-n-octylphthalate	50000	NA	NA	NA	NA	NA	NA	NA
Dibenzofuran	6200	NA	NA	NA	NA	NA	NA	NA
Diethylphthalate	7100	NA	NA	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine (1)	NE	NA	NA	NA	NA	NA	NA	NA
Phenol	30	NA	NA	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	50000	NA	NA	NA	NA	NA	NA	NA
Pesticides/Polychlorinated Biphenyls (ug/kg)								
4,4'-DDE	2100	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	2100	NA	NA	NA	NA	NA	NA	NA
Dieldrin	44	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	1000	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	20	NA	NA	NA	NA	NA	NA	NA
Heptachlor	100	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	540	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)								
Cyanide	NE	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)								
Aluminum	NE	NA	NA	NA	NA	NA	NA	NA
Antimony	NE	NA	NA	NA	NA	NA	NA	NA
Arsenic	7.5	NA	NA	NA	NA	NA	NA	NA
Barium	300	NA	NA	NA	NA	NA	NA	NA
Beryllium	0.16	NA	NA	NA	NA	NA	NA	NA
Cadmium	1	NA	NA	NA	NA	NA	NA	NA
Calcium	NE	NA	NA	NA	NA	NA	NA	NA
Chromium	10	NA	NA	NA	NA	NA	NA	NA
Cobalt	30	NA	NA	NA	NA	NA	NA	NA
Copper	25	NA	NA	NA	NA	NA	NA	NA
Iron	2000	NA	NA	NA	NA	NA	NA	NA
Lead	500	4.5	6.9	4.2	6.8	6	6.8	8.8
Magnesium	NE	NA	NA	NA	NA	NA	NA	NA
Manganese	NE	NA	NA	NA	NA	NA	NA	NA
Mercury	0.1	NA	NA	NA	NA	NA	NA	NA
Nickel	13	NA	NA	NA	NA	NA	NA	NA
Potassium	NE	NA	NA	NA	NA	NA	NA	NA
Selenium	2	NA	NA	NA	NA	NA	NA	NA
Silver	NE	NA	NA	NA	NA	NA	NA	NA
Sodium	NE	NA	NA	NA	NA	NA	NA	NA
Thallium	NE	NA	NA	NA	NA	NA	NA	NA
Vanadium	150	NA	NA	NA	NA	NA	NA	NA
Zinc	20	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Constituent	Parcel: / Site ID: / Sample ID: / Depth (feet): / Date:	New York Recommended Soil Cleanup Objectives (RSCOs)	40 Willow Avenue Parcel						
			GP-10 GP-10 (16-20) 11/15/01	GP-10 GP-10 (40-45) 11/15/01	GP-11 GP-11 (16-20) 11/15/01	GP-11 GP-11 (40-45) 11/15/01	GP-11 (dup) GP-111 (40-45) 11/15/01	GP-12 GP-12 (20-24) 11/14/01	GP-12 GP-12 (40-45) 11/14/01
Total Organic Carbon (TOC) (mg/kg)									
TOC		NE	NA	NA	NA	NA	NA	NA	NA
Toxicity Characteristic Leaching Procedure (mg/L)									
2-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
Acenaphthene (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
Naphthalene (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
Pyridine (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		66 Willow Avenue Parcel					
Site ID:	New York Recommended	SB-65	SB-65	SB-66	SB-66	SB-67	SB-67
Sample ID:	Soil Cleanup	CF-SB-65	CF-SB-65	CF-SB-66	CF-SB-66	CF-SB-67	CF-SB-67
Depth (feet):	Objectives	(0-4)	(4-8)	(0-2)	(12-16)	(0-4)	(4-8)
Constituent Date:	(RSCOs)	11/30/1999	11/30/1999	11/30/1999	11/30/1999	11/30/1999	11/30/1999
Volatile Organic Compounds (VOCs) (ug/kg)							
Benzene	60	6 U	6 U	6 U	100	6 U	6 U
Toluene	1500	6 U	6 U	0.3 J	0.3 J	6 U	6 U
Ethylbenzene	5500	6 U	6 U	6 U	20	6 U	6 U
Xylenes (total)	1200	6 U	6 U	6 U	7 B	6 U	6 U
Total BTEX		0	0	0	127	0	0
Other Volatile Organic Compounds							
1,2,4-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA
2-Butanone	300	NA	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	1000	NA	NA	NA	NA	NA	NA
Acetone	200	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	600	NA	NA	NA	NA	NA	NA
Isopropylbenzene	NE	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	NA	NA	NA	NA	NA	NA
Styrene	NE	NA	NA	NA	NA	NA	NA
n-Butylbenzene	NE	NA	NA	NA	NA	NA	NA
n-Propylbenzene	NE	NA	NA	NA	NA	NA	NA
p-Isopropyltoluene	NE	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NE	NA	NA	NA	NA	NA	NA
tert-Butylbenzene	NE	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (SVOCs) (ug/kg)							
Non-Carcinogenic PAHs							
Naphthalene	13000	370 U	380 U	170 J	79 J	18 J	390 U
2-Methylnaphthalene	36400	370 U	380 U	180 J	380 U	400 U	390 U
Acenaphthylene	41000	370 U	380 U	940 J	10 J	84 J	390 U
Acenaphthene	50000	13 J	380 U	170 J	13 J	400 U	390 U
Fluorene	50000	370 U	380 U	690 J	380 U	18 J	390 U
Phenanthrene	50000	140 J	380 U	6300	16 J	260 J	11 J
Benzo(g,h,i)perylene	50000	370 UJ	380 UJ	440 J	380 UJ	180 J	390 U
Anthracene	50000	22 J	380 U	1800	9 J	89 J	390 U
Fluoranthene	50000	140 J	380 U	4000	14 J	460	20 J
Pyrene	50000	180 J	380 U	6300 J	22 J	470	16 J
Total Non-Carcinogenic PAHs		495	0	20,990	163	1,579	47
Carcinogenic PAHs							
Benz(a)anthracene	224	70 J	380 U	**2400 J**	380 U	280 J	390 U
Chrysene	400	110 J	380 U	**3000 J**	380 U	300 J	390 U
Benzo(b)fluoranthene	1100	43 J	380 U	920 J	380 U	200 J	390 U
Benzo(k)fluoranthene	1100	49 J	380 U	**1400 J**	380 U	370 J	390 UJ
Benzo(a)pyrene	61	**69 J**	380 U	**2000**	380 U	**260 J**	390 U
Indeno(1,2,3-cd)pyrene	3200	370 UJ	380 UJ	520 J	380 UJ	200 J	390 U
Dibenz(a,h)anthracene	14	370 UJ	380 UJ	**170 J**	380 UJ	**65 J**	390 U
Total Carcinogenic PAHs		341	0	10,410	0	1,675	0
Total PAHs		836	0	31,400	163	3,254	47

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		66 Willow Avenue Parcel					
Site ID:	New York Recommended	SB-65	SB-65	SB-66	SB-66	SB-67	SB-67
Sample ID:	Soil Cleanup	CF-SB-65	CF-SB-65	CF-SB-66	CF-SB-66	CF-SB-67	CF-SB-67
Depth (feet):	Objectives	(0-4)	(4-8)	(0-2)	(12-16)	(0-4)	(4-6)
Constituent Date:	(RSCOs)	11/30/1999	11/30/1999	11/30/1999	11/30/1999	11/30/1999	11/30/1999
Other Semivolatile Organic Compounds							
2,4-Dimethylphenol	400	370 U	380 U	1500 U	380 U	400 U	390 U
2-Methylphenol	100	370 U	380 U	1500 U	380 U	400 U	390 U
4-Chloroaniline	220	370 U	380 U	1500 U	380 U	400 U	390 U
4-Methylphenol	900	370 U	380 U	1500 U	380 U	400 U	390 U
Benzoic acid	2700	1800 U	1900 U	7200 U	1900 U	46 J	1900 U
Benzyl alcohol	NE	370 U	380 U	1500 U	380 U	400 U	390 U
Butylbenzylphthalate	50000	370 UJ	380 U	1500 UJ	380 U	400 U	390 U
Carbazole	NE	19 J	380 U	120 J	380 U	31 J	390 U
Di-n-butylphthalate	8100	370 U	380 U	1500 U	380 U	400 U	390 U
Di-n-octylphthalate	50000	370 U	380 U	1500 U	380 U	400 U	390 U
Dibenzofuran	6200	370 U	380 U	110 J	380 U	400 U	390 U
Diethylphthalate	7100	370 U	7 J	1500 U	380 U	400 U	390 U
N-Nitrosodiphenylamine (1)	NE	370 U	380 U	1500 U	380 U	400 U	390 U
Phenol	30	370 U	380 U	1500 U	16 J	400 U	390 U
bis(2-Ethylhexyl)phthalate	50000	370 UJ	380 U	1500 UJ	380 U	400 U	390 U
Pesticides/Polychlorinated Biphenyls (ug/kg)							
4,4'-DDE	2100	NA	NA	NA	NA	NA	NA
4,4'-DDT	2100	NA	NA	NA	NA	NA	NA
Dieldrin	44	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	1000	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	20	NA	NA	NA	NA	NA	NA
Heptachlor	100	NA	NA	NA	NA	NA	NA
gamma-Chlordane	540	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)							
Cyanide	NE	0.56 UJ	0.56 UJ	6.71 J	0.57 UJ	0.73 J	0.57 UJ
Metals (mg/kg)							
Aluminum	NE	NA	NA	NA	NA	NA	NA
Antimony	NE	NA	NA	NA	NA	NA	NA
Arsenic	7.5	4.5	2.5 U	7.2	3.1U	**7.8**	4.2
Barium	300	41.2 B	43.4	89.4	29.2 B	103	38.5 B
Beryllium	0.16	NA	NA	NA	NA	NA	NA
Cadmium	1	0.21 UR	0.2 UR	0.21 UR	0.17 UR	0.23 U	0.22 U
Calcium	NE	NA	NA	NA	NA	NA	NA
Chromium	10	**50.6**	**22**	**37**	**47.1**	**29.1**	**31.1**
Cobalt	30	NA	NA	NA	NA	NA	NA
Copper	25	NA	NA	NA	NA	NA	NA
Iron	2000	NA	NA	NA	NA	NA	NA
Lead	500	4.6 J	5.1 J	198.0	5.9 J	406 J	6.8 J
Magnesium	NE	NA	NA	NA	NA	NA	NA
Manganese	NE	NA	NA	NA	NA	NA	NA
Mercury	0.1	0.0078 U	0.0079 U	**0.2 J**	0.0038 U	**1.2 J**	0.016 J
Nickel	13	NA	NA	NA	NA	NA	NA
Potassium	NE	NA	NA	NA	NA	NA	NA
Selenium	2	1.5	1.3	1.6	1.1	1.9	1.1 U
Silver	NE	0.21 UJ	0.2 UJ	0.21 UJ	0.17 UJ	0.23 U	0.22 U
Sodium	NE	NA	NA	NA	NA	NA	NA
Thallium	NE	NA	NA	NA	NA	NA	NA
Vanadium	150	NA	NA	NA	NA	NA	NA
Zinc	20	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Constituent	Parcel: / Site ID: / Sample ID: / Depth (feet): / Date:	New York Recommended Soil Cleanup Objectives (RSCOs)	66 Willow Avenue Parcel					
			SB-65 CF-SB-65 (0-4) 11/30/1999	SB-65 CF-SB-65 (4-8) 11/30/1999	SB-66 CF-SB-66 (0-2) 11/30/1999	SB-66 CF-SB-66 (12-16) 11/30/1999	SB-67 CF-SB-67 (0-4) 11/30/1999	SB-67 CF-SB-67 (4-6) 11/30/1999
Total Organic Carbon (TOC) (mg/kg)								
TOC		NE	1080 J	1260 J	23600 J	1210 J	7390 J	630 J
Toxicity Characteristic Leaching Procedure (mg/L)								
2-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA
4-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA
Acenaphthene (TCLP)		NE	NA	NA	NA	NA	NA	NA
Naphthalene (TCLP)		NE	NA	NA	NA	NA	NA	NA
Pyridine (TCLP)		NE	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		49 Lynhurst Avenue		51 Lynhurst Avenue			
Site ID:	New York Recommended	SB-58	SB-58	SB-59	SB-59	SB-80	SB-80
Sample ID:	Soil Cleanup	CF-SB-58	CF-SB-58	CF-SB-59	CF-SB-59	CF-SB-80	CF-SB-80
Depth (feet):	Objectives	(0-4)	(4-6)	(0-4)	(8-10)	(0-4)	(52-56)
Constituent Date:	(RSCOs)	11/30/1999	11/30/1999	11/29/1999	11/29/1999	06/03/2002	06/04/2002
Volatile Organic Compounds (VOCs) (ug/kg)							
Benzene	60	0.9 J	1 J	6 U	6 U	6 U	6 U
Toluene	1500	1 J	0.8 J	0.5 J	6 U	6 U	6 U
Ethylbenzene	5500	6 U	6 U	6 U	6 U	6 U	6 U
Xylenes (total)	1200	6 U	6 U	6 U	6 U	6 U	6 U
Total BTEX		2	2	1	0	0	0
Other Volatile Organic Compounds							
1,2,4-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA
2-Butanone	300	NA	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	1000	NA	NA	NA	NA	NA	NA
Acetone	200	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	600	NA	NA	NA	NA	NA	NA
Isopropylbenzene	NE	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	NA	NA	NA	NA	NA	NA
Styrene	NE	NA	NA	NA	NA	NA	NA
n-Butylbenzene	NE	NA	NA	NA	NA	NA	NA
n-Propylbenzene	NE	NA	NA	NA	NA	NA	NA
p-Isopropyltoluene	NE	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NE	NA	NA	NA	NA	NA	NA
tert-Butylbenzene	NE	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (SVOCs) (ug/kg)							
Non-Carcinogenic PAHs							
Naphthalene	13000	40 J	370 U	59 J	11 J	380 U	360 U
2-Methylnaphthalene	36400	31 J	370 U	44 J	390 U	380 U	360 U
Acenaphthylene	41000	120 J	15 J	240 J	22 J	110 J	360 U
Acenaphthene	50000	70 J	370 U	110 J	390 U	46 J	360 UJ
Fluorene	50000	73 J	370 U	91 J	390 U	40 J	360 U
Phenanthrene	50000	1200	50 J	1400	92 J	780	360 U
Benzo(g,h,i)perylene	50000	100 J	39 J	100 J	140 J	540	360 U
Anthracene	50000	210 J	12 J	350 J	27 J	140 J	360 U
Fluoranthene	50000	1400	76 J	1300	270 J	1200	360 U
Pyrene	50000	1900 J	110 J	1800	320 J	1300	360 U
Total Non-Carcinogenic PAHs		5,144	302	5,494	882	4,156	0
Carcinogenic PAHs							
Benz(a)anthracene	224	**750 J**	41 J	**900**	200 J	**580**	360 U
Chrysene	400	**1100 J**	64 J	**1100**	230 J	**730**	360 U
Benzo(b)fluoranthene	1100	470	41 J	1000 J	160 J	510	360 U
Benzo(k)fluoranthene	1100	540	44 J	**1800 J**	160 J	550	360 U
Benzo(a)pyrene	61	**700**	39 J	**920 J**	**210 J**	**560**	360 U
Indeno(1,2,3-cd)pyrene	3200	130 J	29 J	120 J	120 J	440	360 U
Dibenz(a,h)anthracene	14	**46 J**	370 UJ	390 UR	**42 J**	**160 J**	360 U
Total Carcinogenic PAHs		3,736	258	5,840	1,122	3,530	0
Total PAHs		8,880	560	11,334	2,004	7,686	0

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		49 Lynhurst Avenue		51 Lynhurst Avenue			
Site ID:	New York Recommended	SB-58	SB-58	SB-59	SB-59	SB-80	SB-80
Sample ID:	Soil Cleanup	CF-SB-58	CF-SB-58	CF-SB-59	CF-SB-59	CF-SB-80	CF-SB-80
Depth (feet):	Objectives	(0-4)	(4-6)	(0-4)	(8-10)	(0-4)	(52-56)
Constituent Date:	(RSCOs)	11/30/1999	11/30/1999	11/29/1999	11/29/1999	06/03/2002	06/04/2002
Other Semivolatile Organic Compounds							
2,4-Dimethylphenol	400	400 U	370 U	390 U	390 U	NA	NA
2-Methylphenol	100	400 U	370 U	390 U	390 U	NA	NA
4-Chloroaniline	220	400 U	370 U	390 U	390 U	NA	NA
4-Methylphenol	900	400 U	370 U	390 U	390 U	NA	NA
Benzoic acid	2700	30 J	1800 U	85 J	1900 U	NA	NA
Benzyl alcohol	NE	400 U	370 U	390 U	390 U	NA	NA
Butylbenzylphthalate	50000	400 UJ	370 U	89 J	390 U	NA	NA
Carbazole	NE	69 J	370 U	96 J	390 U	NA	NA
Di-n-butylphthalate	8100	400 U	370 U	390 U	390 U	NA	NA
Di-n-octylphthalate	50000	400 U	370 U	390 UR	390 U	NA	NA
Dibenzofuran	6200	30 J	370 U	37 J	390 U	NA	NA
Diethylphthalate	7100	400 U	370 U	390 U	390 U	NA	NA
N-Nitrosodiphenylamine (1)	NE	400 U	370 U	390 U	390 U	NA	NA
Phenol	30	400 U	370 U	390 U	390 U	NA	NA
bis(2-Ethylhexyl)phthalate	50000	230 J	370 U	650 B	180 JB	NA	NA
Pesticides/Polychlorinated Biphenyls (ug/kg)							
4,4'-DDE	2100	NA	NA	NA	NA	NA	NA
4,4'-DDT	2100	NA	NA	NA	NA	NA	NA
Dieldrin	44	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	1000	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	20	NA	NA	NA	NA	NA	NA
Heptachlor	100	NA	NA	NA	NA	NA	NA
gamma-Chlordane	540	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)							
Cyanide	NE	0.58 UJ	0.58 UJ	0.59 UJ	0.67 UJ	0.344 J	0.109 UJ
Metals (mg/kg)							
Aluminum	NE	NA	NA	NA	NA	NA	NA
Antimony	NE	NA	NA	NA	NA	NA	NA
Arsenic	7.5	**11.0**	3.8 U	**9.8**	2.6 U	5.5	1.9
Barium	300	**340**	90.0	174	143	186	47.7
Beryllium	0.16	NA	NA	NA	NA	NA	NA
Cadmium	1	0.59 J	0.19 UR	0.68 B	0.22 UR	0.99 U	0.85 U
Calcium	NE	NA	NA	NA	NA	NA	NA
Chromium	10	**29.3**	**31.4**	**21.8**	**21.7**	**26.6**	**13.2**
Cobalt	30	NA	NA	NA	NA	NA	NA
Copper	25	NA	NA	NA	NA	NA	NA
Iron	2000	NA	NA	NA	NA	NA	NA
Lead	500	**775**	42.2	**565 J**	12.1	436	7.3
Magnesium	NE	NA	NA	NA	NA	NA	NA
Manganese	NE	NA	NA	NA	NA	NA	NA
Mercury	0.1	**1.3 J**	**0.31 J**	**0.56 J**	0.093 J	**1.3**	0.085 U
Nickel	13	NA	NA	NA	NA	NA	NA
Potassium	NE	NA	NA	NA	NA	NA	NA
Selenium	2	**2.1**	0.95 U	1 U	1.2	1.6 UJ	1.4 UJ
Silver	NE	0.21 J	0.19 UJ	0.2 U	0.22 UJ	0.33 J	0.25 U
Sodium	NE	NA	NA	NA	NA	NA	NA
Thallium	NE	NA	NA	NA	NA	NA	NA
Vanadium	150	NA	NA	NA	NA	NA	NA
Zinc	20	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Constituent	Parcel: / Site ID: / Sample ID: / Depth (feet): / Date:	New York Recommended Soil Cleanup Objectives (RSCOs)	49 Lynhurst Avenue		51 Lynhurst Avenue			
			SB-58 CF-SB-58 (0-4) 11/30/1999	SB-58 CF-SB-58 (4-6) 11/30/1999	SB-59 CF-SB-59 (0-4) 11/29/1999	SB-59 CF-SB-59 (8-10) 11/29/1999	SB-80 CF-SB-80 (0-4) 06/03/2002	SB-80 CF-SB-80 (52-56) 06/04/2002
Total Organic Carbon (TOC) (mg/kg)								
TOC		NE	45800 J	3810 J	65600 J	3280 J	NA	NA
Toxicity Characteristic Leaching Procedure (mg/L)								
2-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA
4-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA
Acenaphthene (TCLP)		NE	NA	NA	NA	NA	NA	NA
Naphthalene (TCLP)		NE	NA	NA	NA	NA	NA	NA
Pyridine (TCLP)		NE	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		53 Lynhurst Avenue					55 Lynhurst Avenue	
Site ID:	New York Recommended	SB-60	SB-60 (dup)	SB-60	SB-87	SB-87	SB-61	SB-61
Sample ID:	Soil Cleanup	CF-SB-60	CF-SB-11/30/99	CF-SB-60	CF-SB-87	CF-SB-87	CF-SB-61	CF-SB-61
Depth (feet):	Objectives	(0-4)	(0-4)	(4-8)	(48-52)	(60-64)	(0-4)	(4-8)
Constituent Date:	(RSCOs)	11/30/1999	11/30/1999	11/30/1999	06/13/2002	06/13/2002	11/29/1999	11/29/1999
Volatile Organic Compounds (VOCs) (ug/kg)								
Benzene	60	0.4 J	2 J	0.4 J	**1200**	6	6 U	0.4 J
Toluene	1500	0.4 J	2 J	6 U	**5000**	0.6 J	6 U	0.7 J
Ethylbenzene	5500	6 U	6 U	6 U	1900	6 U	6 U	6 U
Xylenes (total)	1200	6 U	6 U	6 U	**14000**	6 U	6 U	6 U
Total BTEX		1	4	0	22,100	7	0	1
Other Volatile Organic Compounds								
1,2,4-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
2-Butanone	300	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	1000	NA	NA	NA	NA	NA	NA	NA
Acetone	200	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	600	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	NA	NA	NA	NA	NA	NA	NA
Styrene	NE	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
p-Isopropyltoluene	NE	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
tert-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (SVOCs) (ug/kg)								
Non-Carcinogenic PAHs								
Naphthalene	13000	11 J	360 U	390 U	**380000**	65 J	26 J	400 U
2-Methylnaphthalene	36400	780 U	360 U	390 U	**310000**	370 U	27 J	400 U
Acenaphthylene	41000	24 J	7 J	390 U	**95000**	370 U	240 J	400 U
Acenaphthene	50000	72 J	360 U	390 U	10000 J	370 U	460 U	400 U
Fluorene	50000	43 J	360 U	390 U	47000 J	370 U	22 J	400 U
Phenanthrene	50000	1200 J	79 J	11 J	**120000**	370 U	280 J	14 J
Benzo(g,h,i)perylene	50000	1100 J	75 J	390 UJ	75000 U	370 U	260 J	13 J
Anthracene	50000	270 J	20 J	390 U	30000 J	370 U	130 J	400 U
Fluoranthene	50000	1800 J	180 J	27 J	29000 J	370 U	540	28 J
Pyrene	50000	3400 J	280 J	40 J	43000 J	370 U	590	27 J
Total Non-Carcinogenic PAHs		7,920	641	78	1,064,000	65	2,115	82
Carcinogenic PAHs								
Benz(a)anthracene	224	**1200 J**	100 J	15 J	**16000 J**	370 U	**360 J**	18 J
Chrysene	400	**1500 J**	120 J	17 J	**16000 J**	370 U	**430 J**	20 J
Benzo(b)fluoranthene	1100	770 J	62 J	390 U	75000 U	370 U	290 J	16 J
Benzo(k)fluoranthene	1100	790 J	66 J	390 U	75000 U	370 U	490 J	28 J
Benzo(a)pyrene	61	**1100 J**	**88 J**	390 U	75000 U	370 U	**350 J**	18 J
Indeno(1,2,3-cd)pyrene	3200	860 J	50 J	390 UJ	75000 U	370 U	280 J	13 J
Dibenz(a,h)anthracene	14	**290 J**	360 UJ	390 UJ	75000 U	370 U	**98 J**	400 U
Total Carcinogenic PAHs		6,510	486	32	32,000	0	2,298	113
Total PAHs		14,430	1,127	110	1,096,000	65	4,413	195

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:	New York	53 Lynhurst Avenue					55 Lynhurst Avenue	
Site ID:	Recommended	SB-60	SB-60 (dup)	SB-60	SB-87	SB-87	SB-61	SB-61
Sample ID:	Soil Cleanup	CF-SB-60	CF-SB-11/30/99	CF-SB-60	CF-SB-87	CF-SB-87	CF-SB-61	CF-SB-61
Depth (feet):	Objectives	(0-4)	(0-4)	(4-8)	(48-52)	(60-64)	(0-4)	(4-8)
Constituent Date:	(RSCOs)	11/30/1999	11/30/1999	11/30/1999	06/13/2002	06/13/2002	11/29/1999	11/29/1999
Other Semivolatile Organic Compounds								
2,4-Dimethylphenol	400	780 U	360 U	390 U	NA	NA	460 UJ	400 U
2-Methylphenol	100	780 U	360 U	390 U	NA	NA	460 U	400 U
4-Chloroaniline	220	780 U	360 U	390 U	NA	NA	460 U	400 U
4-Methylphenol	900	780 U	360 U	390 U	NA	NA	460 U	400 U
Benzoic acid	2700	3800 U	1800 U	1900 U	NA	NA	55 J	140 J
Benzyl alcohol	NE	780 U	360 U	390 U	NA	NA	460 U	400 U
Butylbenzylphthalate	50000	780 U	360 U	390 U	NA	NA	460 U	400 U
Carbazole	NE	37 J	360 U	390 U	NA	NA	34 J	400 U
Di-n-butylphthalate	8100	780 U	360 U	390 U	NA	NA	460 U	400 U
Di-n-octylphthalate	50000	780 U	360 U	390 U	NA	NA	460 U	400 U
Dibenzofuran	6200	780 U	360 U	390 U	NA	NA	460 U	400 U
Diethylphthalate	7100	780 U	360 U	7 J	NA	NA	460 U	400 U
N-Nitrosodiphenylamine (1)	NE	780 U	360 U	390 U	NA	NA	460 U	400 U
Phenol	30	780 U	360 U	390 U	NA	NA	460 U	400 U
bis(2-Ethylhexyl)phthalate	50000	780 U	360 U	390 U	NA	NA	460 U	400 U
Pesticides/Polychlorinated Biphenyls (ug/kg)								
4,4'-DDE	2100	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	2100	NA	NA	NA	NA	NA	NA	NA
Dieldrin	44	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	1000	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	20	NA	NA	NA	NA	NA	NA	NA
Heptachlor	100	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	540	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)								
Cyanide	NE	0.62 UJ	0.62 UJ	0.59 UJ	0.114 U	0.113 U	0.63 UJ	0.69 UJ
Metals (mg/kg)								
Aluminum	NE	NA	NA	NA	NA	NA	NA	NA
Antimony	NE	NA	NA	NA	NA	NA	NA	NA
Arsenic	7.5	5.8	4.4 U	3.5 U	3.7	2.3	**10.7**	5.5
Barium	300	73.9	66.9	135.	47.9 J	50.5 J	110	147.
Beryllium	0.16	NA	NA	NA	NA	NA	NA	NA
Cadmium	1	0.23 UR	0.23 UR	0.18 UR	1 U	0.99 U	0.21 U	0.26 U
Calcium	NE	NA	NA	NA	NA	NA	NA	NA
Chromium	10	**22.9**	**20.9**	**32.2**	**12.2**	**12**	**52.2**	**54.8**
Cobalt	30	NA	NA	NA	NA	NA	NA	NA
Copper	25	NA	NA	NA	NA	NA	NA	NA
Iron	2000	NA	NA	NA	NA	NA	NA	NA
Lead	500	85.7	79.0	9.2 J	8.8 J	7.5 J	264 J	26.2 J
Magnesium	NE	NA	NA	NA	NA	NA	NA	NA
Manganese	NE	NA	NA	NA	NA	NA	NA	NA
Mercury	0.1	**0.47 J**	**0.43 J**	0.032 J	0.068 U	0.1 U	**0.43 J**	**0.19 J**
Nickel	13	NA	NA	NA	NA	NA	NA	NA
Potassium	NE	NA	NA	NA	NA	NA	NA	NA
Selenium	2	1.2 U	1.4	1.2	1.6 U	1.6 U	**2.3**	**2.3**
Silver	NE	0.23 UJ	0.23 UJ	0.18 UJ	0.3 UJ	0.3 UJ	0.21 U	0.26 U
Sodium	NE	NA	NA	NA	NA	NA	NA	NA
Thallium	NE	NA	NA	NA	NA	NA	NA	NA
Vanadium	150	NA	NA	NA	NA	NA	NA	NA
Zinc	20	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		New York	53 Lynhurst Avenue					55 Lynhurst Avenue	
	Site ID:	Recommended	SB-60	SB-60 (dup)	SB-60	SB-87	SB-87	SB-61	SB-61
	Sample ID:	Soil Cleanup	CF-SB-60	CF-SB-11/30/99	CF-SB-60	CF-SB-87	CF-SB-87	CF-SB-61	CF-SB-61
	Depth (feet):	Objectives	(0-4)	(0-4)	(4-8)	(48-52)	(60-64)	(0-4)	(4-8)
Constituent	Date:	(RSCOs)	11/30/1999	11/30/1999	11/30/1999	06/13/2002	06/13/2002	11/29/1999	11/29/1999
Total Organic Carbon (TOC) (mg/kg)									
TOC		NE	11700 J	18800 J	3660 J	NA	NA	33200 J	3180 J
Toxicity Characteristic Leaching Procedure (mg/L)									
2-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
Acenaphthene (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
Naphthalene (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
Pyridine (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		59 Lynhurst Avenue				63 Lynhurst Avenue		
Site ID:	New York Recommended	SB-62	SB-62	SB-77	SB-77	SB-79	SB-79 (dup)	SB-79A
Sample ID:	Soil Cleanup	CF-SB-62	CF-SB-62	SB-77	SB-77	CF-SB-79	CF-SB-79	CF-SB-79A
Depth (feet):	Objectives	(0-4)	(4-6)	(24-28)	(37-39)	(24-28)	(20-24)	(51-55)
Constituent Date:	(RSCOs)	11/29/1999	11/29/1999	11/20/2001	11/20/2001	06/04/2002	06/04/2002	06/05/2002
Volatile Organic Compounds (VOCs) (ug/kg)								
Benzene	60	6 U	0.2 J	5600 U	2800 U	6 U	5 U	**4800 J**
Toluene	1500	6 U	1 J	5600 U	2800 U	0.5 J	0.5 J	**60000**
Ethylbenzene	5500	6 U	1 J	5600 U	1400 J	6 U	5 U	**6600 J**
Xylenes (total)	1200	6 U	6 UJ	**14000**	**17000**	6 U	2 J	**84000**
Total BTEX		0	2	14,000	18,400	1	3	155,400
Other Volatile Organic Compounds								
1,2,4-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
2-Butanone	300	NA	NA	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	1000	NA	NA	NA	NA	NA	NA	NA
Acetone	200	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	600	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	100	NA	NA	NA	NA	NA	NA	NA
Styrene	NE	NA	NA	NA	NA	NA	NA	NA
n-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
n-Propylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
p-Isopropyltoluene	NE	NA	NA	NA	NA	NA	NA	NA
sec-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
tert-Butylbenzene	NE	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (SVOCs) (ug/kg)								
Non-Carcinogenic PAHs								
Naphthalene	13000	380 U	380 U	9900	**670000**	150 J	100 J	**800000 J**
2-Methylnaphthalene	36400	380 U	380 U	12000	**450000**	360 U	360 U	**520000**
Acenaphthylene	41000	17 J	380 U	3700	**160000**	360 U	360 U	**170000 J**
Acenaphthene	50000	380 U	380 U	570 J	17000 J	28 J	360 U	15000 J
Fluorene	50000	380 U	380 U	2000	**79000 J**	360 U	360 U	**70000 J**
Phenanthrene	50000	58 J	18 J	5400	**190000**	360 U	360 U	**180000 J**
Benzo(g,h,i)perylene	50000	32 J	18 J	1500 U	150000 U	360 U	360 U	190000 U
Anthracene	50000	27 J	380 U	1600	46000 J	360 U	360 U	46000 J
Fluoranthene	50000	160 J	37 J	1500 J	**52000 J**	360 U	360 U	43000 J
Pyrene	50000	130 J	35 J	2300	**74000 J**	360 U	360 U	**65000 J**
Total Non-Carcinogenic PAHs		424	108	38,970	1,738,000	178	100	1,909,000
Carcinogenic PAHs								
Benz(a)anthracene	224	80 J	24 J	**880 J**	**27000 J**	360 U	360 U	**26000 J**
Chrysene	400	70 J	27 J	**840 J**	**27000 J**	360 U	360 U	**26000 J**
Benzo(b)fluoranthene	1100	47 J	18 J	230 J	150000 U	360 U	360 U	190000 U
Benzo(k)fluoranthene	1100	98 J	34 J	370 J	150000 U	360 U	360 U	190000 U
Benzo(a)pyrene	61	**63 J**	26 J	**580 J**	**18000 J**	360 U	360 U	**16000 J**
Indeno(1,2,3-cd)pyrene	3200	37 J	17 J	1500 U	150000 U	360 U	360 U	190000 U
Dibenz(a,h)anthracene	14	13 J	380 U	1500 U	150000 U	360 U	360 U	190000 U
Total Carcinogenic PAHs		408	146	2,900	72,000	0	0	68,000
Total PAHs		832	254	41,870	1,810,000	178	100	1,977,000

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		59 Lynhurst Avenue				63 Lynhurst Avenue		
Site ID:	New York Recommended	SB-62	SB-62	SB-77	SB-77	SB-79	SB-79 (dup)	SB-79A
Sample ID:	Soil Cleanup	CF-SB-62	CF-SB-62	SB-77	SB-77	CF-SB-79	CF-SB-79	CF-SB-79A
Depth (feet):	Objectives	(0-4)	(4-6)	(24-28)	(37-39)	(24-28)	(20-24)	(51-55)
Constituent Date:	(RSCOs)	11/29/1999	11/29/1999	11/20/2001	11/20/2001	06/04/2002	06/04/2002	06/05/2002
Other Semivolatile Organic Compounds								
2,4-Dimethylphenol	400	380 U	380 U	NA	NA	NA	NA	NA
2-Methylphenol	100	380 U	380 U	NA	NA	NA	NA	NA
4-Chloroaniline	220	380 U	380 U	NA	NA	NA	NA	NA
4-Methylphenol	900	380 U	380 U	NA	NA	NA	NA	NA
Benzoic acid	2700	1800 U	50 J	NA	NA	NA	NA	NA
Benzyl alcohol	NE	380 U	380 U	NA	NA	NA	NA	NA
Butylbenzylphthalate	50000	380 U	380 U	NA	NA	NA	NA	NA
Carbazole	NE	380 U	380 U	NA	NA	NA	NA	NA
Di-n-butylphthalate	8100	380 U	380 U	NA	NA	NA	NA	NA
Di-n-octylphthalate	50000	380 U	380 U	NA	NA	NA	NA	NA
Dibenzofuran	6200	380 U	380 U	NA	NA	NA	NA	NA
Diethylphthalate	7100	380 U	380 U	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine (1)	NE	380 U	380 U	NA	NA	NA	NA	NA
Phenol	30	380 U	380 U	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	50000	380 U	380 U	NA	NA	NA	NA	NA
Pesticides/Polychlorinated Biphenyls (ug/kg)								
4,4'-DDE	2100	NA	NA	NA	NA	NA	NA	NA
4,4'-DDT	2100	NA	NA	NA	NA	NA	NA	NA
Dieldrin	44	NA	NA	NA	NA	NA	NA	NA
Endosulfan sulfate	1000	NA	NA	NA	NA	NA	NA	NA
Heptachlor epoxide	20	NA	NA	NA	NA	NA	NA	NA
Heptachlor	100	NA	NA	NA	NA	NA	NA	NA
gamma-Chlordane	540	NA	NA	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)								
Cyanide	NE	0.6 UJ	0.62 UJ	0.110 U	0.108 U	0.105 UJ	0.109 UJ	0.112 UJ
Metals (mg/kg)								
Aluminum	NE	NA	NA	NA	NA	NA	NA	NA
Antimony	NE	NA	NA	NA	NA	NA	NA	NA
Arsenic	7.5	**8**	4.3	3.6	2.5	3.1	3.3	1.8 J
Barium	300	138.	104.	51.1	112	51.2	64.7	44.5
Beryllium	0.16	NA	NA	NA	NA	NA	NA	NA
Cadmium	1	0.23 U	0.21 U	0.21 U	0.25 U	1 U	0.89 U	0.98 U
Calcium	NE	NA	NA	NA	NA	NA	NA	NA
Chromium	10	**38.3**	**29.5**	**33.7 J**	**14 J**	**17.8**	**27.2**	**11.4 J**
Cobalt	30	NA	NA	NA	NA	NA	NA	NA
Copper	25	NA	NA	NA	NA	NA	NA	NA
Iron	2000	NA	NA	NA	NA	NA	NA	NA
Lead	500	235 J	32.9 J	8.3 J	7.6 J	7.2	6.9	6.8 J
Magnesium	NE	NA	NA	NA	NA	NA	NA	NA
Manganese	NE	NA	NA	NA	NA	NA	NA	NA
Mercury	0.1	0.045 J	0.026 J	0.0014 J	0.0011 J	0.093 U	0.091 U	0.083 U
Nickel	13	NA	NA	NA	NA	NA	NA	NA
Potassium	NE	NA	NA	NA	NA	NA	NA	NA
Selenium	2	1.4	1 U	1.2 U	1.4 U	1.6 UJ	1.4 UJ	1.6 UJ
Silver	NE	0.23 U	0.21 U	0.19 U	0.23 U	0.3 U	0.27 U	0.3 U
Sodium	NE	NA	NA	NA	NA	NA	NA	NA
Thallium	NE	NA	NA	NA	NA	NA	NA	NA
Vanadium	150	NA	NA	NA	NA	NA	NA	NA
Zinc	20	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:			59 Lynhurst Avenue				63 Lynhurst Avenue		
Site ID:		New York Recommended	SB-62	SB-62	SB-77	SB-77	SB-79	SB-79 (dup)	SB-79A
Sample ID:		Soil Cleanup	CF-SB-62	CF-SB-62	SB-77	SB-77	CF-SB-79	CF-SB-79	CF-SB-79A
Depth (feet):		Objectives	(0-4)	(4-6)	(24-28)	(37-39)	(24-28)	(20-24)	(51-55)
Constituent	Date:	(RSCOs)	11/29/1999	11/29/1999	11/20/2001	11/20/2001	06/04/2002	06/04/2002	06/05/2002
Total Organic Carbon (TOC) (mg/kg)									
TOC		NE	1570 J	2720 J	NA	NA	NA	NA	NA
Toxicity Characteristic Leaching Procedure (mg/L)									
2-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
4-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
Acenaphthene (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
Naphthalene (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA
Pyridine (TCLP)		NE	NA	NA	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		Lynhurst Avenue				
Site ID:	New York Recommended	SB-78	SB-78	SB-78 (dup)	SB-84	SB-84
Sample ID:	Soil Cleanup	SB-78	SB-78	SB-98	CF-SB-84	CF-SB-84
Depth (feet):	Objectives	(49-50)	(114-115)	(114-115)	(40-44)	(48-52)
Constituent Date:	(RSCOs)	12/13/2001	12/13/2001	12/13/2001	06/21/2002	06/21/2002
Volatile Organic Compounds (VOCs) (ug/kg)						
Benzene	60	11000 U	6 J	3 J	6 U	6 U
Toluene	1500	**15000**	6 U	6 U	6 U	6 U
Ethylbenzene	5500	**10000 J**	3 J	0.8 J	6 U	6 U
Xylenes (total)	1200	**130000**	2 J	1 J	6 U	6 U
Total BTEX		155,000	11	5	0	0
Other Volatile Organic Compounds						
1,2,4-Trimethylbenzene	NE	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	NE	NA	NA	NA	NA	NA
2-Butanone	300	NA	NA	NA	NA	NA
4-Methyl-2-Pentanone	1000	NA	NA	NA	NA	NA
Acetone	200	NA	NA	NA	NA	NA
Carbon Tetrachloride	600	NA	NA	NA	NA	NA
Isopropylbenzene	NE	NA	NA	NA	NA	NA
Methylene Chloride	100	NA	NA	NA	NA	NA
Styrene	NE	NA	NA	NA	NA	NA
n-Butylbenzene	NE	NA	NA	NA	NA	NA
n-Propylbenzene	NE	NA	NA	NA	NA	NA
p-Isopropyltoluene	NE	NA	NA	NA	NA	NA
sec-Butylbenzene	NE	NA	NA	NA	NA	NA
tert-Butylbenzene	NE	NA	NA	NA	NA	NA
Semivolatile Organic Compounds (SVOCs) (ug/kg)						
Non-Carcinogenic PAHs						
Naphthalene	13000	**2100000**	95 J	110 J	360 U	370 U
2-Methylnaphthalene	36400	**1400000**	360 U	59 J	360 U	370 U
Acenaphthylene	41000	**420000**	360 U	83 J	180 J	370 U
Acenaphthene	50000	42000 J	360 U	18 J	37 J	370 U
Fluorene	50000	**180000 J**	360 U	390 U	260 J	370 U
Phenanthrene	50000	**420000**	360 U	170 J	1200	370 U
Benzo(g,h,i)perylene	50000	360000 U	360 U	390 U	360 U	370 U
Anthracene	50000	**120000 J**	360 U	48 J	320 J	370 U
Fluoranthene	50000	**110000 J**	360 U	50 J	350 J	370 U
Pyrene	50000	**150000 J**	360 U	57 J	540	370 U
Total Non-Carcinogenic PAHs		4,942,000	95	595	2,887	0
Carcinogenic PAHs						
Benz(a)anthracene	224	**54000 J**	360 U	390 U	180 J	370 U
Chrysene	400	**57000 J**	360 U	390 U	190 J	370 U
Benzo(b)fluoranthene	1100	360000 U	360 U	390 U	360 U	370 U
Benzo(k)fluoranthene	1100	360000 U	360 U	390 U	360 U	370 U
Benzo(a)pyrene	61	360000 U	360 U	390 U	**120 J**	370 U
Indeno(1,2,3-cd)pyrene	3200	360000 U	360 U	390 U	360 U	370 U
Dibenz(a,h)anthracene	14	360000 U	360 U	390 U	360 U	370 U
Total Carcinogenic PAHs		111,000	0	0	490	0
Total PAHs		5,053,000	95	595	3,377	0

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		Lynhurst Avenue				
Site ID:	New York Recommended	SB-78	SB-78	SB-78 (dup)	SB-84	SB-84
Sample ID:	Soil Cleanup	SB-78	SB-78	SB-98	CF-SB-84	CF-SB-84
Depth (feet):	Objectives	(49-50)	(114-115)	(114-115)	(40-44)	(48-52)
Constituent Date:	(RSCOs)	12/13/2001	12/13/2001	12/13/2001	06/21/2002	06/21/2002
Other Semivolatile Organic Compounds						
2,4-Dimethylphenol	400	NA	NA	NA	NA	NA
2-Methylphenol	100	NA	NA	NA	NA	NA
4-Chloroaniline	220	NA	NA	NA	NA	NA
4-Methylphenol	900	NA	NA	NA	NA	NA
Benzoic acid	2700	NA	NA	NA	NA	NA
Benzyl alcohol	NE	NA	NA	NA	NA	NA
Butylbenzylphthalate	50000	NA	NA	NA	NA	NA
Carbazole	NE	NA	NA	NA	NA	NA
Di-n-butylphthalate	8100	NA	NA	NA	NA	NA
Di-n-octylphthalate	50000	NA	NA	NA	NA	NA
Dibenzofuran	6200	NA	NA	NA	NA	NA
Diethylphthalate	7100	NA	NA	NA	NA	NA
N-Nitrosodiphenylamine (1)	NE	NA	NA	NA	NA	NA
Phenol	30	NA	NA	NA	NA	NA
bis(2-Ethylhexyl)phthalate	50000	NA	NA	NA	NA	NA
Pesticides/Polychlorinated Biphenyls (ug/kg)						
4,4'-DDE	2100	NA	NA	NA	NA	NA
4,4'-DDT	2100	NA	NA	NA	NA	NA
Dieldrin	44	NA	NA	NA	NA	NA
Endosulfan sulfate	1000	NA	NA	NA	NA	NA
Heptachlor epoxide	20	NA	NA	NA	NA	NA
Heptachlor	100	NA	NA	NA	NA	NA
gamma-Chlordane	540	NA	NA	NA	NA	NA
Total Cyanide (mg/kg)						
Cyanide	NE	0.106 U	0.113 U	0.116 U	0.111 R	0.107 R
Metals (mg/kg)						
Aluminum	NE	NA	NA	NA	NA	NA
Antimony	NE	NA	NA	NA	NA	NA
Arsenic	7.5	2.8	1.1 J	1.3 J	2.8	1.9
Barium	300	136	87.1 J	33.1 J	67.4	42.2
Beryllium	0.16	NA	NA	NA	NA	NA
Cadmium	1	0.31 J	0.72 J	2.8 U	0.98 U	0.85 U
Calcium	NE	NA	NA	NA	NA	NA
Chromium	10	**13.3**	**40.6**	**12.3 J**	**14.9**	**12.8**
Cobalt	30	NA	NA	NA	NA	NA
Copper	25	NA	NA	NA	NA	NA
Iron	2000	NA	NA	NA	NA	NA
Lead	500	7.6 J	91.4 J	2.4 B	7.2	6.3
Magnesium	NE	NA	NA	NA	NA	NA
Manganese	NE	NA	NA	NA	NA	NA
Mercury	0.1	0.071 U	0.067 U	0.077 J	0.097 UJ	0.091 UJ
Nickel	13	NA	NA	NA	NA	NA
Potassium	NE	NA	NA	NA	NA	NA
Selenium	2	16.4 U	15.1 U	15.2 U	1.6 U	1.4 U
Silver	NE	3.1 U	0.51	2.8 U	0.29 U	0.25 U
Sodium	NE	NA	NA	NA	NA	NA
Thallium	NE	NA	NA	NA	NA	NA
Vanadium	150	NA	NA	NA	NA	NA
Zinc	20	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Constituent	Parcel: / Site ID: / Sample ID: / Depth (feet): / Date:	New York Recommended Soil Cleanup Objectives (RSCOs)	Lynhurst Avenue				
			SB-78 SB-78 (49-50) 12/13/2001	SB-78 SB-78 (114-115) 12/13/2001	SB-78 (dup) SB-98 (114-115) 12/13/2001	SB-84 CF-SB-84 (40-44) 06/21/2002	SB-84 CF-SB-84 (48-52) 06/21/2002
Total Organic Carbon (TOC) (mg/kg)							
TOC		NE	NA	NA	NA	NA	NA
Toxicity Characteristic Leaching Procedure (mg/L)							
2-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA
4-Methylphenol (TCLP)		NE	NA	NA	NA	NA	NA
Acenaphthene (TCLP)		NE	NA	NA	NA	NA	NA
Naphthalene (TCLP)		NE	NA	NA	NA	NA	NA
Pyridine (TCLP)		NE	NA	NA	NA	NA	NA

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		Lynhurst Avenue					
Site ID:	New York Recommended	SB-85	SB-85	SB-86	SB-86 (dup)	SB-86	
Sample ID:	Soil Cleanup	CF-SB-85	CF-SB-85	CF-SB-86	CF-SB-86	CF-SB-86	Frequency
Depth (feet):	Objectives	(40-44)	(48-51)	(40-44)	(40-44)	(48-52)	of
Constituent Date:	(RSCOs)	06/19/2002	06/19/2002	06/20/2002	06/20/2002	06/20/2002	Exceedance
Volatile Organic Compounds (VOCs) (ug/kg)							
Benzene	60	6 U	6 U	6 U	6 U	6 U	42
Toluene	1500	6 U	6 U	6 U	6 U	6 U	31
Ethylbenzene	5500	6 U	6 U	6 U	6 U	6 U	28
Xylenes (total)	1200	6 U	6 U	6 U	6 U	6 U	39
Total BTEX		0	0	0	0	0	
Other Volatile Organic Compounds							
1,2,4-Trimethylbenzene	NE	NA	NA	NA	NA	NA	0
1,3,5-Trimethylbenzene	NE	NA	NA	NA	NA	NA	0
2-Butanone	300	NA	NA	NA	NA	NA	0
4-Methyl-2-Pentanone	1000	NA	NA	NA	NA	NA	0
Acetone	200	NA	NA	NA	NA	NA	0
Carbon Tetrachloride	600	NA	NA	NA	NA	NA	0
Isopropylbenzene	NE	NA	NA	NA	NA	NA	0
Methylene Chloride	100	NA	NA	NA	NA	NA	0
Styrene	NE	NA	NA	NA	NA	NA	0
n-Butylbenzene	NE	NA	NA	NA	NA	NA	0
n-Propylbenzene	NE	NA	NA	NA	NA	NA	0
p-Isopropyltoluene	NE	NA	NA	NA	NA	NA	0
sec-Butylbenzene	NE	NA	NA	NA	NA	NA	0
tert-Butylbenzene	NE	NA	NA	NA	NA	NA	0
Semivolatile Organic Compounds (SVOCs) (ug/kg)							
Non-Carcinogenic PAHs							
Naphthalene	13000	410 U	370 U	360 U	380 U	410 U	38
2-Methylnaphthalene	36400	410 U	370 U	360 U	380 U	410 U	32
Acenaphthylene	41000	410 U	370 U	360 U	380 U	410 U	22
Acenaphthene	50000	410 U	370 U	360 U	380 U	410 U	9
Fluorene	50000	410 U	370 U	360 U	380 U	410 U	18
Phenanthrene	50000	410 U	370 U	360 U	380 U	410 U	26
Benzo(g,h,i)perylene	50000	410 U	370 U	360 U	380 U	410 U	4
Anthracene	50000	410 U	370 U	360 U	380 U	410 U	9
Fluoranthene	50000	410 U	370 U	360 U	380 U	410 U	10
Pyrene	50000	410 U	370 U	360 U	380 U	410 U	21
Total Non-Carcinogenic PAHs		0	0	0	0	0	
Carcinogenic PAHs							
Benz(a)anthracene	224	410 U	370 U	360 U	380 U	410 U	55
Chrysene	400	410 U	370 U	360 U	380 U	410 U	54
Benzo(b)fluoranthene	1100	410 U	370 U	360 U	380 U	410 U	17
Benzo(k)fluoranthene	1100	410 U	370 U	360 U	380 U	410 U	24
Benzo(a)pyrene	61	410 U	370 U	360 U	380 U	410 U	60
Indeno(1,2,3-cd)pyrene	3200	410 U	370 U	360 U	380 U	410 U	11
Dibenz(a,h)anthracene	14	410 U	370 U	360 U	380 U	410 U	19
Total Carcinogenic PAHs		0	0	0	0	0	
Total PAHs		0	0	0	0	0	

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Parcel:		Lynhurst Avenue					
Site ID:	New York	SB-85	SB-85	SB-86	SB-86 (dup)	SB-86	
Sample ID:	Recommended	CF-SB-85	CF-SB-85	CF-SB-86	CF-SB-86	CF-SB-86	Frequency
Depth (feet):	Soil Cleanup	(40-44)	(48-51)	(40-44)	(40-44)	(48-52)	of
Constituent Date:	Objectives (RSCOs)	06/19/2002	06/19/2002	06/20/2002	06/20/2002	06/20/2002	Exceedance
Other Semivolatile Organic Compounds							
2,4-Dimethylphenol	400	NA	NA	NA	NA	NA	0
2-Methylphenol	100	NA	NA	NA	NA	NA	1
4-Chloroaniline	220	NA	NA	NA	NA	NA	1
4-Methylphenol	900	NA	NA	NA	NA	NA	0
Benzoic acid	2700	NA	NA	NA	NA	NA	0
Benzyl alcohol	NE	NA	NA	NA	NA	NA	0
Butylbenzylphthalate	50000	NA	NA	NA	NA	NA	0
Carbazole	NE	NA	NA	NA	NA	NA	0
Di-n-butylphthalate	8100	NA	NA	NA	NA	NA	0
Di-n-octylphthalate	50000	NA	NA	NA	NA	NA	0
Dibenzofuran	6200	NA	NA	NA	NA	NA	5
Diethylphthalate	7100	NA	NA	NA	NA	NA	0
N-Nitrosodiphenylamine (1)	NE	NA	NA	NA	NA	NA	0
Phenol	30	NA	NA	NA	NA	NA	3
bis(2-Ethylhexyl)phthalate	50000	NA	NA	NA	NA	NA	0
Pesticides/Polychlorinated Biphenyls (ug/kg)							
4,4'-DDE	2100	NA	NA	NA	NA	NA	0
4,4'-DDT	2100	NA	NA	NA	NA	NA	0
Dieldrin	44	NA	NA	NA	NA	NA	0
Endosulfan sulfate	1000	NA	NA	NA	NA	NA	0
Heptachlor epoxide	20	NA	NA	NA	NA	NA	0
Heptachlor	100	NA	NA	NA	NA	NA	0
gamma-Chlordane	540	NA	NA	NA	NA	NA	0
Total Cyanide (mg/kg)							
Cyanide	NE	0.122 U	0.113 U	0.109 U	0.113 U	0.125 U	0
Metals (mg/kg)							
Aluminum	NE	NA	NA	NA	NA	NA	0
Antimony	NE	NA	NA	NA	NA	NA	0
Arsenic	7.5	2 J	3.7	2.6	3.5	5.2	7
Barium	300	53.1	38	59.1	67	52.4	1
Beryllium	0.16	NA	NA	NA	NA	NA	0
Cadmium	1	1.1 U	0.81 U	0.9 U	0.88 U	1 U	8
Calcium	NE	NA	NA	NA	NA	NA	0
Chromium	10	**10.6**	**20.5**	**12.7**	**18.9**	**13.1**	63
Cobalt	30	NA	NA	NA	NA	NA	0
Copper	25	NA	NA	NA	NA	NA	0
Iron	2000	NA	NA	NA	NA	NA	0
Lead	500	5.6	3.7	6	8.4	6.6	5
Magnesium	NE	NA	NA	NA	NA	NA	0
Manganese	NE	NA	NA	NA	NA	NA	0
Mercury	0.1	0.1 U	0.074 U	0.08 U	0.097 U	0.099 U	14
Nickel	13	NA	NA	NA	NA	NA	0
Potassium	NE	NA	NA	NA	NA	NA	0
Selenium	2	1.8 U	1.3 U	1.4 U	1.4 U	1.6 U	4
Silver	NE	0.33 U	0.24 U	0.27 U	0.26 U	0.3 U	0
Sodium	NE	NA	NA	NA	NA	NA	0
Thallium	NE	NA	NA	NA	NA	NA	0
Vanadium	150	NA	NA	NA	NA	NA	0
Zinc	20	NA	NA	NA	NA	NA	0

Table 4-2 (continued)
Subsurface-Soil Analytical Results Summary Table
OU-1
Clifton Former MGP Site
April 1993 through June 2002

Constituent / Parcel / Site ID / Sample ID / Depth (feet) / Date:	New York Recommended Soil Cleanup Objectives (RSCOs)	Lynhurst Avenue					
		SB-85 CF-SB-85 (40-44) 06/19/2002	SB-85 CF-SB-85 (48-51) 06/19/2002	SB-86 CF-SB-86 (40-44) 06/20/2002	SB-86 (dup) CF-SB-86 (40-44) 06/20/2002	SB-86 CF-SB-86 (48-52) 06/20/2002	Frequency of Exceedance
Total Organic Carbon (TOC) (mg/kg)							
TOC	NE	NA	NA	NA	NA	NA	0
Toxicity Characteristic Leaching Procedure (mg/L)							
2-Methylphenol (TCLP)	NE	NA	NA	NA	NA	NA	0
4-Methylphenol (TCLP)	NE	NA	NA	NA	NA	NA	0
Acenaphthene (TCLP)	NE	NA	NA	NA	NA	NA	0
Naphthalene (TCLP)	NE	NA	NA	NA	NA	NA	0
Pyridine (TCLP)	NE	NA	NA	NA	NA	NA	0

Notes:
Only detected analytes are shown on the table.
* site background
NE - not established
NA - not analyzed
J - estimated value
U - indicates not detected to the reporting limit for organic analysis and the method detection limit for inorganic analysis
UJ - estimated detection limit
-- unable to calculate because it was non-detected or not analyzed
(dup) - indicates duplicate sample
Shading/bolding indicates an exceedance of established New York State Recommended Soil Cleanup Objectives for residential soils.
D - identifies all compounds in the analysis completed at secondary dilution factor
R - the reported results or detection limits are estimated or rejected based upon the recovery
B - analyte was found within the laboratory method blank 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 (organics); or indicates analyte result was between IDL and contract required detection limit (metals)
T - indicates total concentration detected
TCLP - Toxicity Characteristic Leaching Procedure
- Naphthalene was tested by and reported under the VOC and SVOC analyses. The higher concentration is reported.
mg/L - milligrams/liter
mg/kg - milligrams/kilogram or parts per million (ppm)
ug/kg - micrograms/kilogram or parts per billion (ppb)
JB - estimated detection limit/analyte was found within laboratory method blank
N - spiked sample recovery was not within control limits (metals)

Prepared By: AMM/SJG
Checked By: PHH

Table 4-3
Summary of Surface-Soil Data
Residential Lots (49 to 67 Lynhurst Avenue) and Background Surface-Soil Samples
Clifton Former MGP Site

Compound	Residential Lots (49 to 67 Lynhurst Avenue)			Background Surface Soils		
	Minimum	Maximum	Mean	Minimum	Maximum	Mean
Volatile Organic Compounds (BTEX) (ppm)						
BTEX	0.0	0.0024	0.00067	0.0	0.001	0.00035
Semivolatile Organic Compounds (PAHs) (ppm)						
PAHs	1.237	38.127	10.664	5.334	91.94	22.746
8 RCRA Metals (ppm)						
Arsenic	5.0	16.1	10.82	5.6	26.4	10.17
Barium	61.3	537	225	59.9	160	110
Cadmium	0.0	4.7	1.6	0.0	1.7	0.81
Chromium	23	138	52.07	18.8	66.1	32.44
Lead	0.0	2,810	628.20	169	744	338
Mercury	0.13	0.97	0.5	0.18	0.82	0.39
Selenium	0.0	4.7	1.93	1.1	2.4	1.7
Silver	0.0	0.74	0.16	0.0	0.47	0.13
Total Cyanide (TCN) (ppm)						
TCN	0.0	1.94	0.38	0.0	2.74	0.36
Total Organic Carbon (TOC) (ppm)						
TOC	22,000	142,000	79,637	15,000	105,000	51,436

Notes:
BTEX is benzene, toluene, ethylbenze, and xylene.
PAHs are polycyclic aromatic hydrocarbons.
Minimum is the lowest concentration for an analysis.
Maximum is the highest concentration for an analysis.
Mean is the arithmetic mean for an analysis.
ppm indicates parts per million

Table 4-4
Groundwater Analytical Results
OU-1
Clifton Former MGP Site
April 1993 through January 2002

Parcel:	NY State Ambient	40 Willow Avenue Parcel				
Site ID:	Groundwater	FPM-MW-01	FPM-MW-01	FPM-MW-02	FPM-MW-02	FPM-MW-03
Sample ID:	Quality Standards	MW-1	MW-1	MW-2	MW-2	MW-3
Constituent Date:	(GA)	04/14/1993	06/29/1994	04/14/1993	06/29/1994	04/14/1993
Volatile Organic Compounds (ug/L)						
Benzene	1	10 U	1 U	10 U	1 U	10 U
Toluene	5	10 U	1 U	10 U	1 U	10 U
Ethylbenzene	5	10 U	1	10 U	2	10 U
Xylene (total)	5	10 U	4	**17**	**12**	10 U
Total BTEX		0	5	17	14	0
Other Volatile Organic Compounds						
1,2,4-Trimethylbenzene	5	NA	3	NA	3	NA
1,3,5-Trimethylbenzene	5	NA	3	NA	2	NA
Acetone	50*	30	NA	13	NA	25
Methyl bromide	5	10 U	NA	10 U	NA	10 U
Methyl chloride	5	10 U	NA	10 U	NA	10 U
n-Butylbenzene	5	NA	**6**	NA	**13**	NA
n-Propylbenzene	5	NA	**6**	NA	1	NA
p-Isopropyltoluene	5	NA	1	NA	1 U	NA
sec-Butylbenzene	5	NA	1	NA	1	NA
Styrene	5	10 U	NA	10 U	NA	10 U
Trichloroethylene	5	10 U	NA	10 U	NA	10 U
Semivolatile Organic Compounds (ug/L)						
Non-Carcinogenic PAHs						
2-Methylnaphthalene	NE	10 U	NA	10 U	NA	10 U
Acenaphthene	20*	10 U	1 U	10 U	1 U	10 U
Acenaphthylene	NE	10 U	NA	10 U	NA	22
Anthracene	50*	10 U	1 U	10 U	1 U	10 U
Benzo(g,h,i)perylene	NE	10 U	1 U	10 U	1 U	10 U
Fluoranthene	50*	10 U	1 U	10 U	1 U	10 U
Fluorene	50*	10 U	1 U	10 U	1 U	10 U
Naphthalene	10*	10 U	4 #	10 U	**16 #**	10 U
Phenanthrene	50*	10 U	1 U	10 U	1 U	10 U
Pyrene	50*	10 U	1 U	10 U	1	10 U
Total Non-Carcinogenic PAHs		0	4	0	17	22
Carcinogenic PAHs						
Benz(a)anthracene	0.002*	10 U	1 U	10 U	1 U	10 U
Benzo(b)fluoranthene	0.002*	10 U	1 U	10 U	1 U	10 U
Benzo(k)fluoranthene	0.002*	10 U	1 U	10 U	1 U	10 U
Benzo(a)pyrene	ND	10 U	1 U	10 U	1 U	10 U
Chrysene	0.002*	10 U	1 U	10 U	1 U	10 U
Dibenz(a,h)anthracene	NE	10 U	1 U	10 U	1 U	10 U
Indeno(1,2,3-cd)pyrene	0.002*	10 U	1 U	10 U	1 U	10 U
Total Non-Carcinogenic PAHs		0	0	0	0	0
Total PAHs		0	4	0	17	22
Other Semivolatile Organic Compounds (ug/L)						
2,4-Dimethylphenol	50*	10 U	NA	10 U	NA	10 U
Benzoic acid	NE	NA	NA	NA	NA	NA
Carbazole	NE	10 U	NA	10 U	NA	10 U
Diethylphthalate	50*	10 U	NA	NA	NA	10 U
(2-Methylphenol) o-Cresol	1	10 U	NA	10 U	NA	10 U
(4-Methylphenol) p-Cresol	1	10 U	NA	10 U	NA	10 U
Phenol	1	10 U	NA	10 U	NA	10 U

Table 4-4
Groundwater Analytical Results
OU-1
Clifton Former MGP Site
April 1993 through January 2002

Parcel: / Site ID: / Sample ID: / Constituent / Date:	NY State Ambient Groundwater Quality Standards (GA)	40 Willow Avenue Parcel				
		FPM-MW-01	FPM-MW-01	FPM-MW-02	FPM-MW-02	FPM-MW-03
		MW-1	MW-1	MW-2	MW-2	MW-3
		04/14/1993	06/29/1994	04/14/1993	06/29/1994	04/14/1993
Inorganics (ug/L)						
Aluminum	NE	NA	NA	NA	NA	NA
Arsenic	25	NA	NA	NA	NA	NA
Barium	1000	NA	NA	NA	NA	NA
Cadmium	5	NA	NA	NA	NA	NA
Calcium	NE	NA	NA	NA	NA	NA
Chromium	50	NA	NA	NA	NA	NA
Copper	200	NA	NA	NA	NA	NA
Iron	300	NA	NA	NA	NA	NA
Lead	25	NA	NA	NA	NA	NA
Magnesium	35000*	NA	NA	NA	NA	NA
Manganese	300	NA	NA	NA	NA	NA
Nickel	100	NA	NA	NA	NA	NA
Potassium	NE	NA	NA	NA	NA	NA
Selenium	10	NA	NA	NA	NA	NA
Silver	50	NA	NA	NA	NA	NA
Sodium	20000	NA	NA	NA	NA	NA
Zinc	2000	NA	NA	NA	NA	NA
Total Cyanide (mg/L)						
Cyanide	200	NA	NA	NA	NA	NA
Cyanide, amenable	NE	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons (mg/L)						
TPH	NE	NA	NA	NA	NA	NA
Other (mg/L)						
Hardness, Total (as CaCO3)	NE	NA	NA	NA	NA	NA
Hardness, Calcium	NE	NA	NA	NA	NA	NA
Hardness, Magnesium	NE	NA	NA	NA	NA	NA
Total Dissolved Solids	NE	NA	NA	NA	NA	NA
Total Suspended Solids	NE	NA	NA	NA	NA	NA
pH	NE	NA	NA	NA	NA	NA
Ignitability (degrees F)	NE	NA	NA	NA	NA	NA

Table 4-4 (continued)
Groundwater Analytical Results
OU-1
Clifton Former MGP Site
April 1993 through January 2002

Parcel:	NY State Ambient	40 Willow Avenue Parcel					
Site ID:	Groundwater	FPM-MW-03	RW-04	RW-04 (dup)	RW-04	RW-07	RW-07
Sample ID:	Quality Standards	MW-3	CFRW04-01	CFRW14-01	CF-RW-04	CFRW07-01	CFTAR01[a]
Constituent Date:	(GA)	06/29/1994	03/31/1999	03/31/1999	10/11/1999	04/01/1999	04/01/1999
Volatile Organic Compounds (ug/L)							
Benzene	1	1 U	5 U	5 U	5 U	**20000**	**4500000**
Toluene	5	1 U	5 U	5 U	0.2 J	**9800**	**7400000**
Ethylbenzene	5	1 U	5 U	5 U	5 U	**290 J**	**730000 J**
Xylene (total)	5	2 U	5 U	5 U	5 U	**2200**	**6100000**
Total BTEX		0	0	0	0.2	32,290	18,730,000
Other Volatile Organic Compounds							
1,2,4-Trimethylbenzene	5	2	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	5	2	NA	NA	NA	NA	NA
Acetone	50*	NA	10 UJ	10 UJ	NA	2000 U	1400000 U
Methyl bromide	5	NA	10 U	10 U	NA	2000 U	1000000 U
Methyl chloride	5	NA	10 U	10 U	NA	2000 U	1000000 U
n-Butylbenzene	5	3	NA	NA	NA	NA	NA
n-Propylbenzene	5	1	NA	NA	NA	NA	NA
p-Isopropyltoluene	5	1 U	NA	NA	NA	NA	NA
sec-Butylbenzene	5	2	NA	NA	NA	NA	NA
Styrene	5	NA	5 U	5 U	NA	**1800**	**4100000**
Trichloroethylene	5	NA	5 U	5 U	NA	1000 U	1000000 U
Semivolatile Organic Compounds (ug/L)							
Non-Carcinogenic PAHs							
2-Methylnaphthalene	NE	NA	10 U	10 U	10 U	1300	68000000
Acenaphthene	20*	5	10 U	10 U	10 U	**31 J**	**2200000 J**
Acenaphthylene	NE	NA	10 U	10 U	0.2 J	480 J	19000000 J
Anthracene	50*	1 U	10 U	10 U	10 U	1000 U	40000000 U
Benzo(g,h,i)perylene	NE	1 U	10 UJ	10 UJ	10 U	1000 U	720000 J
Fluoranthene	50*	1 U	10 U	10 U	10 U	1000 U	40000000 U
Fluorene	50*	4	10 U	10 U	10 U	1000 U	**750000 J**
Naphthalene	10*	1 #	0.4 J	10 U	10 U	**7100**	**94000000**
Phenanthrene	50*	5	10 U	10 U	10 U	1000 U	**23000000 J**
Pyrene	50*	1	10 U	10 U	10 U	1000 U	**11000000 J**
Total Non-Carcinogenic PAHs		16	0.4	0	0.2	8,911	218,670,000
Carcinogenic PAHs							
Benz(a)anthracene	0.002*	1 U	10 U	10 U	10 U	1000 U	40000000 U
Benzo(b)fluoranthene	0.002*	1 U	10 UJ	10 UJ	10 U	1000 U	40000000 U
Benzo(k)fluoranthene	0.002*	1 U	10 UR	10 UR	10 UJ	1000 U	40000000 U
Benzo(a)pyrene	ND	1 U	10 U	10 U	10 U	1000 U	240000 J
Chrysene	0.002*	1 U	10 U	10 U	10 U	1000 U	40000000 U
Dibenz(a,h)anthracene	NE	1 U	10 U	10 U	10 U	1000 U	40000000 U
Indeno(1,2,3-cd)pyrene	0.002*	1 U	10 U	10 U	10 U	1000 U	730000 J
Total Non-Carcinogenic PAHs		0	0	0	0	0	970,000
Total PAHs		16	0.4	0	0.2	8,911	219,640,000
Other Semivolatile Organic Compounds (ug/L)							
2,4-Dimethylphenol	50*	NA	10 U	10 U	10 U	**160 J**	NA
Benzoic acid	NE	NA	50 UR	50 UR	50 U	5000 U	NA
Carbazole	NE	NA	10 U	10 U	10 U	1000 U	NA
Diethylphthalate	50*	NA	10 U	10 U	10 U	1000 U	NA
(2-Methylphenol) o-Cresol	1	NA	10 U	10 U	10 U	**47 J**	NA
(4-Methylphenol) p-Cresol	1	NA	10 U	10 U	10 U	1000 U	NA
Phenol	1	NA	10 U	10 U	10 U	1000 U	NA

Table 4-4 (continued)
Groundwater Analytical Results
OU-1
Clifton Former MGP Site
April 1993 through January 2002

Parcel: / Site ID: / Sample ID: / Constituent / Date:	NY State Ambient Groundwater Quality Standards (GA)	40 Willow Avenue Parcel					
		FPM-MW-03	RW-04	RW-04 (dup)	RW-04	RW-07	RW-07
		MW-3	CFRW04-01	CFRW14-01	CF-RW-04	CFRW07-01	CFTAR01[a]
		06/29/1994	03/31/1999	03/31/1999	10/11/1999	04/01/1999	04/01/1999
Inorganics (ug/L)							
Aluminum	NE	NA	22 U	22 U	NA	62.5 B	NA
Arsenic	25	NA	6 U	6 U	4 U	8.8 U	NA
Barium	1000	NA	423	420	492	105 B	NA
Cadmium	5	NA	1.2 U	1 U	1 U	1.3 U	NA
Calcium	NE	NA	81800	81300	NA	60300	NA
Chromium	50	NA	1 U	1 U	2 U	1 U	NA
Copper	200	NA	1 U	1 U	NA	1 U	NA
Iron	300	NA	50 U	50 U	NA	264	NA
Lead	25	NA	2 U	2 U	3 U	3.4 U	NA
Magnesium	35000*	NA	**36900**	**37000**	NA	28400	NA
Manganese	300	NA	**621**	**618**	NA	**635**	NA
Nickel	100	NA	5.2 U	4.6 U	NA	5.8 U	NA
Potassium	NE	NA	3810 J	3850 J	NA	2660 JB	NA
Selenium	10	NA	4 U	4 U	8.2 NJ	4 U	NA
Silver	50	NA	2 U	2 U	1 U	2 U	NA
Sodium	20000	NA	**23700**	**24200**	NA	14600	NA
Zinc	2000	NA	11 U	24.9 U	NA	8 U	NA
Total Cyanide (mg/L)							
Cyanide	200	NA	0.01 U	0.01 U	0.01 UR	0.01 U	NA
Cyanide, amenable	NE	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons (mg/L)							
TPH	NE	NA	NA	NA	NA	NA	NA
Other (mg/L)							
Hardness, Total (as CaCO3)	NE	NA	NA	NA	NA	NA	NA
Hardness, Calcium	NE	NA	NA	NA	NA	NA	NA
Hardness, Magnesium	NE	NA	NA	NA	NA	NA	NA
Total Dissolved Solids	NE	NA	485	465	NA	353	NA
Total Suspended Solids	NE	NA	NA	NA	NA	NA	NA
pH	NE	NA	NA	NA	NA	NA	NA
Ignitability (degrees F)	NE	NA	NA	NA	NA	NA	NA

Table 4-4 (continued)
Groundwater Analytical Results
OU-1
Clifton Former MGP Site
April 1993 through January 2002

Parcel:	NY State Ambient	40 Willow Avenue Parcel				
Site ID:	Groundwater	RW-14	RW-14 (dup)	PZ-03	PZ-04A	PZ-TP-13
Sample ID:	Quality Standards	CF-RW-14	CF-RW-10/12/99	CF-DWTR-P23	CF-DWTR-P24	CF-DWTR-P2/TP13
Constituent Date:	(GA)	10/13/1999	10/13/1999	01/18/2002	01/18/2002	01/18/2002
Volatile Organic Compounds (ug/L)						
Benzene	1	**2400**	**2000**	**3900**	**10000**	**12000**
Toluene	5	**870 J**	**530 J**	**1100**	**54 J**	**4300**
Ethylbenzene	5	**190**	**220**	**1300**	**420**	**1300**
Xylene (total)	5	**780**	**840**	**1400**	**270**	**2800**
Total BTEX		4,240	3,590	7,700	10,744	20,400
Other Volatile Organic Compounds						
1,2,4-Trimethylbenzene	5	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	5	NA	NA	NA	NA	NA
Acetone	50*	NA	NA	**610 J**	500 UJ	1000 UJ
Methyl bromide	5	NA	NA	200 UJ	250 UJ	500 UJ
Methyl chloride	5	NA	NA	200 U	250 U	500 U
n-Butylbenzene	5	NA	NA	NA	NA	NA
n-Propylbenzene	5	NA	NA	NA	NA	NA
p-Isopropyltoluene	5	NA	NA	NA	NA	NA
sec-Butylbenzene	5	NA	NA	NA	NA	NA
Styrene	5	NA	NA	200 U	250 U	**670**
Trichloroethylene	5	NA	NA	200 U	250 U	500 U
Semivolatile Organic Compounds (ug/L)						
Non-Carcinogenic PAHs						
2-Methylnaphthalene	NE	840	750	650 J	57 J	800 J
Acenaphthene	20*	**70 J**	**64 J**	1000 U	6 J	2000 U
Acenaphthylene	NE	220 J	200 J	1000 U	100 U	2000 U
Anthracene	50*	7 J	6 J	1000 U	100 U	2000 U
Benzo(g,h,i)perylene	NE	500 U	500 U	1000 U	100 U	2000 U
Fluoranthene	50*	500 U	500 U	1000 U	100 U	2000 U
Fluorene	50*	**56 J**	**51 J**	1000 U	100 U	2000 U
Naphthalene	10*	**2400**	**2100**	**6700**	**770**	**7100**
Phenanthrene	50*	41 J	38 J	1000 U	100 U	2000 U
Pyrene	50*	500 U	500 U	1000 U	100 U	2000 U
Total Non-Carcinogenic PAHs		3,634	3,209	7,350	833	7,900
Carcinogenic PAHs						
Benz(a)anthracene	0.002*	500 U	500 U	1000 U	100 U	2000 U
Benzo(b)fluoranthene	0.002*	500 U	500 U	1000 U	100 U	2000 U
Benzo(k)fluoranthene	0.002*	500 U	500 U	1000 U	100 U	2000 U
Benzo(a)pyrene	ND	500 U	500 U	1000 U	100 U	2000 U
Chrysene	0.002*	500 U	500 U	1000 U	100 U	2000 U
Dibenz(a,h)anthracene	NE	500 U	500 U	1000 U	100 U	2000 U
Indeno(1,2,3-cd)pyrene	0.002*	500 U	500 U	1000 U	100 U	2000 U
Total Non-Carcinogenic PAHs		0	0	0	0	0
Total PAHs		3,634	3,209	7,350	833	7,900
Other Semivolatile Organic Compounds (ug/L)						
2,4-Dimethylphenol	50*	500 U	500 U	1000 UJ	26 J	**140 J**
Benzoic acid	NE	2500 U	2500 U	5000 UR	500 UR	10000 UR
Carbazole	NE	16 J	15 J	1000 U	100 U	2000 U
Diethylphthalate	50*	500 U	500 U	1000 U	26 J	2000 U
(2-Methylphenol) o-Cresol	1	500 U	500 U	1000 UJ	**7 J**	**120 J**
(4-Methylphenol) p-Cresol	1	500 U	500 U	1000 UJ	**7 J**	**140 J**
Phenol	1	500 U	500 U	1000 UJ	**26 J**	**170 J**

Table 4-4 (continued)
Groundwater Analytical Results
OU-1
Clifton Former MGP Site
April 1993 through January 2002

Constituent	Parcel: / Site ID: / Sample ID: / Date:	NY State Ambient Groundwater Quality Standards (GA)	40 Willow Avenue Parcel				
			RW-14 CF-RW-14 10/13/1999	RW-14 (dup) CF-RW-10/12/99 10/13/1999	PZ-03 CF-DWTR-P23 01/18/2002	PZ-04A CF-DWTR-P24 01/18/2002	PZ-TP-13 CF-DWTR-P2/TP13 01/18/2002
Inorganics (ug/L)							
Aluminum		NE	NA	NA	NA	NA	NA
Arsenic		25	4 U	4 U	7 U	7 U	7 U
Barium		1000	118 B	115 B	428	263	536
Cadmium		5	1 U	1 U	1.3 U	1.3 U	1.3 U
Calcium		NE	NA	NA	NA	NA	NA
Chromium		50	2 U	2 U	4.3 B	2.9 J	1.5 U
Copper		200	NA	NA	3.8 U	5.4 U	6.2 U
Iron		300	NA	NA	NA	NA	NA
Lead		25	3 UJ	3 NUJ	3.4 U	15.2 U	4.7 U
Magnesium		35000*	NA	NA	NA	NA	NA
Manganese		300	NA	NA	NA	NA	NA
Nickel		100	NA	NA	27.2 J	62.1 J	21.5 J
Potassium		NE	NA	NA	NA	NA	NA
Selenium		10	5 U	5 U	6.9 U	6.9 U	6.9 U
Silver		50	1.2 NJ	1 NUJ	1.4 R	1.4 R	2.5 J
Sodium		20000	NA	NA	NA	NA	NA
Zinc		2000	NA	NA	16.2 U	21.5 J	16.2 U
Total Cyanide (mg/L)							
Cyanide		200	0.328	0.340	0.564	0.258	0.294
Cyanide, amenable		NE	NA	NA	0.564	0.258	0.084
Total Petroleum Hydrocarbons (mg/L)							
TPH		NE	NA	NA	1.86	NA	1.50
Other (mg/L)							
Hardness, Total (as CaCO3)		NE	NA	NA	360	431	205
Hardness, Calcium		NE	NA	NA	218	252	131
Hardness, Magnesium		NE	NA	NA	142	179	73.7
Total Dissolved Solids		NE	NA	NA	460	610	510
Total Suspended Solids		NE	NA	NA	28	772	1.9 U
pH		NE	NA	NA	7.66 J	7.56 J	7.79 J
Ignitability (degrees F)		NE	NA	NA	>201	>201	>201

Table 4-4 (continued)
Groundwater Analytical Results
OU-1
Clifton Former MGP Site
April 1993 through January 2002

Constituent	Parcel: / Site ID: / Sample ID: / Date:	NY State Ambient Groundwater Quality Standards (GA)	49 Lynhurst Avenue PZ-11 CF-P2-11 06/10/2002	49 Lynhurst Avenue PZ-11 (dup) CF-P2-49 06/10/2002	51 Lynhurst Avenue PZ-05 CF-P2-5 06/05/2002	53 Lynhurst Avenue PZ-06 CF-P2-6 06/10/2002	55 Lynhurst Avene PZ-07 CF-P2-7 06/10/2002
Volatile Organic Compounds (ug/L)							
Benzene		1	5 U	0.3 J	5 U	5 U	5 U
Toluene		5	0.3 J	0.3 J	5 U	5 U	5 U
Ethylbenzene		5	5 U	5 U	5 U	5 U	5 U
Xylene (total)		5	5 U	5 U	5 U	5 U	5 U
Total BTEX			0.3	0.6	0	0	0
Other Volatile Organic Compounds							
1,2,4-Trimethylbenzene		5	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene		5	NA	NA	NA	NA	NA
Acetone		50*	10 U	10 U	10 U	10 U	10 U
Methyl bromide		5	5 UJ	5 UJ	5 U	5 UJ	5 U
Methyl chloride		5	5 U	5 U	5 U	5 U	5 U
n-Butylbenzene		5	NA	NA	NA	NA	NA
n-Propylbenzene		5	NA	NA	NA	NA	NA
p-Isopropyltoluene		5	NA	NA	NA	NA	NA
sec-Butylbenzene		5	NA	NA	NA	NA	NA
Styrene		5	5 UJ	5 UJ	5 U	5 UJ	5 U
Trichloroethylene		5	5 U	5 U	5 U	5 U	5 U
Semivolatile Organic Compounds (ug/L)							
Non-Carcinogenic PAHs							
2-Methylnaphthalene		NE	10 U	10 U	10 U	10 U	10 U
Acenaphthene		20*	10 U	10 U	10 U	10 U	10 U
Acenaphthylene		NE	10 U	10 U	10 U	10 U	10 U
Anthracene		50*	10 U	10 U	10 U	10 U	10 U
Benzo(g,h,i)perylene		NE	10 U	10 U	10 U	10 U	10 U
Fluoranthene		50*	10 U	10 U	10 U	10 U	10 U
Fluorene		50*	10 U	10 U	10 U	10 U	10 U
Naphthalene		10*	10 U	10 U	10 U	10 U	10 U
Phenanthrene		50*	10 U	10 U	10 U	10 U	10 U
Pyrene		50*	10 U	10 U	10 U	10 U	10 U
Total Non-Carcinogenic PAHs			0	0	0	0	0
Carcinogenic PAHs							
Benz(a)anthracene		0.002*	10 U	10 U	10 U	10 U	10 U
Benzo(b)fluoranthene		0.002*	10 U	10 U	10 U	10 U	10 U
Benzo(k)fluoranthene		0.002*	10 U	10 U	10 U	10 U	10 U
Benzo(a)pyrene		ND	10 U	10 U	10 U	10 U	10 U
Chrysene		0.002*	10 U	10 U	10 U	10 U	10 U
Dibenz(a,h)anthracene		NE	10 U	10 U	10 U	10 U	10 U
Indeno(1,2,3-cd)pyrene		0.002*	10 U	10 U	10 U	10 U	10 U
Total Non-Carcinogenic PAHs			0	0	0	0	0
Total PAHs			0	0	0	0	0
Other Semivolatile Organic Compounds (ug/L)							
2,4-Dimethylphenol		50*	10 U	10 U	10 U	10 U	10 U
Benzoic acid		NE	50 UJ	50 UJ	50 UJ	50 UJ	50 UJ
Carbazole		NE	10 U	10 U	10 U	10 U	10 U
Diethylphthalate		50*	10 U	0.4 J	0.5 J	10 U	0.6 J
(2-Methylphenol) o-Cresol		1	10 U	10 U	10 U	10 U	10 U
(4-Methylphenol) p-Cresol		1	10 U	10 U	10 U	10 U	10 U
Phenol		1	10 UJ	10 UJ	10 UJ	10 UJ	10 UJ

Table 4-4 (continued)
Groundwater Analytical Results
OU-1
Clifton Former MGP Site
April 1993 through January 2002

Constituent	Parcel: / Site ID: / Sample ID: / Date:	NY State Ambient Groundwater Quality Standards (GA)	49 Lynhurst Avenue PZ-11 CF-P2-11 06/10/2002	49 Lynhurst Avenue PZ-11 (dup) CF-P2-49 06/10/2002	51 Lynhurst Avenue PZ-05 CF-P2-5 06/05/2002	53 Lynhurst Avenue PZ-06 CF-P2-6 06/10/2002	55 Lynhurst Avene PZ-07 CF-P2-7 06/10/2002
Inorganics (ug/L)							
Aluminum		NE	NA	NA	NA	NA	NA
Arsenic		25	NA	NA	NA	NA	NA
Barium		1000	NA	NA	NA	NA	NA
Cadmium		5	NA	NA	NA	NA	NA
Calcium		NE	NA	NA	NA	NA	NA
Chromium		50	NA	NA	NA	NA	NA
Copper		200	NA	NA	NA	NA	NA
Iron		300	NA	NA	NA	NA	NA
Lead		25	NA	NA	NA	NA	NA
Magnesium		35000*	NA	NA	NA	NA	NA
Manganese		300	NA	NA	NA	NA	NA
Nickel		100	NA	NA	NA	NA	NA
Potassium		NE	NA	NA	NA	NA	NA
Selenium		10	NA	NA	NA	NA	NA
Silver		50	NA	NA	NA	NA	NA
Sodium		20000	NA	NA	NA	NA	NA
Zinc		2000	NA	NA	NA	NA	NA
Total Cyanide (mg/L)							
Cyanide		200	NA	NA	NA	NA	NA
Cyanide, amenable		NE	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons (mg/L)							
TPH		NE	NA	NA	NA	NA	NA
Other (mg/L)							
Hardness, Total (as CaCO3)		NE	NA	NA	NA	NA	NA
Hardness, Calcium		NE	NA	NA	NA	NA	NA
Hardness, Magnesium		NE	NA	NA	NA	NA	NA
Total Dissolved Solids		NE	NA	NA	NA	NA	NA
Total Suspended Solids		NE	NA	NA	NA	NA	NA
pH		NE	NA	NA	NA	NA	NA
Ignitability (degrees F)		NE	NA	NA	NA	NA	NA

Table 4-4 (continued)
Groundwater Analytical Results
OU-1
Clifton Former MGP Site
April 1993 through January 2002

Constituent	Parcel: / Site ID: / Sample ID: / Date:	NY State Ambient Groundwater Quality Standards (GA)	59 Lynhurst Avenue PZ-08 CF-PZ-8 06/12/2002	61 Lynhurst Avenue PZ-09 CF-P2-9 06/07/2002	63 Lynhurst Avenue PZ-10 CF-PZ-10 06/04/2002	67 Lynhurst Avenue PZ-12 CF-P2-12 06/10/2002	Frequency of Exceedance
Volatile Organic Compounds (ug/L)							
Benzene		1	5 U	5 U	5 U	5 U	7
Toluene		5	5 U	5 U	5 U	5 U	7
Ethylbenzene		5	5 U	5 U	5 U	5 U	7
Xylene (total)		5	5 U	5 U	5 U	5 U	9
Total BTEX			0	0	0	0	
Other Volatile Organic Compounds							
1,2,4-Trimethylbenzene		5	NA	NA	NA	NA	0
1,3,5-Trimethylbenzene		5	NA	NA	NA	NA	0
Acetone		50*	10 U	10 U	10 R	10 U	0
Methyl bromide		5	4 J	5 U	5 U	**5 J**	1
Methyl chloride		5	1 J	5 U	5 U	1 J	0
n-Butylbenzene		5	NA	NA	NA	NA	2
n-Propylbenzene		5	NA	NA	NA	NA	1
p-Isopropyltoluene		5	NA	NA	NA	NA	0
sec-Butylbenzene		5	NA	NA	NA	NA	0
Styrene		5	5 U	5 U	5 U	5 U	3
Trichloroethylene		5	5 U	5 U	5 U	5 U	0
Semivolatile Organic Compounds (ug/L)							
Non-Carcinogenic PAHs							
2-Methylnaphthalene		NE	10 U	10 U	10 U	10 U	0
Acenaphthene		20*	10 U	10 U	10 U	10 U	4
Acenaphthylene		NE	10 U	10 U	10 U	10 U	0
Anthracene		50*	10 U	10 U	10 U	10 U	0
Benzo(g,h,i)perylene		NE	10 U	10 U	10 U	10 U	0
Fluoranthene		50*	10 U	10 U	10 U	10 U	0
Fluorene		50*	10 U	10 U	10 U	10 U	3
Naphthalene		10*	10 U	10 U	10 U	10 U	8
Phenanthrene		50*	10 U	10 U	10 U	10 U	1
Pyrene		50*	10 U	10 U	10 U	10 U	1
Total Non-Carcinogenic PAHs			0	0	0	0	
Carcinogenic PAHs							
Benz(a)anthracene		0.002*	10 U	10 U	10 U	10 U	0
Benzo(b)fluoranthene		0.002*	10 U	10 U	10 U	10 U	0
Benzo(k)fluoranthene		0.002*	10 U	10 U	10 U	10 U	0
Benzo(a)pyrene		ND	10 U	10 U	10 U	10 U	0
Chrysene		0.002*	10 U	10 U	10 U	10 U	0
Dibenz(a,h)anthracene		NE	10 U	10 U	10 U	10 U	0
Indeno(1,2,3-cd)pyrene		0.002*	10 U	10 U	10 U	10 U	1
Total Non-Carcinogenic PAHs			0	0	0	0	
Total PAHs			0	0	0	0	
Other Semivolatile Organic Compounds (ug/L)							
2,4-Dimethylphenol		50*	10 U	10 U	10 U	10 U	2
Benzoic acid		NE	50 UJ	50 UJ	50 UJ	50 UJ	0
Carbazole		NE	10 U	10 U	10 U	10 U	0
Diethylphthalate		50*	10 U	10 U	10 U	10 U	0
(2-Methylphenol) o-Cresol		1	10 U	10 U	10 U	10 U	3
(4-Methylphenol) p-Cresol		1	10 U	10 U	10 U	10 U	2
Phenol		1	10 UJ	10 UJ	10 UJ	10 UJ	2

Table 4-4 (continued)
Groundwater Analytical Results
OU-1
Clifton Former MGP Site
April 1993 through January 2002

Constituent	Parcel: / Site ID: / Sample ID: / Date:	NY State Ambient Groundwater Quality Standards (GA)	59 Lynhurst Avenue PZ-08 CF-PZ-8 06/12/2002	61 Lynhurst Avenue PZ-09 CF-P2-9 06/07/2002	63 Lynhurst Avenue PZ-10 CF-PZ-10 06/04/2002	67 Lynhurst Avenue PZ-12 CF-P2-12 06/10/2002	Frequency of Exceedance
Inorganics (ug/L)							
Aluminum		NE	NA	NA	NA	NA	0
Arsenic		25	NA	NA	NA	NA	0
Barium		1000	NA	NA	NA	NA	0
Cadmium		5	NA	NA	NA	NA	0
Calcium		NE	NA	NA	NA	NA	0
Chromium		50	NA	NA	NA	NA	0
Copper		200	NA	NA	NA	NA	0
Iron		300	NA	NA	NA	NA	0
Lead		25	NA	NA	NA	NA	0
Magnesium		35000*	NA	NA	NA	NA	2
Manganese		300	NA	NA	NA	NA	3
Nickel		100	NA	NA	NA	NA	0
Potassium		NE	NA	NA	NA	NA	0
Selenium		10	NA	NA	NA	NA	0
Silver		50	NA	NA	NA	NA	0
Sodium		20000	NA	NA	NA	NA	2
Zinc		2000	NA	NA	NA	NA	0
Total Cyanide (mg/L)							
Cyanide		200	NA	NA	NA	NA	0
Cyanide, amenable		NE	NA	NA	NA	NA	0
Total Petroleum Hydrocarbons (mg/L)							
TPH		NE	NA	NA	NA	NA	0
Other (mg/L)							
Hardness, Total (as CaCO3)		NE	NA	NA	NA	NA	0
Hardness, Calcium		NE	NA	NA	NA	NA	0
Hardness, Magnesium		NE	NA	NA	NA	NA	0
Total Dissolved Solids		NE	NA	NA	NA	NA	0
Total Suspended Solids		NE	NA	NA	NA	NA	0
pH		NE	NA	NA	NA	NA	0
Ignitability (degrees F)		NE	NA	NA	NA	NA	NA

Notes:

Only detected analytes are shown on the table

* guidance value

N - spiked sample recovery was not within control limits (metals)

NE - not established

NA - not analyzed

J - estimated value

U - indicates not detected to the reporting limit for organic analysis and the method detection limit for inorganic analysis

UJ - estimated detection limit

(dup) - indicates duplicate sample

Shading/bolding indicates an exceedance of established New York State ambient groundwater quality standards (GA)

ND - indicates standard is applicable to analyte detection limit

R - the reported results or detection limits are estimated or rejected based upon the recovery

B - analyte was found within the laboratory method blank 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 (organics); or indicates analyte result was between IDL and contract required detection limit (metals)

- Naphthalene was tested by and reported under the VOC and SVOC analyses. The higher concentration is reported.

mg/L - milligrams/liter

ug/L - micrograms/liter

JB - estimated detection limit/analyte was found within laboratory method blank

[a] - indicates tar sample from bottom of RW-7

BTEX is benzene, toluene, ethylbenze, and xylene

PAHs are polycyclic aromatic hydrocarbons

Prepared By: AMM/SJG
Checked By: PHH/LEW

Table 7-1
Summary of Surface Soil Data - 40 Willow Avenue
Clifton Former MGP Qualitative Human Exposure Assessment

	40 Willow Avenue Data Set						Background Data Set							
Compound	Frequency of Detect	Minimum[1]	Maximum[1]	Average[2]	EPC	95% UCL or Maximum	Frequency of Detect	Minimum[1]	Maximum[1]	Average[2]	Data Distribution	Background Concentration	95% UCL or Maximum	Site EPC Exceeds Background?
Volatile Organic Compounds														
Ethylbenzene	2/3	0.002	0.004	0.0023	0.004	Max	ND	NA	NA	NA	NA	NA	NA	NA
Xylenes (total)	3/3	0.006	0.027	0.014	0.027	Max	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trimethylbenzene	3/3	0.003	0.031	0.013	0.031	Max	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-Trimethylbenzene	3/3	0.002	0.023	0.01	0.023	Max	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	1/3	NA	0.003	0.0013	0.003	Max	NA	NA	NA	NA	NA	NA	NA	NA
p-Isopropyltoluene	1/3	NA	0.001	0.00067	0.001	Max	NA	NA	NA	NA	NA	NA	NA	NA
Non-carcinogenic PAHs														
2-Methylnaphthalene	4/6	0.35	7.2	2.04	7.2	Max	10/13	0.019	0.19	0.723	lognormal	0.19	Max	yes
Acenaphthene	3/9	0.16	0.45	0.67	0.45	Max	9/13	0.023	0.28	0.762	lognormal	0.28	Max	yes
Acenaphthylene	6/6	0.48	5.8	3.15	5.8	Max	13/13	0.061	3.9	0.822	lognormal	0.6941	95% UCL	yes
Anthracene	8/9	0.61	2.1	1.61	2.1	Max	13/13	0.16	2.8	0.761	lognormal	0.6514	95% UCL	yes
Benzo(ghi)perylene	9/9	0.74	9.6	2.41	9.6	Max	11/13	0.061	3.1	0.834	lognormal	1.605	95% UCL	yes
Fluoranthene	9/9	1.1	8.7	3.38	8.7	Max	13/13	0.54	12	2.729	lognormal	1.036	95% UCL	yes
Fluorene	4/9	0.062	1	0.73	1	Max	10/13	0.026	0.38	0.760	lognormal	0.3313	95% UCL	yes
Naphthalene	6/9	0.5	7.2	2.27	7.2	Max	10/13	0.017	0.22	0.727	lognormal	0.1794	95% UCL	yes
Phenanthrene	8/9	2	26	5.58	26	Max	13/13	0.39	5.2	1.570	lognormal	4.421	95% UCL	yes
Pyrene	9/9	2.9	24	9.13	24	Max	13/13	0.6	13	3.005	lognormal	1.181	95% UCL	yes
Carcinogenic PAHs														
Benzo(a)anthracene	9/9	1.1	8.1	3.89	8.1	Max	13/13	0.38	9.4	2.043	lognormal	8.843	95% UCL	no
Benzo(a)pyrene	9/9	1.4	8.3	4.14	8.3	Max	13/13	0.45	8.8	1.985	lognormal	7.855	95% UCL	yes
Benzo(b)fluoranthene	9/9	1.3	8.4	3.39	8.4	Max	13/13	0.52	8.2	1.928	lognormal	6.733	95% UCL	yes
Benzo(k)fluoranthene	9/9	0.92	7.4	2.96	7.4	Max	13/13	0.74	10	2.590	lognormal	4.191	95% UCL	yes
Chrysene	9/9	1.6	9.4	4.84	9.4	Max	13/13	0.55	12	2.587	lognormal	4.333	95% UCL	yes
Dibenzo(a,h)anthracene	6/9	0.27	3.8	0.93	3.8	Max	9/13	0.046	1.6	0.633	lognormal	1.301	95% UCL	yes
Indeno(1,2,3-cd)pyrene	9/9	0.69	8.4	2.23	8.4	Max	11/13	0.072	4	0.971	lognormal	1.322	95% UCL	yes
Other Semi-volatile Organic Compounds														
2,4-Dimethylphenol	1/6	NA	0.058	1.34	0.058	Max	ND	NA	NA	NA	NA	NA	NA	NA
Carbazole	2/6	0.05	3.8	1.98	3.8	Max	11/13	0.069	0.81	0.590	lognormal	0.744	95% UCL	yes
Dibenzofuran	2/6	0.14	3.8	1.67	3.8	Max	10/13	0.026	0.81	0.773	lognormal	0.6443	95% UCL	yes
bis(2-Ethylhexyl)phthalate	2/6	0.079	3.8	1.66	3.8	Max	5/13	0.47	29	3.846	lognormal	8.262	95% UCL	no
Inorganic Compounds														
Arsenic	6/6	3.5	12.9	7.57	12.9	Max	12/12	5.6	26.4	9.917	lognormal	9.4	95% UCL	yes
Barium	6/6	59.9	97.6	75.58	97.6	Max	12/12	59.9	160	107.942	lognormal	111.3	95% UCL	no
Cadmium	6/6	0.3	0.71	0.52	0.71	Max	11/12	0.23	1.7	0.864	lognormal	1.31	95% UCL	no
Chromium	6/6	26.4	36.7	31.07	36.7	Max	12/12	18.8	66.1	32.792	lognormal	42.3	95% UCL	no
Lead	6/6	98.6	383	191.1	383	Max	12/12	169	744	338.000	lognormal	394.1	95% UCL	no
Mercury	6/6	0.16	0.59	0.4	0.59	Max	12/12	0.18	0.82	0.381	lognormal	0.66	95% UCL	no
Selenium	6/6	0.82	3	2.05	3	Max	12/12	1.1	2.4	1.675	lognormal	1.89	95% UCL	yes
Cyanide (total)	5/6	4.86	33.6	11.62	33.6	Max	2/12	1.18	2.74	0.582	lognormal	0.783	95% UCL	yes

Notes.
PAHs - polycyclic aromatic hydrocarbons
[1] Minimum/maximum of detected concentrations
[2] Calculated using one-half the detection limit for results reported as non-detect.
Units are in milligrams per kilogram (mg/kg) or parts per million (ppm)
NA = not applicable
ND = not detected
UCL = upper confidence limit of the arithmetic mean
SB = site background
EPC = exposure point concentration
As per TAGM 4046, total VOCs must not exceed 10 mg/kg and total SVOCs must not exceed 500 mg/kg
Bold italic text indicates that compound was selected as a chemical of potential concern following the criteria set forth in Section 7.1.3 of the document.

Table 7-2
Summary of Surface Soil Data - Lynhurst Avenue
Clifton Former MGP Qualitative Human Exposure Assessment

	Lynhurst Avenue Data Set						Background Data Set							
Compound	Frequency of Detect	Minimum[1]	Maximum[1]	Average[2]	EPC	95% UCL or Maximum	Frequency of Detect	Minimum[1]	Maximum[1]	Average[2]	Data Distribution	Background Concentration	95% UCL or Maximum	Site EPC Exceeds Background?
Volatile Organic Compounds														
Benzene	1/3	NA	0.0006	0.0024	0.0006	Max	3/12	0.0002	0.0005	0.002	lognormal	0.0005	Max	yes
Ethylbenzene	1/3	NA	0.0005	0.0023	0.0005	Max	ND	NA	NA	NA	NA	NA	NA	NA
Toluene	1/3	NA	0.0004	0.0023	0.0004	Max	7/12	0.0002	0.0008	0.002	lognormal	0.0008	Max	no
Non-carcinogenic PAHs														
Acenaphthylene	3/3	0.03	0.22	0.10	0.22	Max	13/13	0.061	3.9	0.822	lognormal	0.6941	95% UCL	no
Anthracene	3/3	0.029	0.24	0.12	0.24	Max	13/13	0.16	2.8	0.761	lognormal	0.6514	95% UCL	no
Benzo(g,h,i)perylene	3/3	0.05	0.2	0.12	0.2	Max	11/13	0.061	3.1	0.834	lognormal	1.605	95% UCL	no
Fluoranthene	3/3	0.14	1.8	0.74	1.8	Max	13/13	0.54	12	2.729	lognormal	1.036	95% UCL	yes
Fluorene	1/3	NA	0.064	0.21	0.064	Max	10/13	0.028	0.38	0.760	lognormal	0.3313	95% UCL	no
Naphthalene	1/3	NA	0.029	0.20	0.029	Max	10/13	0.017	0.22	0.727	lognormal	0.1794	95% UCL	no
Phenanthrene	3/3	0.1	0.73	0.36	0.73	Max	13/13	0.39	5.2	1.570	lognormal	4.421	95% UCL	no
Pyrene	3/3	0.25	1.9	0.88	1.9	Max	13/13	0.6	13	3.005	lognormal	1.181	95% UCL	yes
Carcinogenic PAHs														
Benz(a)anthracene	3/3	0.12	0.98	0.43	0.98	Max	13/13	0.38	9.4	2.043	lognormal	8.843	95% UCL	no
Benzo(a)pyrene	3/3	0.11	1.1	0.47	1.1	Max	13/13	0.45	8.8	1.985	lognormal	7.855	95% UCL	no
Benzo(b)fluoranthene	3/3	0.075	1.1	0.45	1.1	Max	13/13	0.52	8.2	1.928	lognormal	6.733	95% UCL	no
Benzo(k)fluoranthene	3/3	0.093	1.8	0.69	1.8	Max	13/13	0.74	10	2.590	lognormal	4.191	95% UCL	no
Chrysene	3/3	0.19	1.4	0.65	1.4	Max	13/13	0.55	12	2.587	lognormal	4.333	95% UCL	no
Dibenz(a,h)anthracene	1/3	NA	0.087	0.14	0.087	Max	9/13	0.046	1.6	0.633	lognormal	1.301	95% UCL	no
Indeno(1,2,3-cd)pyrene	3/3	0.05	0.28	0.15	0.28	Max	11/13	0.072	4	0.971	lognormal	1.322	95% UCL	no
Other Semi-volatile Organic Compounds														
Benzoic acid	1/3	NA	0.28	1.03	0.28	Max	9/13	0.037	4	4.361	lognormal	3.666	95% UCL	no
Butylbenzylphthalate	1/3	NA	0.17	0.25	0.17	Max	10/13	0.061	1.3	0.729	lognormal	1.158	95% UCL	no
Carbazole	1/3	NA	0.15	0.24	0.15	Max	11/13	0.069	0.81	0.590	lognormal	0.744	95% UCL	no
bis(2-Ethylhexyl)phthalate	3/3	0.27	1.2	0.64	1.2	Max	5/13	0.47	29	3.846	lognormal	8.262	95% UCL	no
Inorganic Compounds														
Arsenic	3/3	5.0	10.9	7.47	10.9	Max	12/12	5.6	26.4	9.917	lognormal	9.4	95% UCL	yes
Barium	3/3	61.3	117	91.83	117	Max	12/12	59.9	160	107.942	lognormal	111.3	95% UCL	yes
Cadmium	1/1	NA	0.84	0.84	0.84	Max	11/12	0.23	1.7	0.824	lognormal	1.31	95% UCL	no
Chromium	3/3	23	49.2	32.70	49.2	Max	12/12	18.8	66.1	32.792	lognormal	42.3	95% UCL	yes
Lead	3/3	162	390	304.67	390	Max	12/12	169	744	338.000	lognormal	394.1	95% UCL	no
Mercury	3/3	0.13	0.35	0.26	0.35	Max	12/12	0.18	0.82	0.391	lognormal	0.66	95% UCL	no
Selenium	2/3	1.3	2.7	1.52	2.7	Max	12/12	1.1	2.4	1.675	lognormal	1.89	95% UCL	yes

Notes:
PAHs - polycyclic aromatic hydrocarbons
[1] Minimum/maximum of detected concentrations
[2] Calculated using one-half the detection limit for results reported as non-detect.
Units are in milligrams per kilogram (mg/kg) or parts per million (ppm).
NA = not applicable
ND = not detected
UCL = upper confidence limit of the arithmetic mean
SB = site background
EPC = exposure point concentration
As per TAGM 4046, total VOCs must not exceed 10 mg/kg and total SVOCs must not exceed 500 mg/kg
Bold Italic text indicates that compound was selected as a chemical of potential concern following the criteria set forth in Section 7.1.3 of the document

Table 7-3
Summary of Subsurface Soil Data - 40 Willow Avenue
Clifton Former MGP Qualitative Human Exposure Assessment

Compound	Frequency of Detect	Minimum[1]	Maximum[1]	Average[2]	Data Distribution	EPC	95% UCL or Maximum	TAGM[3]	Site EPC Exceeds TAGM?
Volatile Organic Compounds									
Benzene	14/22	0.002	2200	111.36	lognormal	2200	Max	0.06	yes
Toluene	14/22	0.001	1700	90.56	lognormal	1700	Max	1.5	yes
Ethylbenzene	14/22	0.002	780	59.66	lognormal	780	Max	5.5	yes
Xylenes (total)	14/22	0.003	940	65.52	lognormal	940	Max	1.2	yes
1,3,5-Trimethylbenzene	1/1	--	0.002	0.002	NA	0.002	Max	None	NA
Acetone	2/5	0.024	0.031	0.0143	NA	0.031	Max	0.2	no
Styrene	1/5	--	80	16.004	NA	80	Max	None	NA
Non-carcinogenic PAHs									
2-Methylnaphthylene	14/20	0.007	21000	1685.17	lognormal	21000	Max	36.4	yes
Acenaphthene	15/21	0.005	980	93.93	lognormal	980	Max	50	yes
Acenaphthylene	16/20	0.006	2000	172.85	lognormal	2000	Max	41	yes
Anthracene	10/21	0.22	2000	160.91	lognormal	2000	Max	50	yes
Benzo(ghi)perylene	13/21	0.03	720	64.01	lognormal	720	Max	50	yes
Fluoranthene	13/21	0.008	3700	260.53	lognormal	3700	Max	50	yes
Fluorene	14/21	0.035	4400	291.21	lognormal	4400	Max	50	yes
Naphthalene	16/21	0.033	22000	1995.57	lognormal	22000	Max	13	yes
Phenanthrene	15/21	0.02	13000	874.30	lognormal	13000	Max	50	yes
Pyrene	18/21	0.015	7200	484.34	lognormal	7200	Max	50	yes
Carcinogenic PAHs									
Benzo(a)anthracene	17/21	0.006	2300	163.36	lognormal	2300	Max	0.224	yes
Benzo(a)pyrene	16/21	0.043	1900	133.82	lognormal	1900	Max	0.061	yes
Benzo(b)fluoranthene	13/21	0.19	790	63.14	lognormal	790	Max	1.1	yes
Benzo(k)fluoranthene	10/21	0.29	1100	88.19	lognormal	1100	Max	1.1	yes
Chrysene	15/21	0.046	2500	176.32	lognormal	2500	Max	0.4	yes
Dibenzo(a,h)anthracene	7/21	0.014	34	136.81	lognormal	34	Max	0.014	yes
Indeno(1,2,3-cd)pyrene	13/21	0.024	480	46.06	lognormal	480	Max	3.2	yes
Other Semi-volatile Organic Compounds									
2,4-Dimethylphenol	1/14	--	0.022	7.82	lognormal	0.022	Max	None	NA
4-Methylphenol	1/15	--	0.063	7.31	lognormal	0.063	Max	0.9	no
Benzoic acid	2/12	0.037	2.5	43.21	normal	2.5	Max	None	NA
Benzyl alcohol	1/11	--	0.43	10.61	normal	0.43	Max	None	NA
Carbazole	2/15	0.23	16	8.24	lognormal	16	Max	None	NA
Di-n-butylphthalate	1/15	--	0.024	7.32	lognormal	0.024	Max	8.1	no
Dibenzofuran	7/15	0.022	19	2.66	lognormal	19	Max	6.2	yes
Diethylphthalate	1/15	--	0.031	7.31	lognormal	0.031	Max	7.1	no
Phenol	1/15	--	0.024	7.31	lognormal	0.024	Max	0.03	no
bis(2-Ethylhexyl)phthalate	1/15	--	0.23	7.33	lognormal	0.23	Max	50	no
Inorganic Compounds									
Cyanide (total)	2/11	0.005	1.81	0.40	lognormal	1.81	Max	None	NA
Arsenic	11/11	1.6	16.8	5.05	normal	7.3218244	95% UCL	7.5	no
Barium	10/11	39.4	208	82.89	normal	111.838222	95% UCL	300	no
Cadmium	6/11	0.105	7.7	1.68	normal	2.96228275	95% UCL	1	yes
Chromium	11/11	13.4	58	31.79	normal	39.4025099	95% UCL	10	yes
Lead	16/16	6.5	669	150.80	normal	240.685892	95% UCL	SB	NA
Mercury	7/11	0.0073	0.32	0.08	normal	0.13239082	95% UCL	0.1	yes
Selenium	6/11	0.63	2.5	1.46	normal	1.89129617	95% UCL	2	no
Silver	1/11	--	0.41	0.21	normal	0.27600062	95% UCL	SB	NA

Notes:
PAHs - polycyclic aromatic hydrocarbons
[1] Minimum/maximum of detected concentrations.
[2] Calculated using one-half the detection limit for results reported as non-detect.
[3] NYSDEC Technical and Administrative Guidance Memorandum #4046, Determination of Soil Cleanup Objectives and Cleanup Levels, January 24, 1994.
Units are in milligrams per kilogram (mg/kg) or parts per million (ppm).
NA = not applicable
UCL = upper confidence limit of the arithmetic mean
SB = site background
EPC = exposure point concentration
As per TAGM 4046, total VOCs must not exceed 10 mg/kg and total SVOCs must not exceed 500 mg/kg.

Table 7-4
Summary of Subsurface Soil Data - Lynhurst Avenue
Clifton Former MGP Qualitative Human Exposure Assessment

Compound	Frequency of Detect	Minimum[1]	Maximum[1]	Average[2]	Data Distribution	EPC	95% UCL or Maximum	TAGM[3]	Site EPC Exceeds TAGM?
Volatile Organic Compounds									
Benzene	8/14	0.0002	0.41	0.03	lognormal	0.091	95% UCL	0.06	yes
Ethylbenzene	2/14	0.001	30	2.15	lognormal	6.515	95% UCL	5.5	yes
Toluene	7/14	0.0004	0.002	0.11	lognormal	0.002	Max	1.5	no
Xylenes	1/14	NA	30	2.15	lognormal	5.665	95% UCL	1.2	yes
Non-carcinogenic PAHs									
2-Methylnaphthalene	4/14	0.027	2.6	0.34	lognormal	0.796	95% UCL	36.4	no
Acenaphthene	4/14	0.046	0.11	0.29	lognormal	0.110	Max	50	no
Acenaphthylene	9/14	0.007	0.24	0.26	lognormal	0.240	Max	41	no
Anthracene	9/14	0.012	0.35	0.29	lognormal	0.350	Max	50	no
Benzo(ghi)perylene	11/14	0.013	1.1	0.93	lognormal	1.100	Max	50	no
Fluoranthene	12/14	0.027	1.8	0.66	lognormal	1.800	Max	50	no
Fluorene	5/14	0.022	0.091	0.27	lognormal	0.091	Max	50	no
Naphthalene	6/14	0.011	24	1.83	lognormal	7.152	95% UCL	13	no
Phenanthrene	12/14	0.011	1.4	0.53	lognormal	1.400	Max	50	no
Pyrene	12/14	0.027	3.4	0.87	lognormal	3.400	Max	50	no
Carcinogenic PAHs									
Benz(a)anthracene	12/14	0.015	1.2	0.46	lognormal	1.200	Max	0.224	yes
Benzo(a)pyrene	11/14	0.018	1.1	0.46	lognormal	1.100	Max	0.061	yes
Benzo(b)fluoranthene	11/14	0.016	1	0.42	lognormal	1.000	Max	1.1	no
Benzo(k)fluoranthene	11/14	0.028	1.8	0.50	lognormal	1.800	Max	1.1	yes
Chrysene	12/14	0.017	1.5	0.55	lognormal	1.500	Max	0.4	yes
Dibenz(a,h)anthracene	7/14	0.013	0.29	0.30	lognormal	0.290	Max	0.014	yes
Indeno(1,2,3-cd)pyrene	12/14	0.013	0.86	0.32	lognormal	0.860	Max	3.2	no
Other Semi-volatile Organic Compounds									
Benzoic acid	5/11	0.03	0.14	0.62	lognormal	0.140	Max	None	NA
Butylbenzylphthalate	1/11	NA	0.089	0.22	lognormal	0.089	Max	50	no
Carbazole	4/11	0.034	0.096	0.14	lognormal	0.096	Max	None	NA
Dibenzofuran	2/11	0.03	0.037	0.18	lognormal	0.037	Max	6.2	no
Diethylphthalate	1/11	NA	0.007	0.20	lognormal	0.007	Max	7.1	no
bis(2-Ethylhexyl)phthalate	3/11	0.18	0.65	0.26	lognormal	0.330	95% UCL	50	no
Inorganic Compounds									
Arsenic	10/14	3.5	19.4	6.48	lognormal	11.782	95% UCL	7.5	yes
Barium	14/14	66.9	1430	228.91	lognormal	344.442	95% UCL	300	yes
Cadmium	2/9	0.59	0.68	0.44	lognormal	0.680	Max	1	no
Chromium	14/14	18.9	65.9	33.31	lognormal	41.300	95% UCL	10	yes
Lead	14/14	8.4	775	183.74	lognormal	775.000	Max	SB	NA
Mercury	12/14	0.026	1.3	0.38	lognormal	1.300	Max	0.1	yes
Selenium	7/14	1.2	2.3	1.31	lognormal	1.952	95% UCL	2	no
Silver	4/14	0.21	0.33	0.17	lognormal	0.218	95% UCL	SB	NA
Cyanide (total)	1/14	NA	344	39.64	lognormal	344.000	Max	None	NA

Notes:
PAHs - polycyclic aromatic hydrocarbons
[1] Minimum/maximum of detected concentrations.
[2] Calculated using one-half the detection limit for results reported as non-detect.
[3] NYSDEC Technical and Administrative Guidance Memorandum #4046, Determination of Soil Cleanup Objectives and Cleanup Levels, January 24, 1994.
Units are in milligrams per kilogram (mg/kg) or parts per million (ppm).
NA = not applicable
UCL = upper confidence limit of the arithmetic mean
SB = site background
EPC = exposure point concentration
As per TAGM 4046, total VOCs must not exceed 10 mg/kg and total SVOCs must not exceed 500 mg/kg.
Bold italic text indicates that compound was selected as a chemical of potential concern following the criteria set forth in Section 7.1.3 of the document.

Table 7-5
Summary of Groundwater Data - 40 Willow Avenue
Clifton Former MGP Qualitative Human Exposure Assessment

Compound	Frequency of Detect	Minimum[1]	Maximum[1]	Average[2]	EPC	95% UCL or Maximum	TOGS[3]	Site EPC Exceeds TOGS?
Volatile Organic Compounds								
Benzene	3/3	3.9	12	8.63	12	Max	0.001	yes
Toluene	3/3	0.054	4.3	1.82	4.3	Max	0.005	yes
Ethylbenzene	3/3	0.42	1.3	1.01	1.3	Max	0.005	yes
Xylene (total)	3/3	0.27	2.8	1.49	2.8	Max	0.005	yes
Acetone	1/3	NA	0.61	0.45	0.61	Max	None	NA
Semi-volatile Organic Compounds								
Naphthalene	3/3	0.77	7.1	4.86	7.1	Max	None	NA
2-Methylnaphthalene	3/3	0.057	0.8	0.50	0.8	Max	None	NA
Acenaphthene	1/3	NA	0.006	0.50	0.006	Max	None	NA
Phenol	2/3	0.026	0.17	0.23	0.17	Max	0.005	yes
2-Methylphenol	2/3	0.007	0.12	0.21	0.12	Max	None	NA
4-Methylphenol	2/3	0.007	0.14	0.22	0.14	Max	None	NA
2,4-Dimethylphenol	2/3	0.026	0.14	0.22	0.14	Max	0.005	yes
Inorganic Compounds								
Barium	3/3	0.263	0.536	0.41	0.536	Max	1	no
Chromium	2/3	0.0029	0.0043	0.0027	0.0043	Max	0.05	no
Nickel	3/3	0.0215	0.0621	0.04	0.0621	Max	0.1	no
Silver	1/1	NA	0.0025	0.0025	0.0025	Max	0.05	no
Zinc	1/3	NA	0.0215	0.01	0.0215	Max	None	NA
Cyanide (total)	3/3	0.258	0.564	0.37	0.564	Max	0.2	yes
Cyanide (amenable)	3/3	0.084	0.564	0.30	0.564	Max	None	NA

Notes:

[1] Minimum/maximum of detected concentrations.

[2] Calculated using one-half the detection limit for results reported as non-detect.

[3]NYSDEC Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, (TOGS 1.1.1) June 1998.
Values presented are for Class GA groundwater.
Units are in milligrams per liter (mg/L) or parts per million (ppm).
NA = not applicable
UCL = upper confidence limit of the arithmetic mean
EPC = exposure point concentration
Bold italic text indicates that compound was selected as a chemical of potential concern following the criteria set forth in Section 7.1.3 of the document.

Table 7-6
Summary of Groundwater Data - Lynhurst Avenue
Clifton Former MGP Qualitative Human Exposure Assessment

Compound	Frequency of Detect	Minimum[1]	Maximum[1]	Average[2]	EPC	95% UCL or Maximum	TOGS[3]	Site EPC Exceeds TOGS?
Volatile Organic Compounds								
Benzene	1/9	NA	0.0003	0.0023	0.0003	Max	0.001	no
Toluene	2/9	0.0003	0.0003	0.0020	0.0003	Max	0.005	no
Methyl bromide	2/9	0.004	0.005	0.0029	0.005	Max	None	NA
Methyl chloride	2/9	0.001	0.001	0.0022	0.001	Max	0.005	no
Tetrachloroethylene	1/9	NA	0.0003	0.0023	0.0003	Max	0.005	no
Semi-volatile Organic Compounds								
Diethylphthalate	3/9	0.0004	0.0006	0.0035	0.0006	Max	None	NA

Notes:

[1] Minimum/maximum of detected concentrations.

[2] Calculated using one-half the detection limit for results reported as non-detect.

[3]NYSDEC Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, (TOGS 1.1.1) June 1998.

Values presented are for Class GA groundwater.

Units are in milligrams per liter (mg/L) or parts per million (ppm).

NA = not applicable

UCL = upper confidence limit of the arithmetic mean

EPC = exposure point concentration

Table 7-7
Exposure Matrix for the Clifton Former MGP Site

Media		Outdoor Air		Indoor Air	Surface Soil		Subsurface Soil		Groundwater		
Potential Exposure Pathway		Vapor Inhalation	Particulate Inhalation	Accumulated Vapor Inhalation	Dermal Contact	Ingestion	Dermal Contact	Ingestion	Dermal Contact	Ingestion	Inhalation of Vapors
Location	Receptor										
Lynhurst Avenue	Resident Adult [1]	√	√	√	√	√	√ [2]	√ [2]	√ [2]	Ø	√ [2]
	Resident Child [1]	√	√	√	√	√	Ø	Ø	Ø	Ø	Ø
40 Willow Avenue	Commercial Worker and Visitors [3]	Ø	Ø	√	Ø	Ø	Ø	Ø	Ø	Ø	Ø
	Construction Worker [3]	√	√	Ø	√	√	√	√	√	Ø	√
	KeySpan Employee [4]	√	√	√	√	√	√	√	√	Ø	√
	Trespasser - Adult	√	√	Ø	√	√	Ø	Ø	Ø	Ø	Ø
	Trespasser - Adolescent	√	√	Ø	√	√	Ø	Ø	Ø	Ø	Ø
	Trespasser - Child	√	√	Ø	√	√	Ø	Ø	Ø	Ø	Ø
Nearby Off-Site	Utility Workers [3]	√	√	Ø	√	√	√	√	√	Ø	√
Biotic Receptors											
Plants		Ø	Ø	Ø	√	Ø	Ø	Ø	Ø	Ø	Ø
Wildlife		Ø	Ø	Ø	√	√	Ø	Ø	Ø	Ø	Ø

Ø Incomplete Pathway/Route
√ Potentially Complete Pathway/Route

[1] A gardening scenario also is a possible exposure scenario for the adult resident. This scenario includes potential ingestion of and dermal contact with surface soil and inhalation of air-borne particulates while gardening. Consumption of homegrown produce also is possible for both the resident adult and child and is included as part of this exposure scenario.
[2] Direct contact with subsurface soil and groundwater are considered potentially complete exposure pathways in the event that a resident engages in excavation work in their yard.
[3] Future exposure scenario. All other scenarios listed are current scenarios.
[4] KeySpan maintains a policy that only trained workers are used for excavation work at active facilities, *i.e.*, a "no dig" policy is in effect at the site.

Table 7-8
Derivation of Toxicological Benchmarks for Meadow Vole

Chemical	Test Organism	Endpoint	NOAELt (mg/kg/day)	Reference for Test Species	NOAEL for Meaow Vole (mg/kg/day)	Toxicological Benchmark for Meadow Vole (mg/kg)
1,2,4-Trimethylbenzene	Rat	NOAEL	14.8	IRIS	24.9	218
1,3,5-Trimethylbenzene[a]	Rat	NOAEL	14.8	IRIS	24.9	218
Ethylbenzene	Rat	NOAEL	136	IRIS	228.4	2003
Isopropylbenzene	Rat	NOAEL	110	IRIS	184.7	1620
Styrene	Dog	NOAEL	200	IRIS	824.4	7231
n-Butylbenzene[b]	Mouse	NOAEL	26	ORNL	23.6	207
n-Propylbenzene[b]	Mouse	NOAEL	26	ORNL	23.6	207
p-Isopropyltoluene[b]	Mouse	NOAEL	26	ORNL	23.6	207
sec-Butylbenzene[b]	Mouse	NOAEL	26	ORNL	23.6	207
tert-Butylbenzene[b]	Mouse	NOAEL	26	ORNL	23.6	207
2,4-Dimethylphenol	Mouse	LD50 (809 mg/kg)	2.91	NTP	2.6	23
2-Methylnaphthalene	Rat	LD50 (1630 mg/kg)	2.61	NTP	4.4	38
2-Methylphenol	Rat	NOAEL	50	IRIS	84.0	737
3-Nitroaniline	Mouse	LD50 (308 mg/kg)	1.13	NTP	1.0	9
4-Chloroaniline	Rat	LOAEL (12.5 mg/kg/day)	1.25	IRIS	2.1	18
4-Methylphenol	Rat	NOAEL	5.00	HEAST	8.4	74
Acenaphthylene[c]	Mouse	NOAEL	175	HEAST	159.0	1395
Acenaphthene	Mouse	NOAEL	175	IRIS	159.0	1395
Anthracene	Mouse	NOAEL	1000	IRIS	908.7	7971
Benzo(a)anthracene[e]	Mouse	NOAEL	1	ORNL	0.9	8
Benzo(b)fluoranthene[d]	Mouse	NOAEL	125	IRIS	113.6	996
Benzo(g,h,i)perylene[f]	Mouse	NOAEL	75	IRIS	68.2	598
Benzo(k)fluoranthene[d]	Mouse	NOAEL	125	IRIS	113.6	996
Benzoic acid	Dog	LD50 (2000 mg/kg)	0.95	NTP	3.9	34
Benzyl alcohol	Rabbit	NOAEL	143	HEAST	435.9	3824
Butylbenzylphthalate	Rat	NOAEL	159	IRIS	267.0	2342
Carbazole	Rat	LDLo (500 mg/kg)	4.00	NTP	6.7	59
Chrysene[e]	Mouse	NOAEL	1	ORNL	0.9	8
Di-n-butylphthalate	Rat	NOAEL	125	IRIS	209.9	1841
Di-n-octylphthalate	Rat	LOAEL (175 mg/kg/day)	17.5	HEAST	29.4	258
Dibenzo(a,h)anthracene[e]	Mouse	NOAEL	1	ORNL	0.9	8
Dibenzofuran[e]	Mouse	NOAEL	1	ORNL	0.9	8
Fluoranthene	Mouse	NOAEL	125	IRIS	113.6	996
Fluorene	Mouse	NOAEL	125	IRIS	113.6	996
Hexachlorobenzene	Rat	NOAEL	0.08	IRIS	0.1	1
Indeno(1,2,3-cd)pyrene[d]	Mouse	NOAEL	125	IRIS	113.6	996
Isophorone	Dog	NOAEL	150	IRIS	618.3	5423

Naphthalene	Rat	NOAEL	100	IRIS	167.9	1473
N-nitrosodiphenylamine	Rat	LD50 (2500 mg/kg)	4.00	NTP	6.7	59
Phenanthrene	Mouse	LD50 (700 mg/kg)	2.6	NTP	2.3	20
Phenol	Rat	NOAEL	60.0	IRIS	100.8	884
Pyrene	Mouse	NOAEL	75	IRIS	68.2	598
Cobalt	Rat	LDLo (750 mg/kg)	6.00	NTP	10.1	88
Silver[g]	Rat	NOAEL	1	ORNL	1.7	15
Endosulfan sulfate[n]	Rat	NOAEL	0.15	ORNL	0.3	2

To convert mg diet/kg body weight, divide the diet component by the food factor times the uncertainty factor

Sources:

IRIS: USEPA, 2000:

HEAST: USEPA, 1997.

NTP: National Toxicology Program's Chemical Health and Safety Data Website: http://ntp-server.niehs.nih.gov/Main_Pages/Chem-HS.html

ORNL; Oak Ridge National Laboratory, Sample et al. 1996.

a Value for 1,2,4-Trimethylbenzene used

b Value for toluene used

c Value for acenaphthene used

d Value for fluoranthene used

e Value for benzo(a)pyrene used

f Value for pyrene used

g Value for cadmium used

h Value for endosulfan used

Table 7-9
Comparison of Clifton Surface Soil Data to Toxicological Benchmark Values

Chemical	Toxicological Benchmark			Surface Soil *	
	Earth Worms	Terrestrial Plants	Meadow Vole	Frequency of Detection	Range of Detected Concentrations
Volatile Organic Compounds (µg/kg)					
1,2,4-Trimethylbenzene			**218,027**	10/37	1.5-470000
1,3,5-Trimethylbenzene			**218,027**	11/41	2-180000
Acetone			147,800	12/47	0.4-1000000
Benzene			210,800	14/42	0.2-4400
Carbon Tetrachloride			236,500	10/53	2-1500000
Ethylbenzene			**2,003,493**	12/38	0.5-640000
Isopropylbenzene			**1,620,473**	6/41	3-87000
Methylene Chloride			86,500	2/38	18-21
Styrene			**7,231,242**	17/53	0.3-1800000
Toluene		200,000	207,900	26/57	0.2-1800000
Xylene (total)			2,512	11/38	6-1000000
n-Butylbenzene			**207,246**	6/37	83-10000
n-Propylbenzene			**207,246**	6/37	4.1-24000
p-Isopropyltoluene			**207,246**	8/37	1-10000
sec-Butylbenzene			**207,246**	1/37	1700-1700
tert-Butylbenzene			**207,246**	5/53	140-4200
Semi-Volatile Organic Compounds (µg/kg)					
2,4-Dimethylphenol			**23,215**	11/51	27-26000000
2-Methylnaphthalene			**38,420**	26/51	9-860000
3-Nitroaniline			**9,002**	1/51	260-260
4-Methylphenol			**73,658**	16/51	5-1500000
Acenaphthene		20,000	**1,394,923**	45/61	7-3300000
Acenaphthylene			**1,394,923**	55/57	20-230000
Anthracene			**7,970,991**	59/61	29-1700000
Benzo(a)anthracene			**7,971**	61/61	63-1500000
Benzo(a)pyrene			8,000	60/61	43-590000
Benzo(b)fluoranthene			**996,374**	59/61	32-3600000
Benzo(g,h,i)perylene			**597,824**	57/61	49-870000
Benzo(k)fluoranthene			**996,374**	49/61	30-70000
Benzoic acid			**34,277**	17/50	23-1400
Benzyl alcohol			**3,823,965**	3/50	89-4200
Butylbenzylphthalate			**2,342,319**	28/51	19-13000
Carbazole			**58,926**	44/51	24-2200000
Chrysene			**7,971**	44/61	190-90000
Di-n-butylphthalate		200,000	**1,841,446**	1/51	1300-1300
Di-n-octylphthalate			**257,802**	14/51	13-2600000
Dibenzo(a,h)anthracene			**7,971**	42/61	22-890000
Dibenzofuran			**7,971**	25/51	8-19000
Diethylphthalate		100,000	36,648,000	16/51	140-270000
Fluoranthene			4,398,000	57/61	18-3200000

Table 7-9
Comparison of Clifton Surface Soil Data to Toxicological Benchmark Values

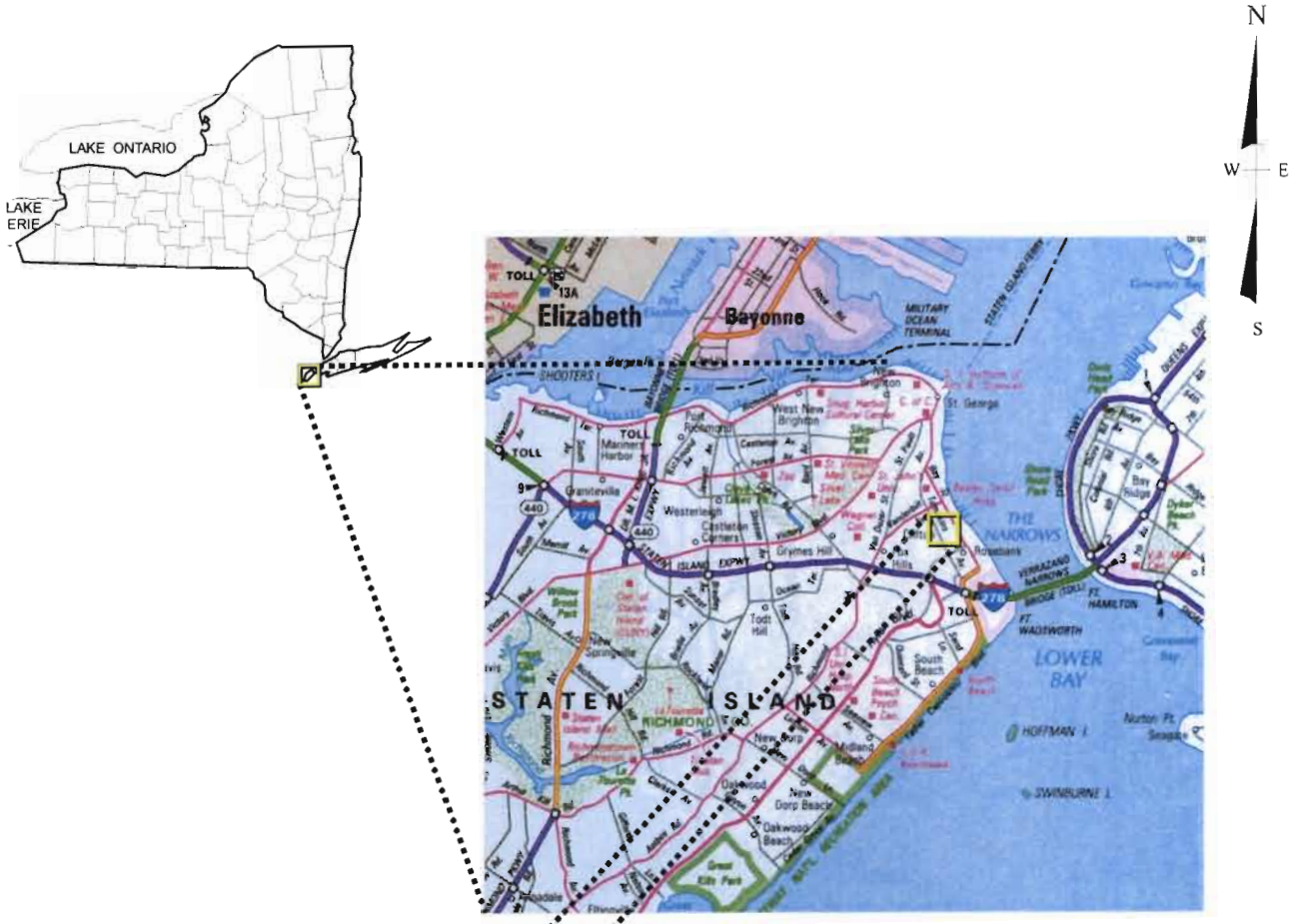
Chemical	Toxicological Benchmark			Surface Soil *	
	Earth Worms	Terrestrial Plants	Meadow Vole	Frequency of Detection	Range of Detected Concentrations
Fluorene	30,000		**996,374**	48/61	5-3200000
Hexachlorobenzene			**1,179**	1/51	400-400
Indeno(1,2,3-cd)pyrene			**996,374**	42/61	50-50000
Isophorone			**5,423,432**	1/51	33-33
N-Nitrosodiphenylamine	20,000		**1,473,157**	13/51	11-27000000
Naphthalene			**58,926**	53/61	12-14000000
Phenanthrene			**20,459**	43/61	100-420000
Phenol	30,000	70,000	**883,894**	17/51	130-4700000
Pyrene			**597,824**	45/61	230-200000
bis(2-Ethylhexyl)phthalate			146,000	17/35	79-29000
Inorganic Compounds (mg/kg)					
Antimony		5	1	15/16	1.6-16.8
Arsenic	60	10	1.008	48/49	3.5-340
Barium		500	79.6	33/34	59.9-537
Beryllium		10	9.75	6/16	0.19-1.4
Cadmium	20	4	14.255	28/34	0.21-816
Chromium	0.4	1	40,449	34/34	0.72-138
Cobalt		20	**88,389**	1/1	28.3-28.3
Copper	50	100	224.8	1/1	1560-1560
Lead	500	50	118.23	34/34	98.6-2740
Manganese		500	1,301	14/16	0.042-1.3
Mercury	0.1	0.3	19.21	34/34	0.13-13.7
Nickel	200	30	591.15	1/1	57.8-57.8
Selenium	70	1	2.956	32/49	0.2-4.7
Silver		2	**15**	13/34	0.2-202
Thallium		1	0.111	1/1	16.2-16.2
Vanadium		2	2.881	1/1	208-208
Zinc	200	50	2364.6	9/9	1080-65600
Cyanide			954.2	11/52	0.83-33.6
Pesticides (mg/kg)					
Dieldrin			296	1/1	2100-2100
Endosulfan sulfate			**2,210**	1/1	640-640
Heptachlor			1,921	1/1	160-160

Notes:

* Surface soil includes soils collected to a depth of 4 feet below ground surface

Bolded values are derived benchmarks. See Table 7-8.

Figures



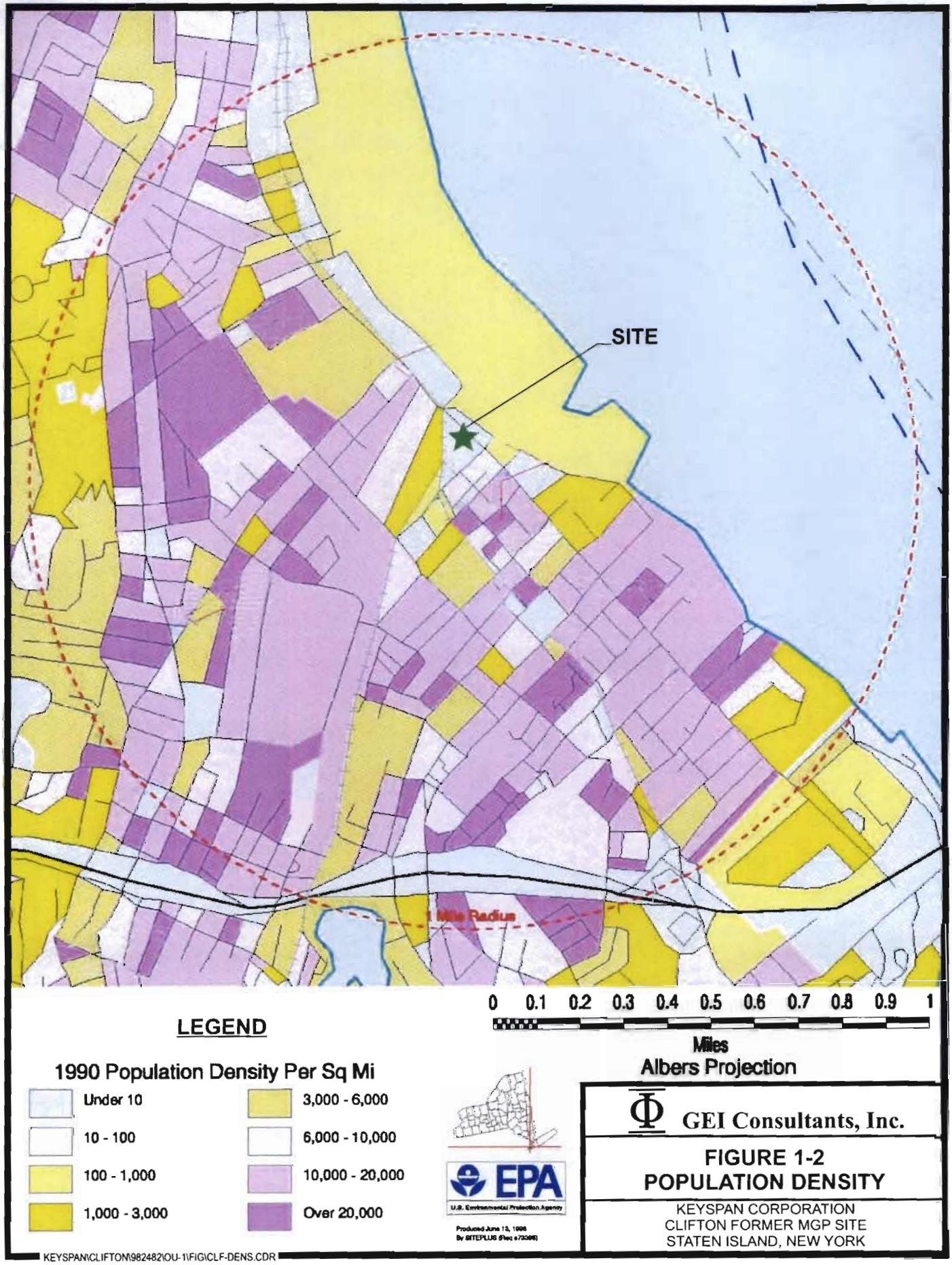
SOURCE: USGS TOPOGRAPHIC MAP, THE NARROWS, N.Y.-N.J., PHOTOREVISED 1981.

GEI Consultants, Inc.

FIGURE 1-1
SITE LOCATION MAP

KEYSPAN CORPORATION
CLIFTON FORMER MGP SITE
STATEN ISLAND, NEW YORK

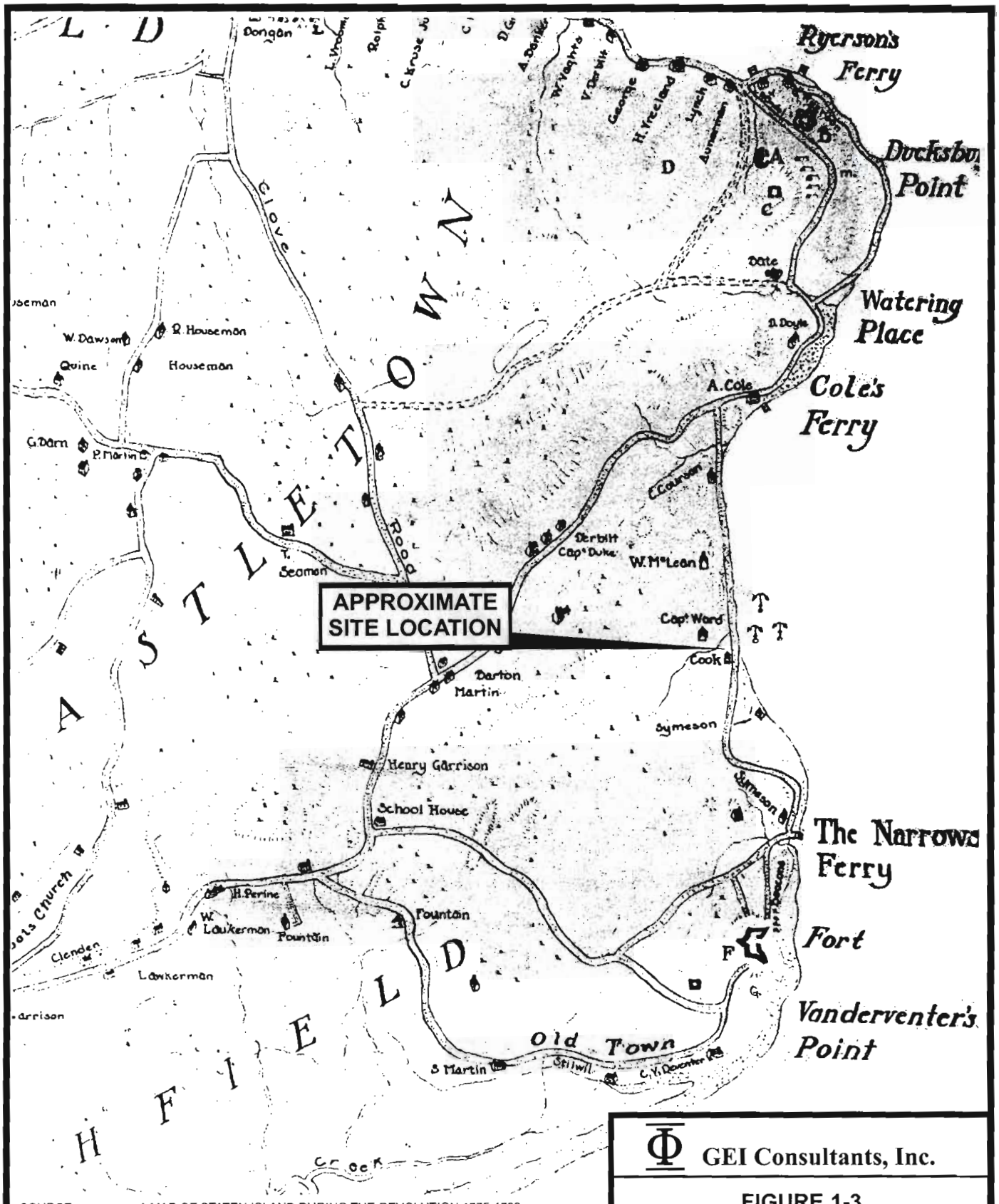
KEYSPAN\CLIFTON\982482\OU-1\FIG\CLF-SLOC.CDR



GEI Consultants, Inc.

FIGURE 1-2
POPULATION DENSITY

KEYSPAN CORPORATION
CLIFTON FORMER MGP SITE
STATEN ISLAND, NEW YORK



SOURCE: A MAP OF STATEN ISLAND DURING THE REVOLUTION 1775-1783

COMPILED FROM: THE TAYLOR & SKINNER MAP 1781
PLAN NO. 31 DU COMP ANGLO-HESSOIS DONS STATEN ISL. DE 1780-1783
THE HESSIAN MAP C. 1777

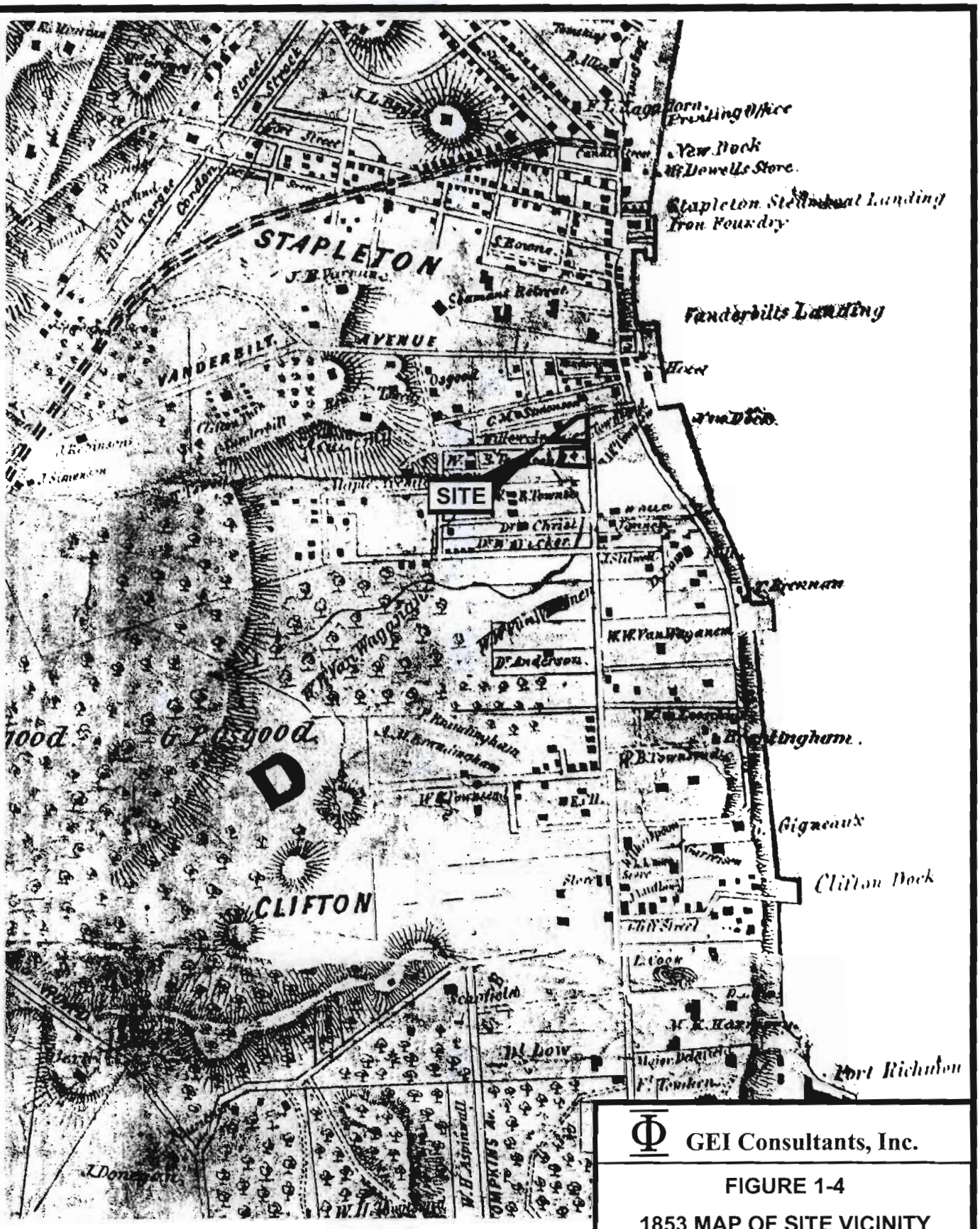
PROVIDED BY: STATEN ISLAND INSTITUTE OF ARTS AND SCIENCES.

KEYSPAN\CLIFTON\982482\OU-1\FIG\CLF-HIST.CDR

GEI Consultants, Inc.

FIGURE 1-3
1775-1783 MAP OF SITE VICINITY

KEYSPAN CORPORATION
CLIFTON FORMER MGP SITE
STATEN ISLAND, NEW YORK



SOURCE: MAP OF STATEN ISLAND OR RICHMOND COUNTY, N.Y. SURVEY DRAWN AND PUBLISHED BY JAMES BUTLER

PROVIDED BY: STATEN ISLAND INSTITUTE OF ARTS AND SCIENCES.

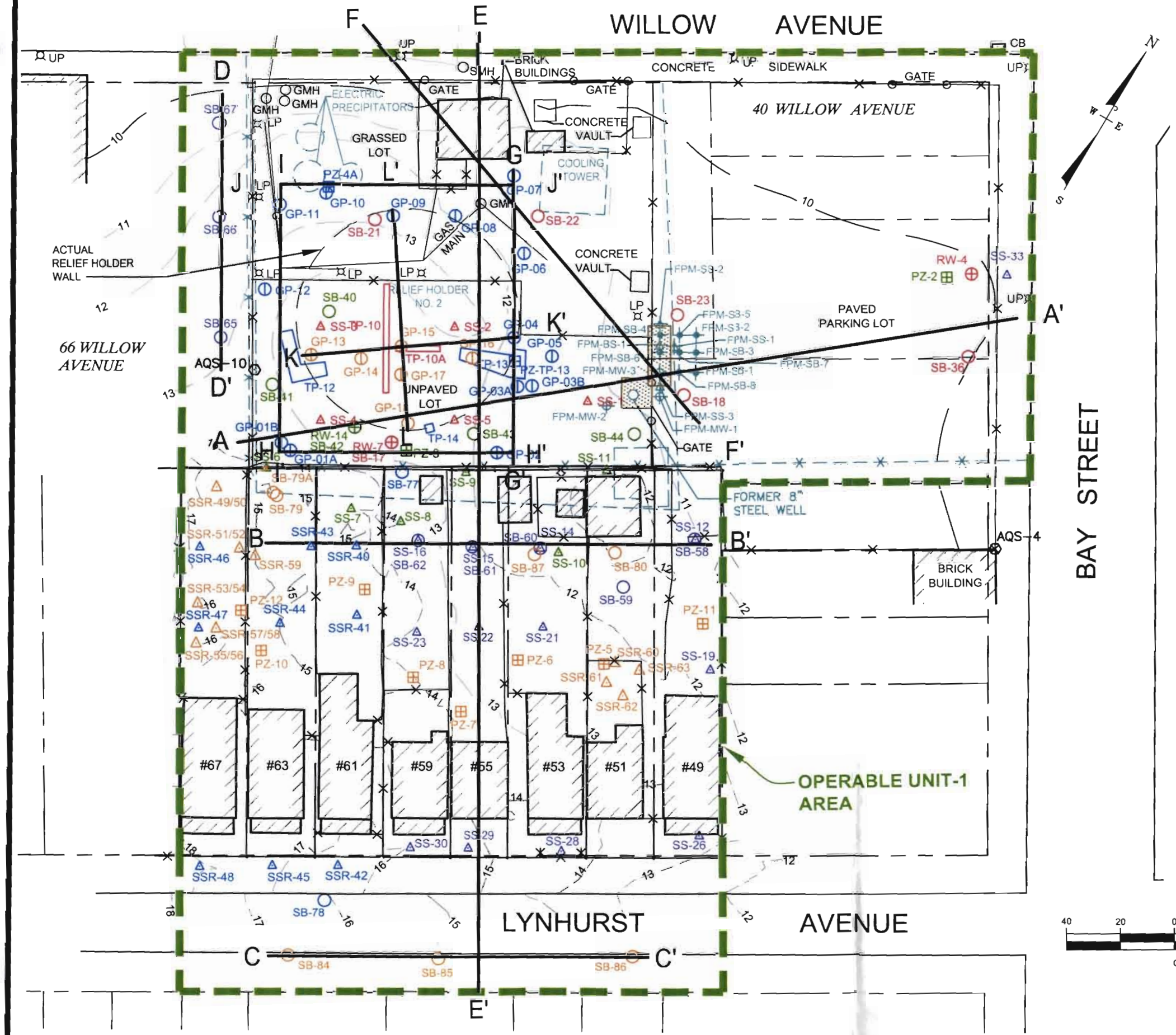
GEI Consultants, Inc.

FIGURE 1-4

1853 MAP OF SITE VICINITY

KEYSPAN CORPORATION
CLIFTON FORMER MGP SITE
STATEN ISLAND, NEW YORK

KEYSPAN\CLIFTON\982482\OU-1\FIG\CLF-HIST.CDR



LEGEND

- EXISTING BUILDING/STRUCTURE
- HISTORICAL STRUCTURE/FEATURE
- CHAIN LINK FENCE
- CURRENT/HISTORIC PROPERTY BOUNDARY
- 10 — GROUND SURFACE CONTOURS (FT)
- RW-4 — REMEDIAL INVESTIGATION (RI) MONITORING WELL LOCATION
- SB-18 — RI SOIL BORING LOCATION
- PZ-3 — RI PIEZOMETER LOCATION
- SS-11 — RI SOIL SAMPLE LOCATION
- AQS-10 — RI AIR QUALITY SAMPLE LOCATION
- GP-01A — FEASIBILITY STUDY (FS) SUPPORT GEOPROBE LOCATION
- TP-12 — RI TEST PIT LOCATION
- ROUND 1 RI SAMPLE LOCATION (FEBRUARY-APRIL 1999)
- ROUND 2 RI SAMPLE LOCATION (JULY-OCTOBER 1999)
- ROUND 3 RI SAMPLE LOCATION (NOVEMBER-DECEMBER 1999)
- ROUND 4 RI SAMPLE LOCATION (NOVEMBER 2001-JANUARY 2002)
- ROUND 5 RI SAMPLE LOCATION (MAY-JUNE 2002)
- LEX-SS-1 — PREVIOUS LEXICON SIDEWALL SOIL SAMPLE LOCATION
- LEX-OW-1 — PREVIOUS LEXICON MONITORING WELL LOCATION
- FPM-OW-1 — PREVIOUS FANNING, PHILLIPS & MOLNAR MONITORING WELL LOCATION
- FPM-GP-1 — PREVIOUS FANNING, PHILLIPS & MOLNAR GEOPROBE/PIEZOMETER LOCATION
- SB-NY — PREVIOUS SOIL BORING LOCATION
- FPM-SB-1 — PREVIOUS FANNING, PHILLIPS & MOLNAR SOIL BORING LOCATION
- CNY#1 — PREVIOUS CITY OF NEW YORK SOIL BORING LOCATION
- G — GAS LINE
- LP — LIGHT POLE
- UP — UTILITY POLE
- CB — CATCH BASIN
- MANHOLE
- EXCAVATION BOUNDARY
- A — A' — CROSS-SECTION LOCATION

SOURCES:

1. "FOLLOW-UP SOIL AND GROUNDWATER INVESTIGATION AT THE BROOKLYN UNION GAS COMPANY CLIFTON STATION FACILITY, 40 WILLOW AVENUE, STATEN ISLAND, NY" BY FANNING, PHILLIPS & MOLNAR, AUGUST 29, 1994.
2. "MAP OF PROPERTY, EXIST. BLDG & YARD CONNECTIONS, NEW YORK AND RICHMOND GAS COMPANY - 1921" BY FANNING, PHILLIPS & MOLNAR ENGINEERS, RONKONKOMA, NEW YORK. SCALE 1"=30'. DATED 2/8/94 - REVISED TO 2/13/98.
3. "TOPOGRAPHY AND SAMPLE LOCATIONS, #49 - #67 LYNHURST AVENUE" BY GEI CONSULTANTS, INC., COLCHESTER, CONNECTICUT FOR KEYSPAN ENERGY. SCALE 1"=10'. DATED 7/8/02.

40 20 0 40 80

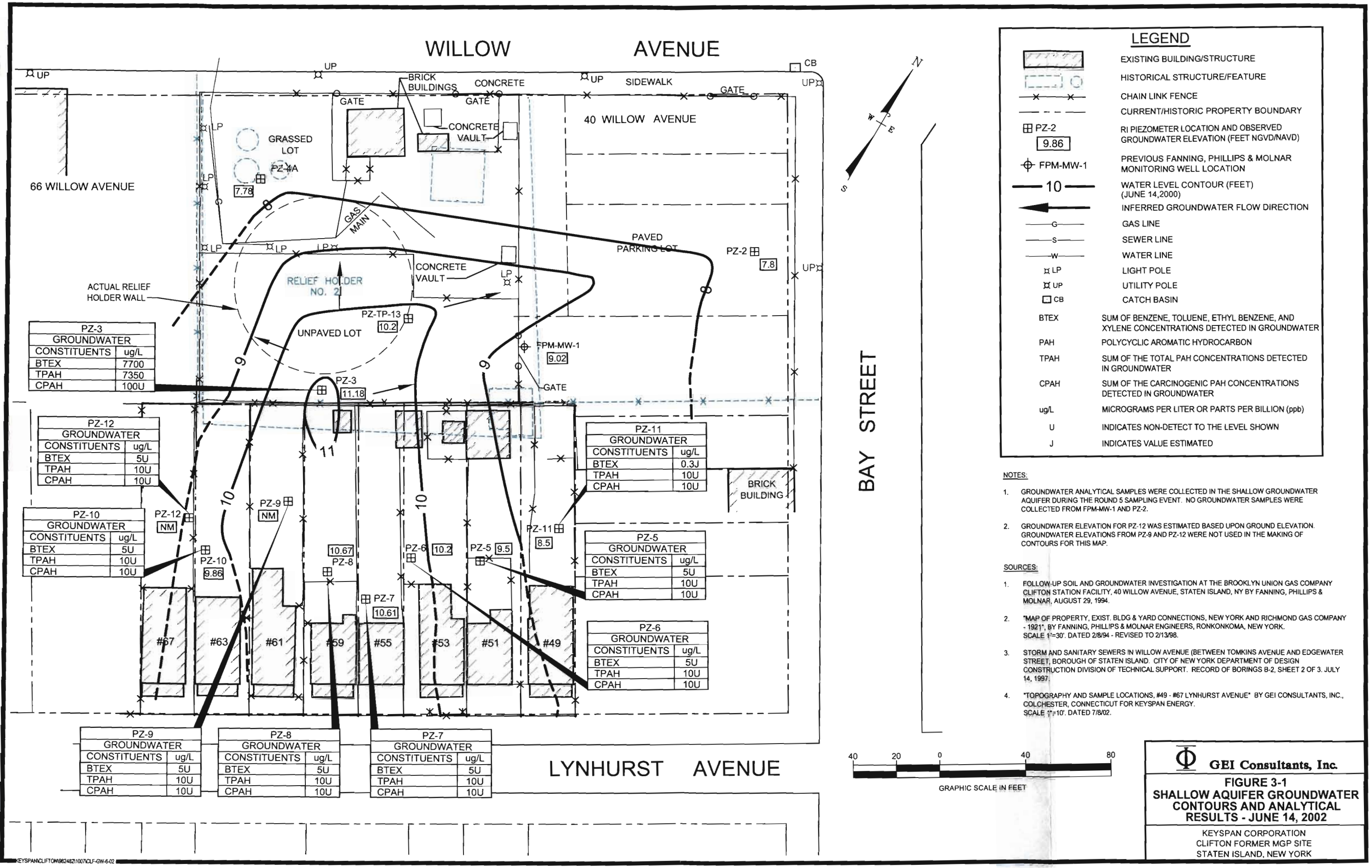
GRAPHIC SCALE IN FEET

GEI Consultants, Inc.

FIGURE 2-1
OU-1 SAMPLE AND CROSS-SECTION LOCATION MAP

KEYSPAN CORPORATION
CLIFTON FORMER MGP SITE
STATEN ISLAND, NEW YORK

K:\KEYSPAN\CLIFTON\982482\1007\CLF-OU1



LEGEND

- EXISTING BUILDING/STRUCTURE
- HISTORICAL STRUCTURE/FEATURE
- CHAIN LINK FENCE
- CURRENT/HISTORIC PROPERTY BOUNDARY
- PZ-2 / 9.86 — RI PIEZOMETER LOCATION AND OBSERVED GROUNDWATER ELEVATION (FEET NGVD/NAVD)
- FPM-MW-1 — PREVIOUS FANNING, PHILLIPS & MOLNAR MONITORING WELL LOCATION
- 10 — WATER LEVEL CONTOUR (FEET) (JUNE 14,2000)
- INFERRED GROUNDWATER FLOW DIRECTION
- G — GAS LINE
- S — SEWER LINE
- W — WATER LINE
- LP — LIGHT POLE
- UP — UTILITY POLE
- CB — CATCH BASIN

BTEX	SUM OF BENZENE, TOLUENE, ETHYL BENZENE, AND XYLENE CONCENTRATIONS DETECTED IN GROUNDWATER
PAH	POLYCYCLIC AROMATIC HYDROCARBON
TPAH	SUM OF THE TOTAL PAH CONCENTRATIONS DETECTED IN GROUNDWATER
CPAH	SUM OF THE CARCINOGENIC PAH CONCENTRATIONS DETECTED IN GROUNDWATER
ug/L	MICROGRAMS PER LITER OR PARTS PER BILLION (ppb)
U	INDICATES NON-DETECT TO THE LEVEL SHOWN
J	INDICATES VALUE ESTIMATED

NOTES:

1. GROUNDWATER ANALYTICAL SAMPLES WERE COLLECTED IN THE SHALLOW GROUNDWATER AQUIFER DURING THE ROUND 5 SAMPLING EVENT. NO GROUNDWATER SAMPLES WERE COLLECTED FROM FPM-MW-1 AND PZ-2.
2. GROUNDWATER ELEVATION FOR PZ-12 WAS ESTIMATED BASED UPON GROUND ELEVATION. GROUNDWATER ELEVATIONS FROM PZ-9 AND PZ-12 WERE NOT USED IN THE MAKING OF CONTOURS FOR THIS MAP.

SOURCES:

1. FOLLOW-UP SOIL AND GROUNDWATER INVESTIGATION AT THE BROOKLYN UNION GAS COMPANY CLIFTON STATION FACILITY, 40 WILLOW AVENUE, STATEN ISLAND, NY BY FANNING, PHILLIPS & MOLNAR, AUGUST 29, 1994.
2. "MAP OF PROPERTY, EXIST. BLDG & YARD CONNECTIONS, NEW YORK AND RICHMOND GAS COMPANY - 1921", BY FANNING, PHILLIPS & MOLNAR ENGINEERS, RONKONKOMA, NEW YORK. SCALE 1"=30'. DATED 2/8/94 - REVISED TO 2/13/98.
3. STORM AND SANITARY SEWERS IN WILLOW AVENUE (BETWEEN TOMKINS AVENUE AND EDGEWATER STREET, BOROUGH OF STATEN ISLAND. CITY OF NEW YORK DEPARTMENT OF DESIGN CONSTRUCTION DIVISION OF TECHNICAL SUPPORT. RECORD OF BORINGS B-2, SHEET 2 OF 3. JULY 14, 1997.
4. "TOPOGRAPHY AND SAMPLE LOCATIONS, #49 - #67 LYNHURST AVENUE" BY GEI CONSULTANTS, INC., COLCHESTER, CONNECTICUT FOR KEYSPAN ENERGY. SCALE 1"=10'. DATED 7/8/02.

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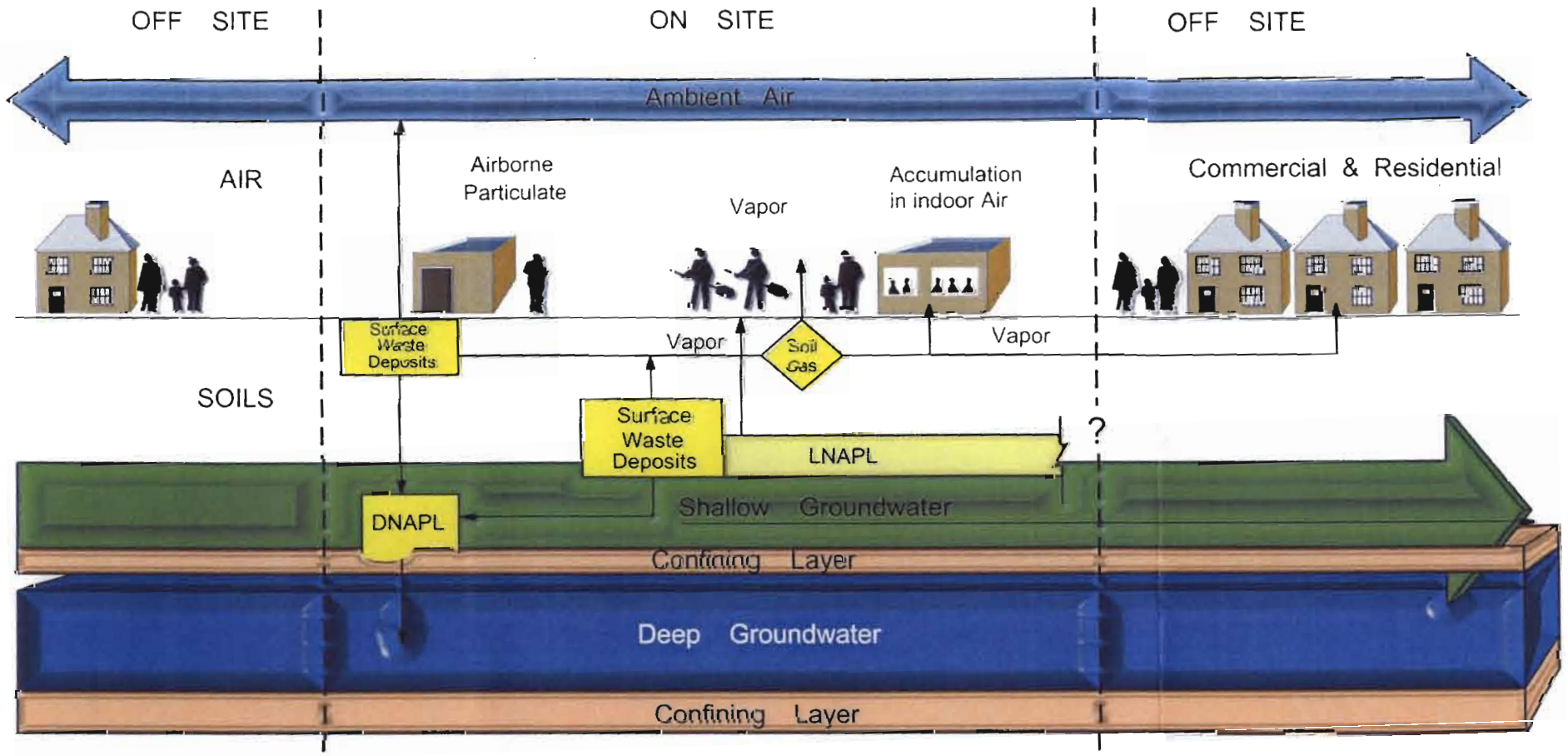
GRAPHIC SCALE IN FEET

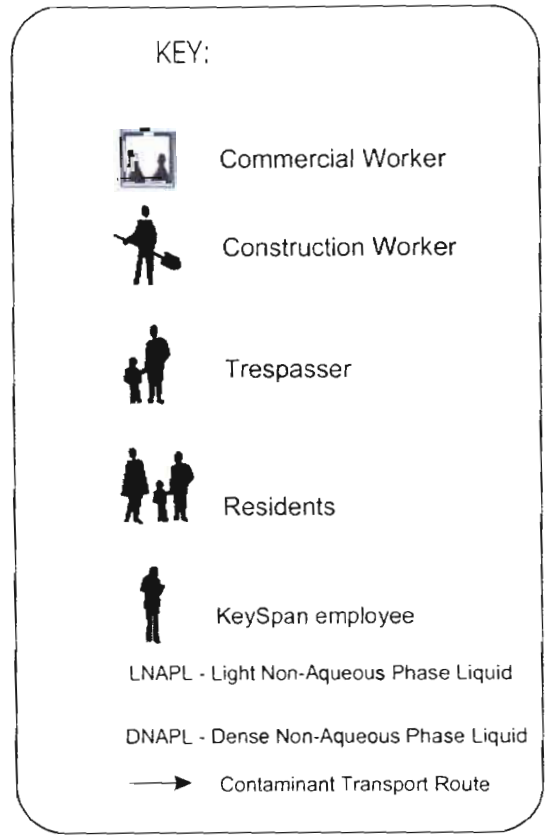
GEI Consultants, Inc.

FIGURE 3-1
SHALLOW AQUIFER GROUNDWATER CONTOURS AND ANALYTICAL RESULTS - JUNE 14, 2002

KEYSPAN CORPORATION
CLIFTON FORMER MGP SITE
STATEN ISLAND, NEW YORK

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Media		Outdoor Air		Indoor Air	Surface Soil		Subsurface Soil		Groundwater		
Potential Exposure Pathway		Vapor Inhalation	Particulate Inhalation	Accumulated Vapor Inhalation	Dermal Contact	Ingestion	Dermal Contact	Ingestion	Dermal Contact	Ingestion	Inhalation of Vapors
Location	Receptor										
Lynhurst Avenue	Resident Adult [1]	√	√	√	√	√	√ [2]	√ [2]	√ [2]	∅	√ [2]
	Resident Child [1]	√	√	√	√	√	∅	∅	∅	∅	∅
40 Willow Avenue	Commercial Worker [3]	∅	∅	√	∅	∅	∅	∅	∅	∅	∅
	Construction Worker [3]	√	√	∅	√	√	√	√	√	∅	√
	KeySpan Employee [4]	√	√	√	√	√	√	√	√	∅	√
	Trespasser - Adult	√	√	∅	√	√	∅	∅	∅	∅	∅
	Trespasser - Adolescent	√	√	∅	√	√	∅	∅	∅	∅	∅
	Trespasser - Child	√	√	∅	√	√	∅	∅	∅	∅	∅
Biotic Receptors											
Plants		∅	∅	∅	√	∅	∅	∅	∅	∅	∅
Wildlife		∅	∅	∅	√	√	∅	∅	∅	∅	∅

∅ Incomplete Pathway/Route
√ Potentially Complete Pathway/Route

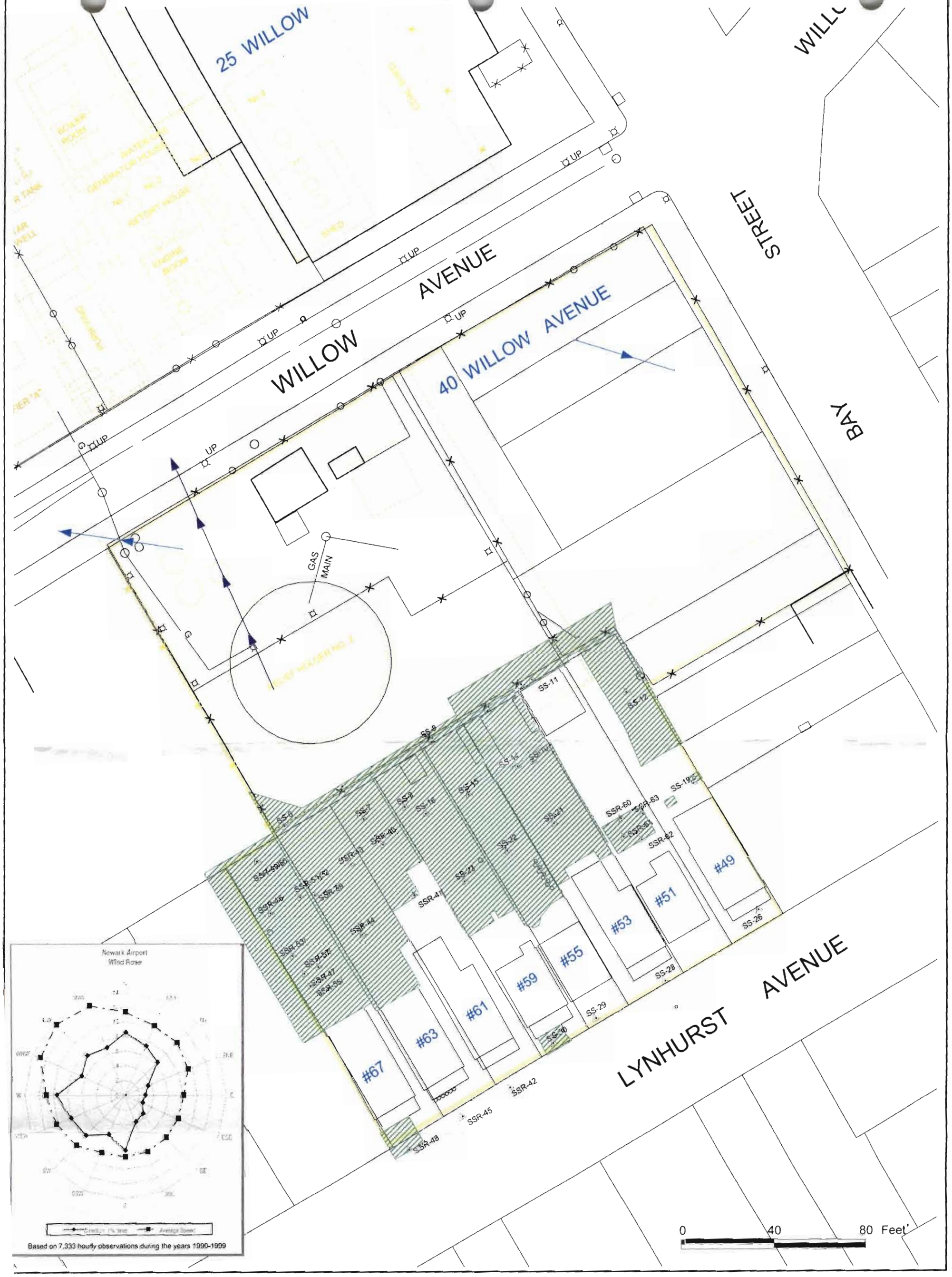
[1] A gardening scenario also is a possible exposure scenario for the adult resident. This scenario includes potential ingestion of and dermal contact with surface soil and inhalation of air-borne particulates while gardening. Consumption of homegrown produce also is possible for both the resident adult and child and is included as part of this exposure scenario.
[2] Direct contact with subsurface soil and groundwater are considered potentially complete exposure pathways in the event that a resident engages in excavation work in their yard. These exposure scenarios are discussed qualitatively in the text of the risk assessment.
[3] Future exposure scenario. All other scenarios listed are current scenarios.
[4] KeySpan maintains a policy that only trained workers are used for excavation work at active facilities, *i.e.*, a "no dig" policy is in effect at the site.

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Compiled by:
VHB
Vanasse Hangen Brustlin, Inc.
SEPTEMBER 2002

KEYSPAN

Figure 7-1
Conceptual Risk System Model
OU-1
Former Manufactured Gas Plant Site
Borough of Staten Island
New York City, New York



SEMAP SOURCES: "Sample Locations and Existing Conditions," Plate 1, prepared by GEI Consultants, Inc., 2/2000.
nits of Excavation, Post-IRM Soil Confirmation Sample Locations and Analytical Results Map," Figure 3, Prepared by Tetra Tech, FW, Inc.

Map Key

- Chain Link Fence
- Gas Line (G)
- Sewer Line (S)
- Water Line (W)
- FP Flag Pole
- LP Light Pole
- SSR-59 Surface Soil Sample Location
- HYD Fire Hydrant
- UP Utility Pole
- CB Catch Basin
- Manhole

N

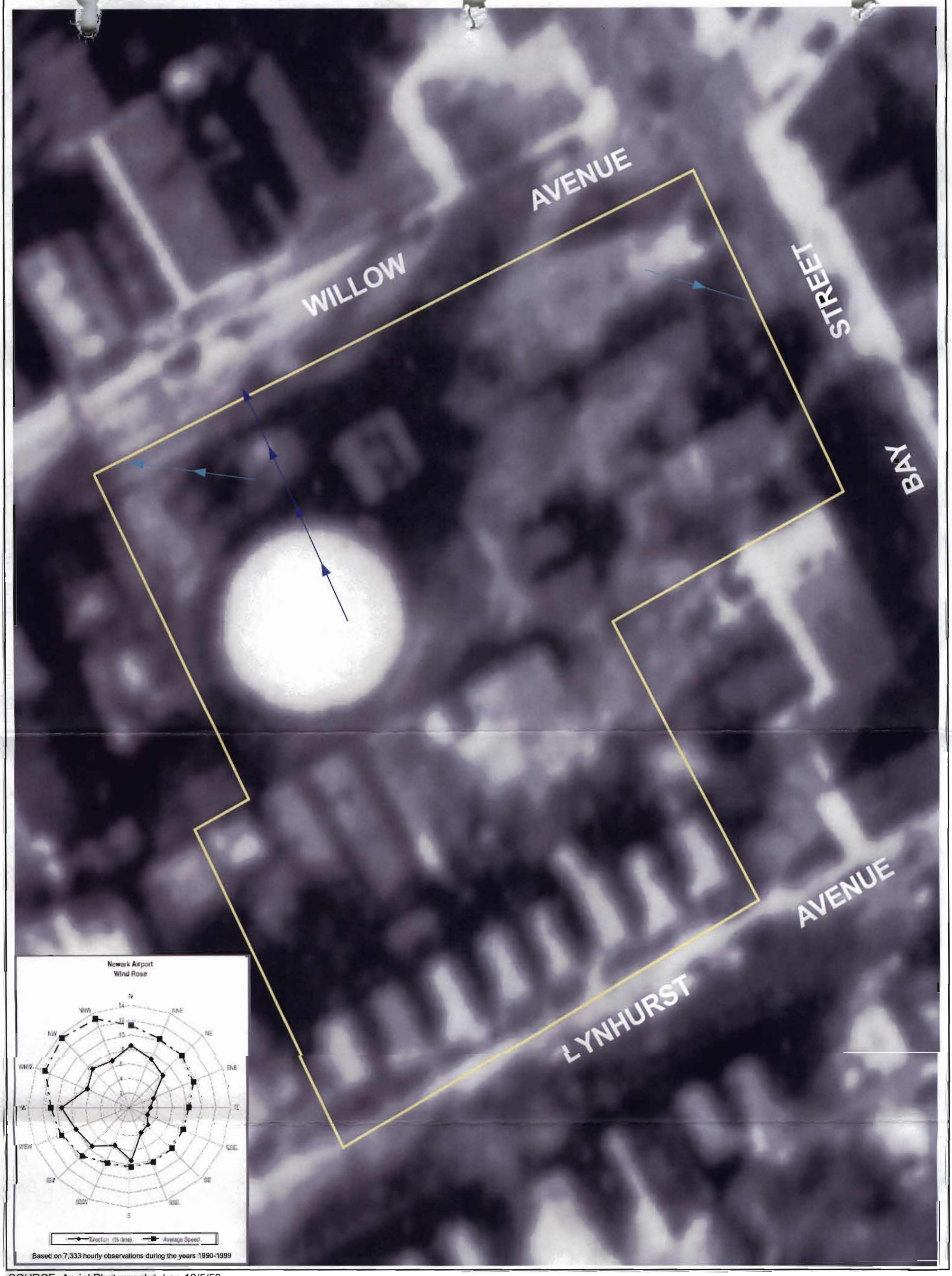
- OU-1
- Historic Features
- Excavation Area (Depth = 3')
- Surface Drainage
- Groundwater Direction

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HB
masse Hangen Brustlin, Inc.
EPTEMBER 2002
:eyspan\clifton\982482\1007\ou-1\figs\clf-fig 7-2A.cdr
ified by GEI Consultants, Inc. For Limits of Excavation in June 2004.

KEYSPAN

Figure 7-2A
Current Site Plan - OU-1

Former Clifton
Manufactured Gas Plant Site
Borough of Staten Island
New York City, New York



SOURCE: Aerial Photograph taken 12/5/53
(provided by GEI Consultants, Inc. 3/29/2000)

0 40 80 Feet

KEYSPAN

Map Key

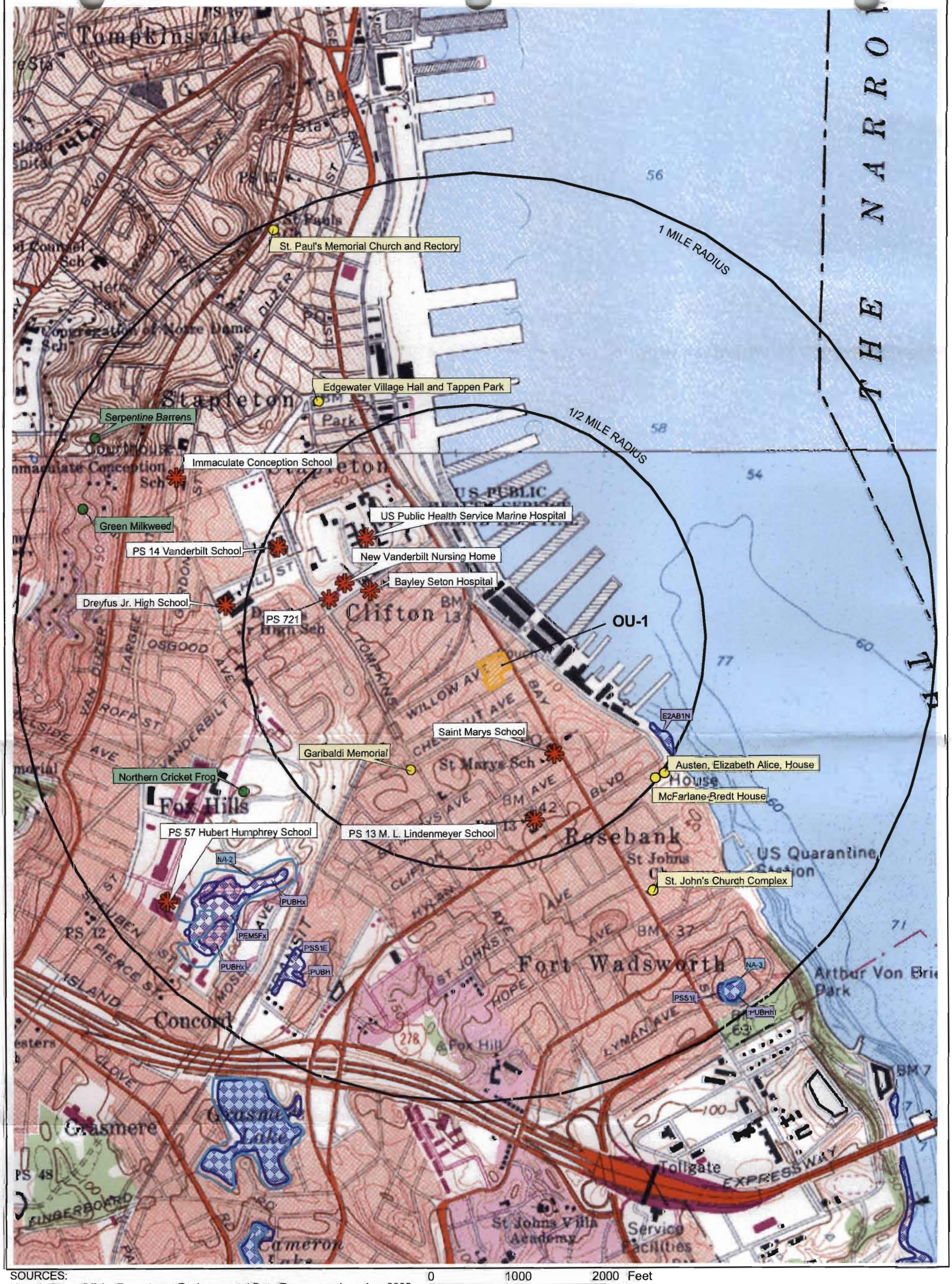
- Approximate Boundary of OU-1
- Surface Drainage
- Groundwater Direction

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Map Compiled By:
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Vanasse Hangen Brustlin, Inc.

SEPTEMBER 2002
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Figure 7-2B
Historic Aerial Photo - OU-1
Former Clifton
Manufactured Gas Plant Site
Borough of Staten Island
New York City, New York



SOURCES:
Historic Sites, Offsite Receptors - Environmental Data Resources, Inc., Aug 2002
USGS Topographic Map, The Narrows, NY-NJ, Photorevised 1981
USGS Topographic Map, Jersey City, NY-NJ, Photorevised 1981
US Fish and Wildlife National Wetlands Inventory
Fresh Water Wetlands - NYSDEC
Protected Species - NYSDEC

0 1000 2000 Feet

Map Key

- OU-1
- Fresh Water Wetlands
- National Wetlands Inventory
- Protected Species
- Historic Places
- Offsite Receptors

Note: only those Historic Places and Receptors that fall within the one mile radius are included in this figure.

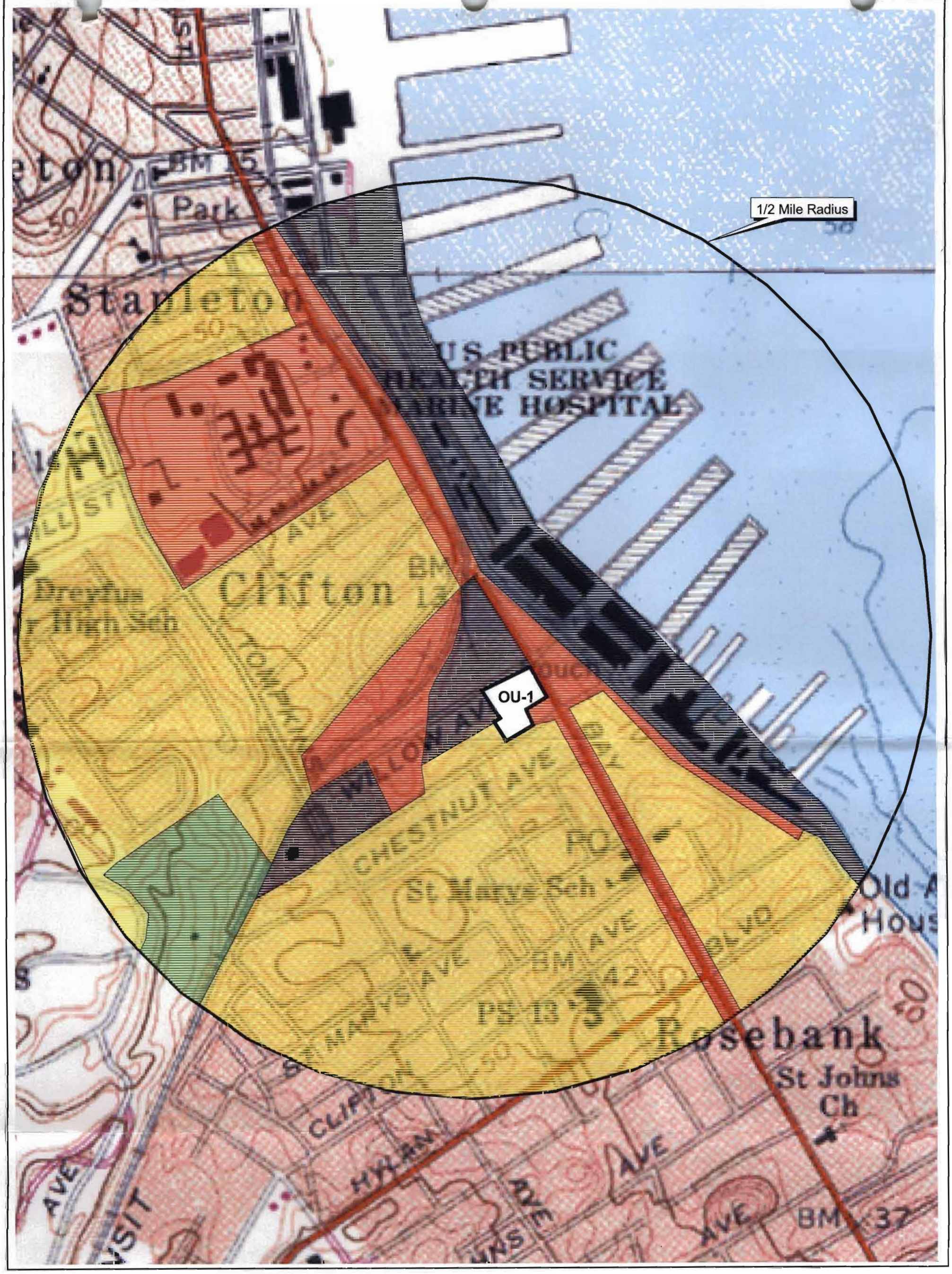
Map Compiled By:
VHB
Vanasse Hangen Brustlin, Inc.
SEPTEMBER 2002

N

KEYSPAN

Figure 7-2C
Environmental Attributes and Sensitive Receptors - OU-1

Former Clifton
Manufactured Gas Plant Site
Borough of Staten Island
New York City, New York



SOURCES:
USGS Topographic Map, The Narrows, NY-NJ, Photorevised 1981
USGS Topographic Map, Jersey City, NY-NJ, Photorevised 1981

0 525 1050 Feet

Map Key

- OU-1
- Commercial
- Industrial
- Residential
- Woodland

KEYSPAN

Figure 7-2D
Land Cover/Land Use Map - OU-1

Former Clifton
Manufactured Gas Plant Site
Borough of Staten Island
New York City, New York

Map Compiled By:
VHB
Vanasse Hangen Brustlin, Inc.
SEPTEMBER 2002

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Appendix A

Supplemental Remedial Investigation Work Plans and NYSDEC Approval Letters

KEYSPAN ENERGY

KeySpan Energy
One MetroTech Center
Brooklyn, New York 11201-3850

July 26, 1999

Mr. Amen M. Omorogbe, P.E.
Project Manager
Bureau of Construction Services
Division of Environmental Remediation
New York State Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233-7010

RE: Remedial Investigation--Clifton Former MGP Site
Staten Island, New York
Amendment to the Work Plan

Dear Mr. Omorogbe:

KeySpan Energy (KeySpan) is submitting this proposed amendment to the remedial investigation Work Plan for the above-referenced site. As you know, between February 20 and April 6, 1999, GEI Consultants, Inc., Atlantic Environmental Division (GEI/Atlantic), conducted the field investigation at the Clifton former manufactured gas plant site located at 25 and 40 Willow Ave., Staten Island.

The field investigation included:

- three surface-soil samples (an addition to the original Work Plan designed to provide additional characterization data);
- 11 test pit excavations;
- 27 borings;
- six monitoring wells (three hand-dug piezometers were installed as an addition to better define the water table);
- six permeability tests;
- 42 subsurface-soil samples collected for analysis;
- nine groundwater samples;
- two rounds of water table measurement; and
- nine air quality stations were monitored routinely during the test pit work.

The preliminary findings of the investigation were presented to you during our meeting on June 8, 1999. Based upon these findings and the decisions made during our meeting, we plan further efforts to complete the site investigation. Specifically, additional field work will be conducted to:

- characterize the subsurface soils within specific former MGP structures;
- characterize subsurface soils to a confining layer or bedrock at approximately 175 feet;
- characterize groundwater within the lower aquifer;

- evaluate the lateral extent of water table aquifer impacts;
- further characterize the subsurface soils horizontally and vertically on the site;
- evaluate surface-soil conditions adjacent to the site on residential property; and
- evaluate conditions associated with the on-site storm drain system.

Plate 1 presents the planned sampling locations along with the current site conditions and the locations of previously conducted borings and monitoring wells. Table 1 presents a rationale for each sampling location.

Surface-Soil Sampling and Analysis

Shallow surface-soil samples (0 to 0.5 feet) are planned to be collected at up to seven locations (SS-6 through SS-12) located on the residential properties just to the south of the former relief holder on 40 Willow Avenue. Note that the actual location of the surface soil samples are subject to change pending an evaluation of the actual property boundaries and the finalization of access agreements with the property owners. These samples will be analyzed for volatile organic compounds (VOCs) under SW-846 Method 8260A, semivolatile organic compounds (SVOCs) following Method 8270B, total cyanide using Method 9012A, and RCRA 8 metals (by mass analysis). In addition total organic carbon and grain size analysis will be measured on each sample.

Shallow Soil and Groundwater Investigation

Three shallow soil borings (SB-37, SB-38, and SB-39) will be drilled within the building occupied by the Saturn dealership at 25 Willow Avenue. These borings will be used to characterize the soils in the area of former relief holder No.1 and a former tar separator. Each boring will be completed to an estimated 30 feet below the floor of the building (coincident with the bottom of the MGP structures) to determine the integrity of these structures and characterize the subsurface soils, or as close to this depth as possible based on the equipment used.

Soil boring SB-40 will be drilled within a former relief holder No. 2 on 40 Willow Avenue. The boring is anticipated to be completed to 25 feet below ground surface (bgs) to coincide with the bottom of that holder. If the holder bottom does not appear to be intact, or if no bottom is found, the boring may be advanced up to 10 feet below the bottom of the holder to determine the integrity of the holder bottom.

Soil borings SB-41 through SB-44 will be completed along the southeast property line of the 40 Willow Avenue parcel, southeast of former relief holder No. 2. Soil boring SB-42 will be completed as a deep boring/well (see discussion below) and soil borings SB-41, 43, and 44 will be completed to an anticipated depth of 30 feet below grade to characterize the subsurface soils.

Five shallow soil borings finished as monitoring wells are planned to be completed off-site to assess the subsurface conditions adjacent to the western property line (SB-45 through SB-49). Each well is intended

to evaluate the groundwater flow conditions to the northwest of the former MGP in an area where a former streambed may have existed. Each boring/well is anticipated to be completed to an estimated depth of 40 feet bgs.

Soil borings SB-50, 51, and 52 will be drilled on-site along the westerly property line to an anticipated depth of 40 feet. Each boring will be placed downgradient of previously observed soil impacts and will be placed adjacent to the sewer line that roughly parallels the westerly property line. The borings will evaluate the horizontal and vertical extent of possible subsurface soil impacts.

Shallow soil borings SB-53 and SB-54 will be drilled within the former tar tank/gasometer and near a former tar well. Boring SB-55, also near the tar tank/gasometer is planned as part of the deep investigation discussed below. Each boring will be completed to the bottom of the structure (anticipated to be 25 feet bgs). An additional soil boring SB-57 will be installed within gas holder number 2.

Piezometer PZ-3 will also be installed adjacent to the storm sewer line, near the north corner of the Saturn dealership building. The piezometer will aid in interpretation of groundwater flow as it approaches the storm sewer.

The sampling procedures section (below) describes the methods of sample collection and the analyses to be performed on the samples collected. Table 1 specifies the laboratory analyses per boring/well location.

Deep Soil and Groundwater Investigation

Three deep soil borings/monitoring wells will be completed to provide characterization of the subsurface soils and groundwater adjacent to former gas holder foundations. Each deep boring will be sampled continuously to the top of the bedrock or a significant confining layer. Based on available geologic information, it is assumed that bedrock is the first confining layer and it may be encountered at depths as great as 175 feet bgs.

Soil boring/well SB-42 (previously mentioned) will be completed adjacent to the former relief holder No. 2 located at 40 Willow Avenue. Soil boring/monitoring well SB-55 will be completed adjacent to the former tar tank/gasometer located near the southwest corner of the property (25 Willow Avenue). SB-56 will be completed adjacent to the former relief holder No. 1 near test pit TP-8 adjacent to the loading dock. If substantial contamination is identified in borings 37,38, or 56, or if either boring 52 or the new boring to be located within Holder #2 identify substantial contamination, a field decision, with the concurrence of the NYSDEC monitor, will be made regarding placement and location of an additional deep well.

At each location, soil sampling will be conducted until the vertical extent of MGP impacts has been reached. Soil samples will be continuously collected and field screened with an OVA-PID (headspace method). Each sample will be described in the field and observations of odor, tar, staining, etc. will be

recorded on the field log. A nominal 8-inch diameter steel casing will be placed to a depth extending from the surface to approximately 10 feet below the observed maximum extent of contamination. The casing will be pressure-grouted in place and the grout will be allowed to cure for a minimum 48-hour period. After the grout has cured, the grout within the casing will be reamed out and soil sampling will proceed from the bottom depth of the casing to the top the first significant confining layer. Should a deeper layer of contamination be encountered, a section of nominal 6-inch diameter steel casing will be telescoped below the 8-inch casing, pressure-grouted in place, and allowed to cure prior to sampling below the extent of the encountered deeper contaminant zone.

Soil sampling will be conducted until bedrock or the confining layer is encountered (anticipated at 175 feet bgs). A monitoring well will be constructed of nominal 4-inch inner diameter polyvinyl chloride (PVC) riser pipe and a 10-foot section of machine-slotted well screen. The screen interval for each well will be placed below the maximum extent of observed contamination. In the event that 6-inch diameter casing was installed, the monitoring well(s) will be constructed of 2-inch inner diameter PVC materials.

A silica sand filter pack will be placed around the screen interval of each well extending to approximately 2 feet above the top of the well screen. A minimum 5 ft. bentonite seal will be placed atop the filter pack, and the remaining annular space will be sealed with a bentonite/portland cement grout slurry. The top of each well will be completed with a flush-mounted well cover set in a concrete pad.

In the event that the borings continue to the top of bedrock, a monitoring well will be constructed, as described above, to characterize the subsurface conditions. If mobile and significant amounts of NAPL contamination are observed on top of a confining layer (clay unit, bedrock) drilling will proceed a few feet into the layer to allow for installation of a two-foot sump for NAPL collection. The sump will aid in the collection and evaluation of NAPL mobility.

All newly installed wells will be developed using a surge and pump method until all turbidity has been removed. A turbidity measurement of 50 NTU's or the removal of ten well volumes will determine the extent of development.

The sampling procedures section (below) describes sample collection methods and the analyses to be performed. Table 1 specifies the laboratory analyses per boring/well location.

Survey

Permanent markers (steel pins) will be placed flush to the ground surface at the location of each soil boring not completed as a monitoring well and at each surface soil sampling location to allow the location and ground surface elevations to be accurately surveyed following completion of the field program.

After completion of all the subsurface investigations, a surveyor will measure the horizontal location and vertical elevation of each boring, well, and surface soil sample point.

Groundwater Sampling

Approximately two weeks after the installation and development of the last additional monitoring well, groundwater samples will be collected from each newly installed well and from each well previously sampled during the March/April 1999 sampling event. Two synoptic rounds of depth to groundwater measurements will be made: one at high tide and one at low tide.

For the deep monitoring wells, artesian conditions are anticipated. Before these wells (five total) are sampled, a well riser extension will be used to measure the piezometric surface.

Sampling Procedures

All soil and groundwater samples will be collected in accordance with the procedures specified in GEI/Atlantic's RI/FS Work Plan for the site, dated November 1998. All work performed will be conducted in accordance with GEI/Atlantic's site-specific health and safety plan and in accordance with the quality control/quality assurance procedures specified in the work plan.

Two soil samples from each boring will be collected for laboratory analyses of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), total cyanide, and RCRA 8 metals (metals). Generally, the soil sample exhibiting the greatest degree of contamination and a soil sample from beneath the observed MGP-impacted soil in each boring will be submitted for analyses.

For the deep soil borings (SB-42, SB-55, and SB-56), if vertically discrete zones of contamination are encountered, additional soil samples may be collected for laboratory analyses to document the magnitude and extent of the observed contamination.

Groundwater will be analyzed for VOCs, SVOCs, total cyanide, and the eight RCRA metals.

As we discussed, the best date for Keyspan to begin this additional sampling is July 26th, based on drillers' schedules and other considerations.

Please provide your comments to me at the above address or email tbell@keyspanenergy.com. If you have any questions or need additional information, I can be reached at (718)403-3053.

Very truly yours,

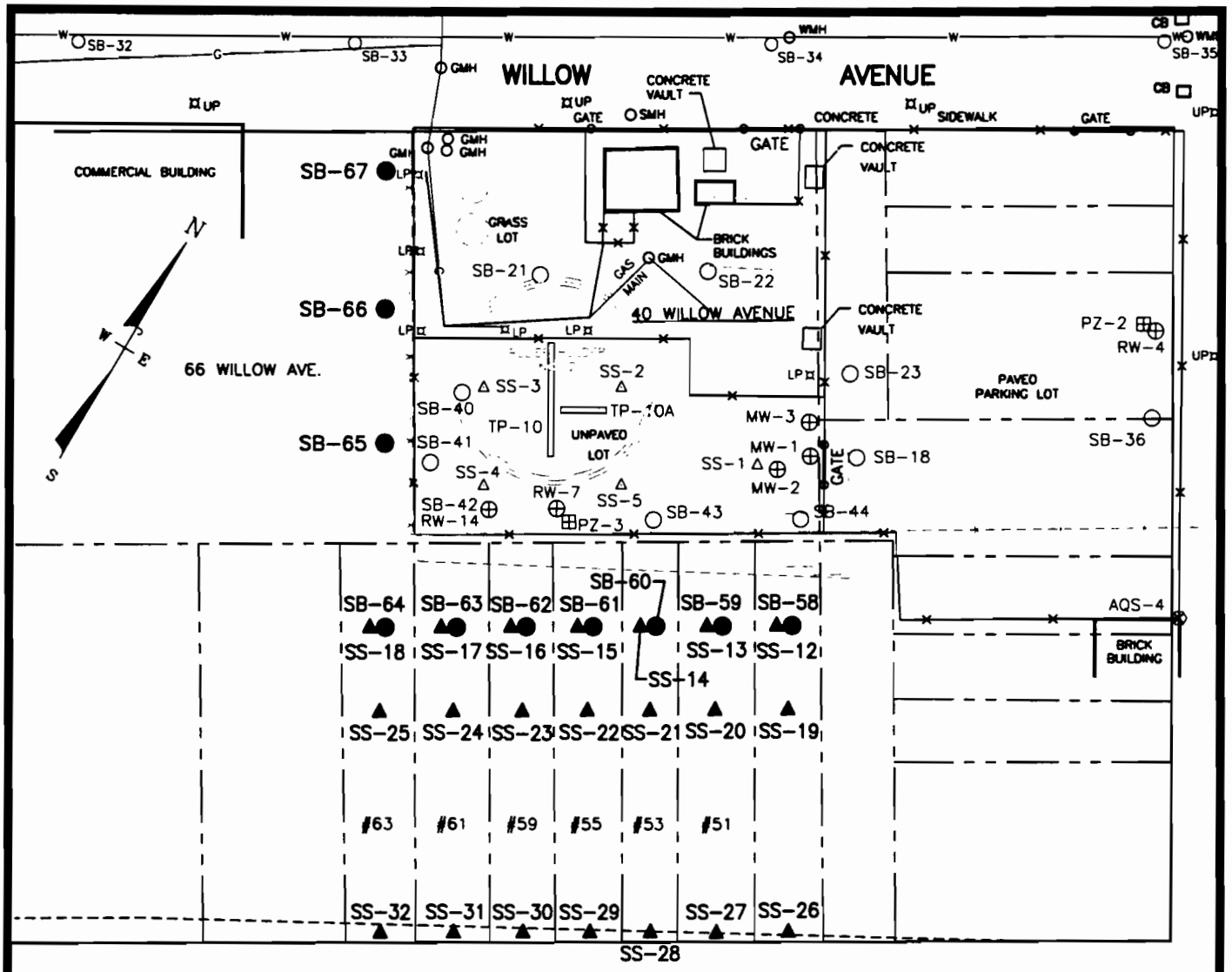
Tracey L. Bell

Tracey L. Bell
Director

TABLE 1
Proposed Sample Summary

Sample ID (Depth)	Location Rationale	Analysis
	Surface Soils	
SS-6. 7. 8.9.10.11.12 (0.5)	Situated in the adjacent residential property to evaluate the lateral extent of surface soil PAH impacts noted in the vicinity of the former relief holder at 40 Willow Avenue.	VOCs. SVOCs. total cyanide. RCRA 8 metals. TOC. grain size - 1 sample per location
	Shallow Soil Borings and Monitoring Wells	
SB-37. 38 (25)	Situated within the former relief holder No. 1 beneath the dealership building to evaluate its presence. contents. depth and integrity.	VOCs. SVOCs. total cyanide. RCRA 8 metals 2 soil samples from each boring: TCLP organics - 1 worst case sample
SB-39 (25)	Situated within the former tar separator beneath the dealership building to evaluate its potential presence. contents. depth. and integrity.	VOCs. SVOCs. total cyanide. RCRA 8 metals - 2 soil samples
SB-40 (25)	Situated within the former relief holder No. 2 to evaluate its potential presence. contents. depth. and integrity.	VOCs. SVOCs. total cyanide. RCRA 8 metals - 2 soil samples: TCLP organics - 1 worst case sample
SB-41. 42. 43. 44 (30) Note: SB-42 will be completed as a deep well (175') per below	Situated on the south-southwestern portion of the gate station property (40 Willow Avenue) to provide horizontal and vertical characterization of subsurface soil.	VOCs. SVOCs. total cyanide. RCRA 8 metals - 2 soil samples from each boring
SB-45/RW-8	Situated west of the site on the abandoned railroad spur to provide horizontal and vertical characterization of subsurface soil in the direction of groundwater flow.	VOCs. SVOCs. total cyanide. RCRA 8 metals - 2 soil samples. 1 groundwater sample
SB-46/RW-9 (40)	Situated west of the site on the abandoned rail spur to provide horizontal and vertical characterization of subsurface soils in the vicinity of SB-9.	VOCs. SVOCs. total cyanide. RCRA 8 metals: 2 soil samples. 1 groundwater sample
SB-47/RW-10	Situated west of the site. west of the active railroad embankment to provide horizontal and vertical characterization of subsurface soils and to evaluate groundwater flow direction.	VOCs. SVOCs. total cyanide. RCRA 8 metals - 2 soil samples. 1 groundwater sample
SB-48/RW-11 (40)	Situated northwest of the site on the north side of the active line to provide horizontal and vertical characterization of subsurface soils and to determine groundwater flow direction.	VOCs. SVOCs. total cyanide. RCRA 8 metals - 2 soil samples. 1 groundwater sample
SB-49/RW-12	Situated north of the active railroad embankment near the northwest corner of the site to provide horizontal and vertical characterization of subsurface soils and to determine groundwater flow direction.	VOCs. SVOCs. total cyanide. RCRA 8 metals - 2 soil samples. 1 groundwater sample

TABLE 1 (continued) Proposed Sample Summary		
Sample ID (Depth)	**Location Rationale**	**Analysis**
SB-50/RW-13 (40)	Situated along the westerly property boundary (hydraulically downgradient of 'shallow' impacts) to provide horizontal and vertical characterization of subsurface soils.	VOCs, SVOCs, total cyanide, RCRA 8 metals - 2 soil samples. 1 groundwater sample
SB-51 (40)	Situated along the westerly property boundary (hydraulically downgradient of 'shallow' impacts) to provide horizontal and vertical characterization of subsurface soils.	VOCs, SVOCs, total cyanide, RCRA 8 metals - 2 soil samples
SB-52	Situated near existing well OW-6 to provide horizontal and vertical characterization of subsurface soils.	VOCs, SVOCs, total cyanide, RCRA 8 metals - 2 soil samples
SB-53 (25)	Situated within the former tar tank/gasometer in the southwestern portion of the site to evaluate its depth and contents.	VOCs, SVOCs, total cyanide, RCRA 8 metals, TCLP organics - 2 soil samples
SB-54 (25)	Situated within the former tar well to evaluate its potential presence, contents, depth, and integrity.	VOCs, SVOCs, total cyanide, RCRA 8 metals, TCLP organics - 2 soil samples
SB-42/RW-14 (175)	Situated adjacent to RW-7 to evaluate the vertical extent of impacts observed in RW-7 and to determine whether site impacts have migrated to the top of bedrock or a confining layer.	VOCs, SVOCs, total cyanide, RCRA 8 metals - 2 soil samples. 1 groundwater sample
SB-55/RW-15 (175)	Situated adjacent to the former tar tank/gasometer near the southwestern corner of the site to provide horizontal and vertical characterization of subsurface soils and to determine whether site impacts have migrated to the top of bedrock or a confining layer.	VOCs, SVOCs, total cyanide, RCRA 8 metals - 2 soil samples. 1 groundwater sample
SB-56/RW-16 (175)	Situated adjacent to former relief holder No. 1 to determine whether site impacts have migrated to the top of bedrock or a confining layer.	VOCs, SVOCs, total cyanide, RCRA 8 metals - 2 soil samples, 1 groundwater sample
SB-57 (25)	Situated within former holder No. 2 to determine impacts resulting from the holder.	VOCs, SVOCs, total cyanide, RCRA 8 metals - 2 soil samples



LEGEND

- PROPERTY LINE FROM BOROUGH TAX MAP
- CHAIN LINK FENCE
- GAS LINE
- STORM SEWER LINE
- WATER LINE
- HISTORIC BUILDING OR STRUCTURE

PROPOSED SAMPLE LOCATIONS

- ● SB-50 SOIL BORING
- ▲ SS-7 SURFACE SOIL

EXISTING SAMPLE LOCATIONS

- ○ AQS-1 AIR QUALITY STATION
- △ SS-1 SURFACE SOIL SAMPLE
- ⊞ PZ-2 HAND-DUG PIEZOMETER
- ⊕ RW-1 MONITORING WELL
- ▭ TP-7 TEST PIT
- ○ SB-14 SOIL BORING

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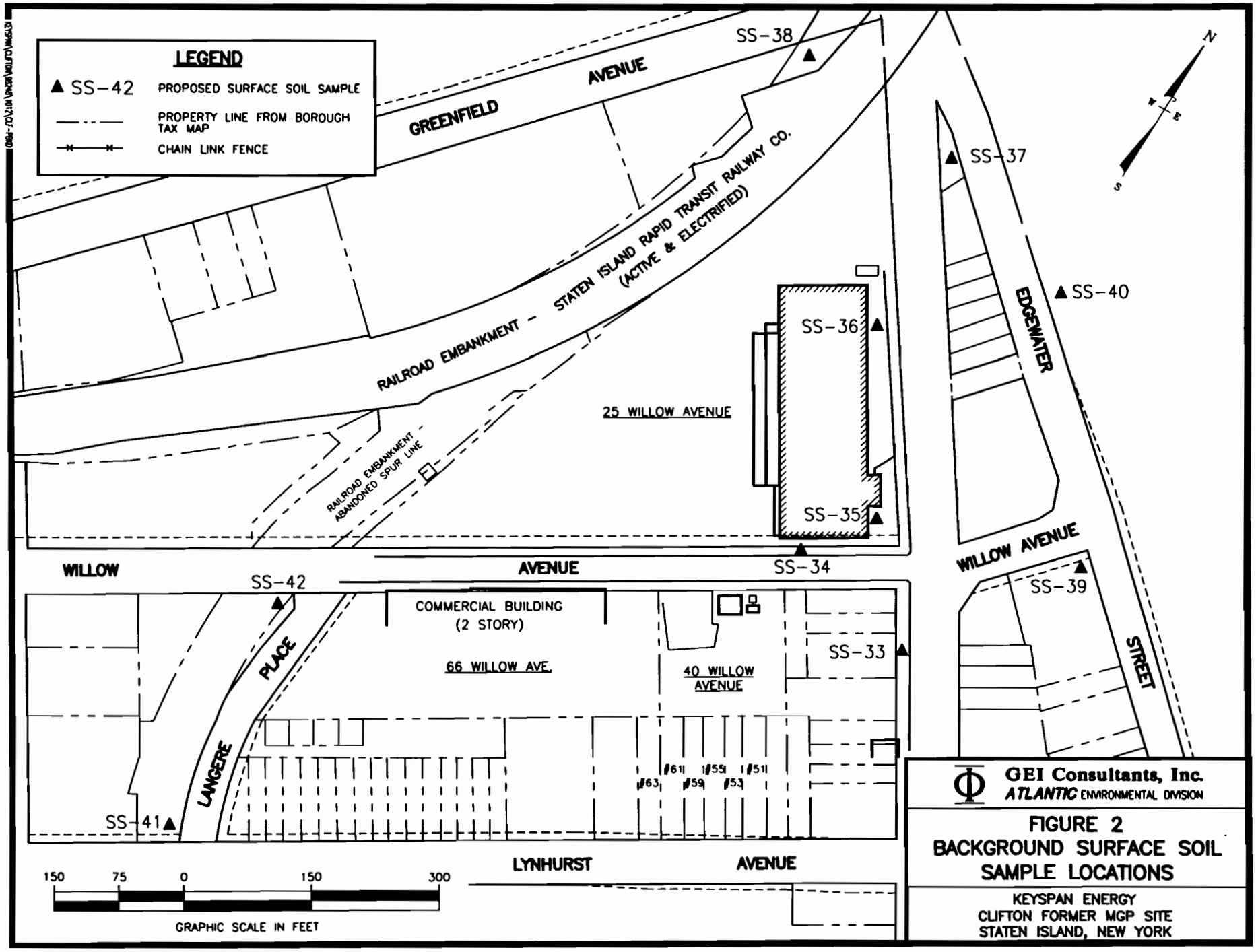
GRAPHIC SCALE IN FEET

GEI Consultants, Inc.
ATLANTIC ENVIRONMENTAL DIVISION

FIGURE 1
PROPOSED SURFACE SOIL SAMPLING & BORING LOCATIONS

KEYSPAN ENERGY
CLIFTON FORMER MGP SITE
STATEN ISLAND, NEW YORK

K:\SPNW\CLIFTON\98248\1012\CLF-PSS


LEGEND
SS-42 PROPOSED SURFACE SOIL SAMPLE
PROPERTY LINE FROM BOROUGH TAX MAP
CHAIN LINK FENCE
SS-38
GREENFIELD AVENUE
RAILROAD EMBANKMENT - STATEN ISLAND RAPID TRANSIT RAILWAY CO. (ACTIVE & ELECTRIFIED)
RAILROAD EMBANKMENT ABANDONED SPUR LINE
25 WILLOW AVENUE
SS-36
SS-35
SS-34
SS-37
SS-40
EDGEWATER
WILLOW AVENUE
SS-39
STREET
WILLOW
AVENUE
SS-42
COMMERCIAL BUILDING (2 STORY)
66 WILLOW AVE.
40 WILLOW AVENUE
SS-33
PLACE
LANGERE
SS-41
#63 #61 #59 #55 #53 #51
LYNHURST AVENUE
150 75 0 150 300
GRAPHIC SCALE IN FEET
N
E
S
GEI Consultants, Inc.
ATLANTIC ENVIRONMENTAL DIVISION
FIGURE 2
BACKGROUND SURFACE SOIL SAMPLE LOCATIONS
KEYSPAN ENERGY
CLIFTON FORMER MGP SITE
STATEN ISLAND, NEW YORK

New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Construction Services, Room 267
50 Wolf Road, Albany, New York 12233-7010
Phone: (518) 457-9285 FAX: (518) 457-7743

John P. Cahill
Commissioner

July 19, 1999

Mrs. Tracey Bell
Director
Corporate Environmental Overview
KeySpan Energy
One Metro Tech Center
Brooklyn, New York 11201-3850

Dear Mrs. Bell:

Re: Clifton Former MGP Site
RI/FS Supplementary Work Plan

The Department has completed the review of the Clifton site Supplementary Work Plan and offer the comments below. Please note that additional comments may be forthcoming from the Department of Health.

a. Borings SB-37, 38 and 39 should be advanced beyond the proposed holder and tar separator bottoms to determine if any leaks from the structures have occurred. These borings should extend until the vertical extent of contamination has been clearly defined (at least five feet into a clean zone) or till the top of the confining layer which ever comes first.

b. If mobile and significant amount of NAPL contamination are observed on top of a confining layer (clay unit, bedrock) in a boring, it should be completed as a monitoring well and drilling should proceed a few feet into the layer to allow for installation of a two-foot sump for NAPL collection. The sump will aid in the collection and evaluation of NAPL mobility.

c. Holder number 2 - Unless there are definitive results from boring (GP-3) placed within holder number 2 during the phase 1 investigation, we would recommend placement of deep boring within this holder to determine the extent of contamination if any. Also, the comment in (a) above is applicable to borings SB-42, 52, 55 and 56.

d. If significant amount of tar contamination are observed in SB-37,38 or 56, then an additional deep well should be placed on the other side of the building to determine the extent of contamination.

If you have any questions, or would like to discuss these comments further, please call me at (518) 457-9285.

Sincerely,

Amen M. Omorogbe, P.E.
Project Manager
Central Field Services Section
Bureau of Construction Services
Division of Environmental Remediation

cc: Steven Bates/W. Kuehner - NYSDOH
P. Carella, DFWMR
R. Gardineer/J. O'Connell - NYSDEC, Region 2

AO/ts
bcc: J. Van Hoesen
G. Cross
A. Omorogbe
Dayfile
a:Tbell.Work Plan.wpd

FILE

July 22, 1999

Mr. Amen M. Omorogbe, P.E.
Project Manager
Bureau of Construction Services
Division of Environmental Remediation
New York State Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233-7010

RE: Remedial Investigation–Clifton Former MGP Site
RI/FS Supplementary Work Plan
Response to Comments

Dear Mr. Omorogbe:

Thank you for your review of the Clifton Supplementary RI/FS Workplan. Our response to your comments is as follows:

a. Borings SB-37, 38, and 39 are located inside the existing buildings and will be advanced using a geoprobe rig. If contamination is found consistently down to the planned depth of 25 feet, it will be difficult to advance the borings a great deal further due to the limitations of the geoprobe system. There is not room for any other type of apparatus within the building. However, we believe that some concerns about contamination at depth will be addressed by deep well SB-56, located immediately next to the building and the considerations discussed below.

b. This comment is accepted with the condition that if an intermediate confining layer is encountered, a sump will only be installed if the layer is of sufficient thickness that there will be no concern about drilling through the layer.

c. GP-3 was a piezometer that was installed in the early 90's to determine groundwater flow direction. No analytical data was collected from GP-3, however drilling logs indicate that some staining and small amounts of free product were encountered during installation of the 7' boring. As requested, we will add one approximately 25 foot boring to the workplan, located within Gas Holder 2.

With regard to borings 42,52,55,and 56, we would like to note that 42, 55, and 56 are already scheduled to go to the deep confining layer (estimated at 172 feet below grade.) Pending the discussion below (in item d.), vertical characterization would be conducted to the depths projected for each of the remaining boreholes proposed in the workplan.

d. If substantial contamination is identified in borings 37,38, or 56, or if either boring 52 or the new boring to be located within Holder #2 identify substantial contamination, a field decision, with your concurrence and the concurrence of the NYSDEC monitor, will be made regarding placement and location of an additional deep well. However, please note that boring 56 is already scheduled to go to the deep confining layer.

As we discussed, I will amend the workplan to reflect these changes and forward it to you. If you require further changes or need more information, please contact me at (718) 403-3053.

Very truly yours,

Tracey L. Bell
Director

November 11,1999

Mr. Amen M. Omorogbe, P.E.
Project Manager
Bureau of Construction Services
Division of Environmental Remediation
New York State Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233-7010

RE: Remedial Investigation -- Clifton Former MGP Site
Staten Island, New York
Amendment to the Work Plan

Dear Mr. Omorogbe:

KeySpan Energy (KeySpan) is submitting this proposed amendment to the Remedial Investigation (RI) Work Plan for the above-referenced site. This amendment addresses surface- and subsurface-soil sampling at parcels adjacent to the KeySpan property located at 40 Willow Avenue, Staten Island, New York.

The overall objectives of this proposed work scope are two-fold: to obtain additional surface-soil data as requested by the New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH); and to evaluate the potential presence of MGP-related contaminants in the subsurface beneath seven residential and one commercial parcel adjacent to the KeySpan 40 Willow Avenue parcel. We have assumed that the findings from this scope of work will be incorporated into the final RI report for the Clifton former manufactured gas plant (MGP) site. The details of the amended scope are provided below.

SCOPE OF WORK

All soil samples will be collected in accordance with the procedures specified in GEI's RI/FS Work Plan for the site, dated November 1998. All work performed will be conducted in accordance with GEI's site-specific Health and Safety Plan (HASP) and in accordance with the quality control/quality assurance procedures specified in the Work Plan.

Surface-Soil Sampling

Three additional surface-soil samples will be collected from each of the seven residential lots abutting the 40 Willow Avenue parcel (Figure 1). Each sample will be collected from the first 2 inches of mineral soil, immediately beneath the sod. The actual sampling locations are dependent upon any existing physical impediments, and will be determined in the field. Each surface-soil sample will be collected with a hand-held stainless-steel sampling device that has been decontaminated in accordance with the RI Work Plan prior to each sample collection. The actual sampling locations will be field measured relative to permanent physical structures at each site and photographs will be taken to document the sampling locations.

Each sample will be submitted to Severn Trent Laboratories (STL) of Monroe, Connecticut for analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX) by United States Environmental Protection Agency (EPA) Method 8260A, semivolatile organic compounds (SVOCs BNA fraction) plus tentatively-identified compounds (TICs) by Method 8270B, total cyanide (TCN) by Method 9012A, the RCRA 8 Metals (by mass analysis), and total organic carbon (TOC).

Surface-soil samples SS-12 through SS-18 will be co-located with proposed soil borings SB-58 through SB-64 (see below), and will be located approximately 30 feet into the residential yards from the 40 Willow Avenue property line (Figure 1). Surface-soil samples SS-19 through SS-25 will be collected from each of the seven residential lots approximately 60 feet from the 40 Willow Avenue parcel property line. Surface-soil samples SS-26 through SS-32 will be collected from the front yards of each of the seven residential lots.

In addition to the surface-soil samples collected from the residential lots, 10 surface-soil samples (SS-33 through SS-42) will be collected from the general vicinity surrounding the Clifton former MGP site to provide information regarding the background surface-soil quality in the area (Figure 2). Each sample will be collected and handled in the same manner as the residential lot samples. Each background sample will be analyzed for BTEX, SVOCs, TCN, RCRA 8 metals, TOC, and grain size by wet sieve methods.

Subsurface-Soil Sampling

Subsurface-soil samples will be collected using a small rubber-tracked direct-push Geoprobe™ sampling rig. The tracked rig was selected due to its small size (less than 36 inches wide), maneuverability, and general unobtrusiveness. The Geoprobe™ will be used to complete seven soil borings on the residential lots (SB-58 through SB-64) and three soil borings (SB-65 through SB-67) in the parking lot of the 66 Willow Avenue parcel which abuts the 40 Willow Avenue parcel to the southwest (Figure 1). At each boring, soil samples will be collected continuously using the macro-core sampling device to a maximum depth of 20 feet below ground surface (bgs).

Each soil sample will be logged by the GEI field representative and screened for total volatile organic compound (VOC) content using a photoionization detector (PID). All field observations will be recorded in the field notebook and the samples will be handled in accordance with the procedures specified in the RI Work Plan.

Two soil samples from each boring will be submitted to STL for analysis of BTEX, SVOCs, TCN, and RCRA 8 Metals using the same methods as described above. In each boring, if contamination is observed, then the shallowest sample exhibiting evidence of contamination, and the apparent "most heavily contaminated" sample will be submitted for analysis. If contamination is not observed in a boring, then the 0- to 2-foot soil sample and the water table interface soil sample will be submitted for analysis.

SURVEY

After completion of all the subsurface investigations, a surveyor will measure the horizontal location and vertical elevation of each boring and surface-soil sample point.

SCHEDULE

We anticipate that the scope of work can be completed in five field days (one day for surface-soil sampling and four days for the subsurface-soil sampling). Mobilization to the field will occur within one week of obtaining legal access to all of the parcels. KeySpan will notify you of the intended start date. This schedule assumes that accessing each sampling location will not cause significant delays and that the drilling and surface-soil sampling will be performed during one continuous field mobilization effort.

Please provide your comments to me at the above address or email tbell@keyspanenergy.com. If you have any questions or need additional information, I can be reached at (718) 403-3053.

Very truly yours,

Tracey L. Bell
Director

New York State Department of Environmental Conservation
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Bureau of Construction Services, Room 267
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John P. Cahill
Commissioner

June 15, 2000

Mrs. Tracey Bell
Director
Corporate Environmental Overview
KeySpan Energy
One Metro Tech Center
Brooklyn, New York 11201-3850

Dear Mrs. Bell:

Re: Clifton Former MGP Site
RI/FS Work Plan Amendment.

This Department and the NYSDOH have completed the review of the amendment to the work plan submitted to us by your e-mail of November 15, 1999 for additional surface and subsurface soil sampling at residential parcels at the Clifton site and found it acceptable. It is also our understanding that the field work will begin on Monday November 29, 1999. We request that a copy of the amendment be made available to our inspector at the site. Please notify this office of any change in schedules.

If you have any questions, please call me at (518) 457-9285.

Sincerely,

Amen M. Omorogbe, P.E.
Project Manager
Central Field Services Section
Bureau of Construction Services
Division of Environmental Remediation

cc: Steven Bates/W. Kuehner - NYSDOH
P. Carella, DFWMR
R. Gardineer/J. O'Connell - NYSDEC, Region 2

AO/ts
bcc: J. Van Hoesen
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GEI Consultants, Inc.

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October 9, 2001
98248-1012

Mr. Amen M. Omorogbe, P.E.
Project Manager MGP Remedial Section
New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Western Remedial Action, 11th Floor
625 Broadway
Albany, New York 12233-7010

Re: Former Clifton MGP Site
Revised Supplemental Remedial Investigation (RI) Work Plan

Dear Mr. Omorogbe:

On behalf of our client, KeySpan Energy, GEI Consultants, Inc. (GEI) is submitting this revised work plan to conduct supplemental remedial investigations at the former manufactured gas plant (MGP) site located at 25 and 40 Willow Avenue Clifton, Staten Island, New York. This revised work plan has been revised from the September 18, 2001 work plan submitted to you by GEI to address the comments about delineation activities at the 40 Willow Avenue parcel that you provided to Ms. Tracey Bell of KeySpan via email on September 26, 2001. Following your review of this work plan, please contact Ms. Tracey Bell with KeySpan with your approval or if you have any questions.

Work Plan

The work described herein will be conducted in accordance with the procedures specified in the NYSDEC-approved November 9, 1998 RI Work Plan for the site. In addition, the work will be conducted following the quality assurance/quality control (QA/QC) procedures established in the approved RI work plan. All field activities will comply with the health and safety procedures specified in the NYSDEC-approved site-specific Health and Safety Plan.

The scope of work presented below is based on the requested supplemental RI scope of work presented in the NYSDEC August 1, 2001 letter plus additional delineation activities at the 40 Willow Avenue parcel.

Bay Street Evaluation

Six borings (SB-68 through SB-73) will be installed along Bay Street to evaluate whether tar is present atop the till surface at Bay Street and to evaluate the dip of that surface. Three of these borings will be completed at the top of the till surface and three will be drilled 10 feet into the till unit. The till surface is anticipated to be approximately 40 to 45 feet below ground surface (bgs). Each boring will be completed on the 25 Willow Avenue parcel

along Bay Street (Figure 1). Completion of these borings will promote an understanding of the potential for tar migration from either Relief Holder No. 1 or the former tar separator toward New York Harbor atop the till surface.

At a minimum, one soil boring (SB-70) will be completed as a 2-inch diameter PVC monitoring well to evaluate the groundwater quality discharging from the site along the former stream trace. If no tar is present in the other borings, they will be grouted upon completion. If tar is present in a particular boring, the vertical extent of tar will be evaluated to the extent practical. Additionally, if tar is in a particular boring along Bay Street, a 2-inch diameter PVC monitoring well will be installed with a sump beneath the screen interval to serve as a potential point of tar recovery.

Up to two soil samples from each boring will be submitted to Severn Trent Laboratories (STL) in Shelton, Connecticut for analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX), poly-nuclear aromatic hydrocarbons (PAHs), RCRA 8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver), and total cyanide. STL is an approved New York State ELAP laboratory.

Quality assurance/quality control samples will include laboratory-blind duplicate samples, matrix spike/matrix spike duplicate (MS/MSD) samples, equipment rinsate blank samples, and trip blank samples. The blind duplicate, MS/MSD, and rinsate blank samples will be collected at a frequency of one per 20 soil samples. Trip blanks will be submitted at a frequency of one trip blank set per day of sample shipment to the laboratory. Trip blank samples will be analyzed for BTEX; the other QA/QC samples will be analyzed for BTEX, PAHs, and RCRA 8 metals.

Following installation of the well at boring SB-70 and any other completed well installations, each well will be developed in accordance with the methods described in the NYSDEC-approved November 9, 1998 RI Work Plan. Groundwater samples from each newly installed well will be collected no sooner than two weeks after development. Each groundwater sample collected will be analyzed for BTEX, PAHs, RCRA 8 metals, and total cyanide. One blind duplicate sample, one MS/MSD, and one equipment rinsate blank sample will be collected and analyzed for BTEX, PAHs, RCRA 8 metals and total cyanide. One trip blank sample (for BTEX analysis) will be submitted per day of sampling.

STL will provide New York State Category B data deliverables for the soil and groundwater samples. The analytical results will be validated in accordance with New York requirements. Data will be provided in both electronic and printed format. The analytical results will be incorporated into the existing site-wide database.

Immediately prior to the start of groundwater sampling activities, a full round of groundwater elevations and storm sewer invert elevations will be collected from the existing and newly

installed shallow aquifer wells and accessible storm sewer manhole locations to confirm groundwater flow directions in the shallow aquifer.

Storm Sewer and Former Stream Trace Assessment

To further assess the potential for the storm water line to act as a preferential pathway for dissolved phase constituents, three storm water samples will be collected: one from a manhole upstream of the site (along Willow Avenue), one from an on-site manhole, and one from a manhole downstream of the site (across Bay Street). Each storm water sample will be analyzed for PAHs, BTEX, RCRA 8 metals, total cyanide, pH, and hardness.

A test pit trench (TP-11) will be excavated from the location of the existing storm sewer line northerly parallel to Bay Street approximately 100 feet in length (Figure 1). The purpose of this trench is to assess the presence or absence of tar in either the storm sewer backfill and/or along the former stream trace. The trench will be excavated with a standard backhoe with a maximum reach of approximately 12 feet. The test pits will extend to the maximum reach of the backhoe or to the limits dictated by soil conditions. No analytical samples will be collected from the test pit.

Materials excavated from the test pit will be placed on plastic sheeting laid on pavement. A temporary berm will be created around this temporary lay-down area to contain any liquids that may drain from the excavated materials. Upon test pit completion, the test pit will be backfilled in reverse sequence of excavation so that the deepest materials will be replaced first and the shallowest materials will be replaced last. The bituminous concrete pavement will be replaced after the test pit is backfilled.

Ambient air quality will be monitored around the area of the proposed test pit. This perimeter air monitoring and the worker health and safety air monitoring methods and frequency will be performed as specified in the NYSDEC-approved November 9, 1998 RI Work Plan. In general, the ambient air quality will be monitored around the perimeter of the excavation using a PID organic vapor analyzer (OVA) and a particulate meter. Particulate meters and a PID-OVA will be used to monitor the potential dust and volatiles within the work zone.

Vertical Delineation at SB-10, SB-14, and SB-54

Three soil borings (SB-74, 75 and 76) will be completed at the previous soil borings locations SB-10, SB-14, and SB-54 to evaluate the vertical extent of tar encountered at these locations (Figure 1). Each proposed boring will be completed to the top of the till confining layer. Upon completion each soil boring will be grouted. Up to two soil samples will be colleted from each soil boring for analysis of BTEX, PAHs, RCRA 8 metals, and total cyanide. Quality control samples will be collected as described above.

Lynhurst Avenue Residential Parcels

One approximately 40-foot deep soil boring (SB-77) will be completed between Relief Holder No. 2 and the residential properties on Lynhurst Avenue. The boring is proposed to be located approximately 20 feet from the fence line between the residential lots and the 40 Willow Avenue parcel (Figure 2). The actual location of the proposed boring will be dependant upon physical constraints and negotiated access to the residential lot(s). However, completing the boring on #55, #59, or #61 Lynhurst Avenue would adequately address NYSDEC's request to evaluate deeper potential extent of tar from Relief Holder No. 2. Up to two soil samples from this boring will be collected for analysis of BTEX, PAHs, RCRA 8 metals, and total cyanide.

NYSDEC requested completion of one deep boring to approximately 90 feet bgs "south of Lynhurst Avenue to establish the extent of off-site impact." Residential dwellings are present on the southern side of Lynhurst Avenue; therefore, the only potential location to drill a deep boring would be within Lynhurst Avenue. The depth of this boring will be extended beyond the requested 90 foot depth to intercept the top of the saprolite (weathered bedrock) estimated to be approximately 125 to 135 feet bgs. By extending this boring to the top of saprolite, we will document the presence/absence of any potential tar throughout the vertical extent of the soil profile. The depth and hydrogeologic conditions at this site require the use of a sonic drilling rig to efficiently complete this soil boring.

As Figure 2 shows, there are significant overhead and underground utilities located within Lynhurst Avenue that will have to be cleared and potentially relocated prior to this boring being drilled. The presence of these utilities will dictate the actual location of the boring. Based on a site visit conducted by GEI, a drilling contractor, and Mr. Jack Rodak of KeySpan, we believe a potential boring location would be in the vicinity of # 58 Lynhurst Avenue, provided that the overhead electric lines could be adequately shielded.

40 Willow Avenue – Relief Holder No. 2

Twelve GeoProbe® soil borings (GP-01 through GP-12) are proposed to refine the extent of tar impacts immediately surrounding Relief Holder No. 2 on the 40 Willow Avenue parcel. As requested, an additional boring (GP-12) was placed on-site between borings SB-65 and SB-66. In light of NYSDEC comments provided on September 26, 2001, each boring will be completed to a maximum depth of 45 feet bgs. The data from these borings will be used to more adequately refine any volume estimates of soils that may require remediation in the future. Figure 3 shows the proposed boring locations along with previous boring and well locations.

Soil samples will be collected continuously from each boring using 4-foot long Macrocore® samplers. If sample volume permits, soil samples for potential laboratory analyses will be collected at 2-ft depth increments, otherwise, the samples will be collected at 4-foot sample

increments. Up to two soil samples per boring will be submitted for the laboratory analyses listed below, with a maximum of 25 soil samples being analyzed.

Soil samples will be submitted to STL in Shelton, CT for analysis of polycyclic aromatic hydrocarbons (PAHs), benzene, toluene, ethylbenzene, and xylenes (BTEX), and lead. Quality assurance/quality control samples shall include laboratory-blind duplicate samples, matrix spike/matrix spike duplicate (MS/MSD) samples, equipment rinsate blank samples, and trip blank samples. The blind duplicate, MS/MSD, and rinsate blank samples will be collected at a frequency of 1 per 20 soil samples. Trip blanks will be submitted at a frequency of one trip blank set per day of sample shipment to the laboratory. Trip blank samples will be analyzed for BTEX, the other QA/QC samples will be analyzed for BTEX, PAHs, and lead.

STL will provide New York State Category B data deliverables and the analytical results will be validated in accordance with New York requirements. Data will be provided in both electronic and printed format. The analytical results will be incorporated into the site-wide database.

Test Pit Assessment of Relief Holder No. 2

Two test pits (TP-12 and TP-13) will be excavated to confirm the diameter of the holder structure and to assess the construction and integrity of the holder walls (Figure 3). At each test pit, once the top edge of the holder wall is encountered, the excavator will attempt to clear soils from around the outside of the holder to allow the examination of the structure, construction, and integrity of the walls. The test pits will extend into the inside of the holder to examine the inner construction of the holder. The test pits will extend to the maximum reach of the excavator (approximately 15 feet bgs) or to the limits dictated by soil conditions. Once completed, the test pits will be backfilled with the material that was excavated in reverse sequence of removal, so that the deepest soils are placed at the bottom of the excavation. Each test pit will be photo-documented. The holder diameter, and the observed wall construction materials and thickness will be recorded along with all field observations. No soil samples will be analyzed from these test pits.

Three groundwater samples will be collected from the area surrounding Relief Holder No. 2 to characterize groundwater that may need to be handled should dewatering activities be part of a potential remedy. One groundwater sample will be collected from the existing piezometer PZ-3 on the southern side of Relief Holder No. 2; one grab groundwater sample will be collected from a test pit and one sample will be collected from a temporary micro-well to be installed on the northern side of the holder. The groundwater samples will be analyzed for parameters required to determine potential on-site treatment needs and for New York City Department of Environmental Protection's *Limitations For Effluent to Sanitary or Combined Sewers*. The groundwater samples will be analyzed for VOCs, SVOCs, , pH, RCRA 8 metals, copper, nickel, zinc, hexavalent chromium, flash point, total suspended solids, total dissolved solids, total PCBs,

total petroleum hydrocarbons (TPH), total cyanide, and amenable cyanide. The analytical results from the groundwater treatment evaluation will not be validated.

Survey

The locations and elevations of each newly completed soil boring, monitoring well, and storm sewer sampling point will be surveyed by a New York State licensed surveyor. These survey data will be incorporated into the site survey database.

RI Report Revision

The newly obtained data will be incorporated into the site-wide database and will be used to supplement the understanding of site conditions. Following evaluation of the geologic, hydrogeologic, soil and groundwater analytical data, the existing RI report will be revised and submitted for NYSDEC review and approval. The revised RI report will include new boring, well, and test pit completion logs, summaries of laboratory data, laboratory data reports, and an evaluation and discussion of the mobility of dissolved phase contaminants and DNAPL tar. The report will also include a revised groundwater contour map for the upper (water table) aquifer and a top of till contour map based on the borings that intercepted the till unit.

Schedule

A detailed project schedule will be prepared and provided to NYSDEC once a project start date has been established. Issues affecting the start date include negotiation of access agreements, utility clearance, and the availability of the sonic drilling rig. The schedule will address the field activities, data evaluation, report preparation, review, revision, and report submittal dates.

Field activities to drill the planned soil borings and complete the monitoring well installations can commence following NYSDEC approval of this work scope. However, given that a sonic drilling rig is required to complete at least a portion of the work, the actual start date may depend on the availability of the sonic drilling contractor. At last assessment, the sonic drilling rig could be available approximately one month from receipt of approval to proceed with the work plan.

GEI is evaluating the most time and cost-effective combination of drilling methods (hollow stem auger, sonic, and geoprobe) to complete the scope of work. The selected drilling methods will directly affect the duration of the drilling program. At this time, we believe that the drilling activities can be conducted between approximately four weeks (assuming mostly hollow stem methods) and 2½ weeks (assuming mostly sonic drilling methods).

Groundwater sampling can commence two weeks after installation of the last new monitoring well. Laboratory analytical results will be provided on a standard three-week turnaround basis.

Following receipt of the validated analytical results, the data will be used to prepare the revised RI report.

If you have any questions or require any additional information, please contact Ms. Tracey Bell at 718-403-3053 or by email at tbell@keyspanenergy.com.

Sincerely,

GEI CONSULTANTS, INC.

David B. Terry, P.G., LEP
Project Manager

DBT:jls
Enclosures
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c: T. Bell
L. Liebs

New York State Department of Environmental Conservation

Division of Environmental Remediation

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October 11, 2001

Mrs. Tracey Bell
Manager
Environmental Asset Management
KeySpan Energy
One Metro Tech Center
Brooklyn, New York 11201-3850

Dear Mrs. Bell:

Re: Former Clifton MGP Site
Remedial Investigation
Site # 2-43-023

The NYSDEC has reviewed the revision to the Supplemental Remedial Investigation (RI) Work Plan for the referenced site dated October 9, 2001. This revision addresses our comments to include one additional boring location next to Relief Holder #2 on the 40 Willow Avenue parcel and to drive all borings around the holder to approximately 45 feet below grade. Following the incorporation of this revision, the Work Plan is acceptable and hereby approved.

Please forward a schedule to perform the field work to this office within 15 days of the date of this letter. If you have any questions, please call me at (518) 402-9662.

Sincerely,

Amen M. Omorogbe, P.E.
Project Manager
Manufactured Gas Plants Remedial Section
Division of Environmental Remediation

cc: S. Haskins - NYSDOH

P. Carella, DFWMR
R. Gardineer/J. O'Connell - NYSDEC, Region 2

GEI Consultants, Inc.

May 15, 2002
982482-1-1012

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Mr. Amen M. Omorogbe, P.E.
Project Manager MGP Remedial Section
New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Western Remedial Action, 11th Floor
625 Broadway
Albany, New York 12233-7010

Re: Former Clifton, Staten Island MGP Site
Supplemental Remedial Investigation (RI) Revised Work Plan

Dear Mr. Omorogbe:

On behalf of our client, KeySpan Energy (KeySpan), GEI Consultants, Inc. (GEI) is submitting this interim data deliverable and revised work plan to conduct supplemental remedial investigations and feasibility study (FS) support investigations at the former manufactured gas plant (MGP) site located at 25 and 40 Willow Avenue, Clifton, Staten Island, New York. This work plan has been revised to incorporate comments on the initial March 14, 2002 work plan as provided by the New York State Department of Environmental Conservation (NYSDEC) in their letter dated April 12, 2002 and comments provided by the New York State Department of Health in their letter dated April 26, 2002 (as transmitted via email by NYSDEC on May 13, 2002).

Included as part of this submittal are:

- Table 1 - Chemical data summary tables for subsurface soil samples collected in November and December 2001
- Table 2 - Chemical data summary tables for surface soil samples collected on the residential parcels on Lynhurst Avenue in November 2001
- Plate 1 - An updated site-wide base map showing all explorations completed to date
- Plate 2 - Updated cross sections A-A' and F-F' from the August 2000 Draft RI Report
- Plate 3 - Four cross sections completed around Relief Holder No. 2 on the 40 Willow Avenue parcel
- Plate 4 - Photographic documentation of the test pits completed around Relief Holder No. 2 in December of 2001

The remainder of this document presents our proposed work plan for additional investigations and discusses the new findings as a framework to explain the rationale for the additional investigations. Figures 1 and 2 present the locations of the proposed additional explorations. Following your review of this work plan, please contact Ms. Tracey Bell, with KeySpan, with your approval or if you have any questions.

Work Plan

The work described herein will be conducted in accordance with the procedures specified in the New York State Department of Environmental Conservation (NYSDEC)-approved November 9, 1998 RI Work Plan for the site. In addition, the work will be conducted following the quality assurance/quality control (QA/QC) procedures established in the approved RI work plan. All field activities will comply with the health and safety procedures specified in the NYSDEC-approved site-specific Health and Safety Plan.

Supplemental Remedial Investigation Activities:

Soil Investigation - Lynhurst Avenue Residential Parcels

The findings from boring SB-77 completed on November 20, 2001 on the 59 Lynhurst Avenue residential parcel indicate the presence of MGP residuals beneath this property beginning at a depth of approximately 33.5 feet below ground surface (bgs) and extending to 39.5 feet bgs at the terminus of the boring (Plate 2). Previous borings completed on the Lynhurst Avenue residential parcels determined that MGP residuals were not present to a depth of approximately 20 feet below ground surface. Therefore, the potential lateral extent of MGP residuals beneath the residential parcels will be assessed by completing three soil borings (SB-79, SB-80, and SB-87). Borings SB-79 and SB-80 will be completed respectively on residential parcels located at 63 and 51 Lynhurst Avenue. SB-87 will be completed on either of the residential parcels located at 53 or 55 Lynhurst Avenue, depending upon access. Two of the three borings will be installed until at least five feet of visually clean material is encountered or the extent allowable by the drilling equipment, whichever is encountered first. The third boring will be completed to approximately 40-foot deep (Figure 1).

Each boring will be located approximately 20 feet to the southeast of the fence line between the 40 Willow Avenue parcel and the residential lots located on Lynhurst Avenue. The actual location of the proposed boring will be dependant upon physical constraints at the parcels and negotiated access agreements to the residential lots. The soil borings will be installed using a track-mounted Geoprobe® drill rig.

Soil samples will be collected continuously from the ground surface within each boring using 4-foot long MacroCore® samplers. A discrete sampler device will be used during the collection of all MacroCore® samples. Up to two soil samples from each boring will be submitted to Severn Trent Laboratories (STL) in Shelton, Connecticut for analysis of benzene, toluene, ethylbenzene, and xylenes (BTEX), poly-nuclear aromatic hydrocarbons (PAHs), RCRA-8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver), and total cyanide (TCN). STL is an approved New York State ELAP laboratory. Each subsurface soil boring will be back-filled with bentonite chips and hydrated with water upon completion.

QA/QC samples will include one laboratory-blind duplicate sample, one matrix spike/matrix spike duplicate (MS/MSD) sample, one equipment rinsate blank sample, and one trip blank sample per day of sample shipment to the STL. Trip blank samples will be analyzed for BTEX; the other QA/QC samples will be analyzed for BTEX, PAHs, and RCRA-8 metals, and TCN.

STL will provide New York State Category B data deliverables for the soil samples. The analytical results will be validated in accordance with New York requirements. Data will be provided in both electronic and printed format. The analytical results will be incorporated into the existing site-wide database.

Groundwater Assessment and Evaluation of Volatilization Potential to Indoor Air - Lynhurst Avenue Residential Parcels

KeySpan proposes evaluating whether the presence of deep MGP residuals beneath the residential parcels abutting the 40 Willow Avenue parcel potentially affects the indoor air of the residential dwellings. If VOCs are present in the groundwater beneath the dwellings, a potential exists for volatile compounds to volatilize to the indoor air of the dwellings. To carry out this evaluation, groundwater samples will be collected from temporary piezometer (micro-well) locations (PZ-5 through PZ-12) adjacent to each of the residential dwellings (49 through 67 Lynhurst Avenue) and the volatile concentrations of the groundwater samples will be used to estimate indoor air concentrations (Figure 1). This exposure analysis will use a model developed by the United States Environmental Protection Agency (EPA) for estimating indoor air exposure concentrations and the associated health risks from subsurface vapor transport into buildings. The model is based on the analytical solutions of Johnson and Ettinger in "Heuristic Model for Predicting the Intrusion Rate of Contaminant Vapors into Buildings" (1991, *Environ. Sci. Tech.* 25(8): 1445-1452).

The groundwater samples will be collected through temporary micro-wells installed by Geoprobe® methods adjacent to the residential dwellings. Each micro-well will

be installed to depths below the residential dwelling floor slab or basement floor (if present) as follows:

- If the groundwater elevation is below the elevation of the basement floor, then a groundwater sample will be collected approximately 4 feet below the encountered groundwater table.
- If the groundwater elevation is above the basement floor, then a groundwater sample will be collected from the elevation of the basement floor to 4 feet below the basement floor.
- If the groundwater elevation is below the slab foundation of a dwelling, then a groundwater sample will be collected approximately 4 feet below the encountered groundwater table.

These sampling scenarios will based upon basement elevation information collected from the residents by KeySpan personnel prior to the commencement of sampling. Immediately following installation of a micro-well, a groundwater grab sample will be collected using low-flow sample collection methods. Each groundwater grab sample will be submitted to STL for analysis of volatile organic compounds (VOCs) by EPA method 8260 and semi-volatile organic compounds (SVOCs) by EPA method 8270. One blind duplicate sample, one MS/MSD, and an equipment rinsate blank sample will be collected and analyzed for VOCs and SVOCs as listed above. One trip blank sample (VOC analysis) will be submitted per shipment of samples to STL. Following collection of the groundwater grab sample, each micro-well will be removed and the borehole will be backfilled with bentonite chips.

If necessary because of physical constraints or limited access, the temporary groundwater sampling points may be hand installed by GEI personnel or GEI's subcontractor.

STL will provide New York State Category B data deliverables for the groundwater samples. The analytical results will be validated in accordance with New York requirements. Data will be provided in both electronic and printed format. The analytical results will be incorporated into the existing site-wide database.

Lynhurst Avenue Evaluation

Completion of soil boring SB-78 determined the presence of MGP residuals at a depth of 44 to 50 beneath Lynhurst Avenue. No MGP residuals were encountered above or below this interval (Plate 2). Therefore, three borings (SB-84 through SB-86) will be drilled on the southern side of Lynhurst Avenue, in the sidewalk (Figure 1) to evaluate the potential lateral extent of MGP residuals beneath

Lynhurst Avenue. Based upon visual and analytical findings (Table 1) from boring SB-78, the proposed borings will be completed to be approximately 50 to 60 feet bgs.

Because of limited space within the street, these soil borings will be installed using a track or truck-mounted Geoprobe®. Soil samples will be collected continuously from each boring using 4-foot long MacroCore® samplers equipped with a discrete sampler device. Up to two soil samples from each boring will be submitted to STL for analysis of BTEX, PAHs, RCRA-8 metals, and TCN.

QA/QC samples will include one laboratory-blind duplicate sample, one MS/MSD sample, one equipment rinsate blank sample, and trip blank samples. Trip blanks will be submitted at a frequency of one trip blank set per day of sample shipment to the laboratory. Trip blank samples will be analyzed for BTEX; the other QA/QC samples will be analyzed for BTEX, PAHs, and RCRA-8 metals, and TCN.

Off-Site Evaluation of Tar Migration from 25 Willow Avenue Parcel

Soil borings SB-68 through SB-73, completed in December 2001, evaluated the presence and integrity of the glacial till layer along Bay Street that serves as a confining layer to vertical tar migration (Figure 2). Plate 2 shows the geologic and physical observations from these borings. The glacial till surface was encountered approximately 8 to 15 feet bgs along the southern portion of the 25 Willow Avenue parcel in borings SB-71, SB-72, and SB-73. No MGP-related odors or visual impacts were noted in these borings. The shallow depth of the confining till and the lack of observed MGP residuals demonstrates that tar is not migrating from the 25 Willow Avenue site toward Bay Street in the vicinity of these borings.

To the north, the confining glacial till was encountered deeper at approximately 33 to 41 feet bgs in borings SB-68, SB-69 (RW-17), and SB-70A (RW-18). MGP residuals were present in borings SB-69 (RW-17) and SB-70A (RW-18) within well-sorted gravelly-sand located above the confining glacial till. This gravelly-sand likely represents a glacial outwash channel with its axis oriented northeasterly.

During a groundwater sampling event in January 2002, approximately 2 feet of a tar/water mixture was gauged within the bottom of RW-18. Discrete tar blebs were also observed in the water from well RW-17. Both wells are screened above the confining till within the inferred glacial stream channel.

To evaluate the potential lateral extent of tar to the northeast of borings SB-69 (RW-17) and SB-70A (RW-18), three borings (SB-81 through SB-83) will be completed across Bay Street on a triangular shaped parcel between Bay Street and Edgewater Street. Each boring will be advanced approximately 10 feet into the till

unit, which is located approximately 30 to 40 feet bgs. Soil samples will be collected continuously from each boring using 4-foot long MacroCore® samplers equipped with a discrete sampler device. Up to two soil samples from each boring will be submitted to STL for analysis of BTEX, PAHs, RCRA-8 metals, and total cyanide. Should field conditions indicate the presence of potential recoverable tar, one of the above listed borings will be completed as a 2-inch polyvinyl chloride (PVC) monitoring well with a sump beneath the screen to serve as a potential recovery well. The monitoring well will be constructed in accordance with the methods described in the NYSDEC-approved November 9, 1998 RI Work Plan. Each boring not completed as a monitoring well will be abandoned with a Portland/bentonite grout mix following completion.

Following the potential installation of the monitoring well (RW-19), the monitoring well will be developed in accordance with methods described within the NYSDEC-approved November 9, 1998 RI Work Plan. Groundwater samples will be collected no sooner than two weeks after development. Each groundwater sample will be collected and analyzed for BTEX, PAHs, RCRA-8 metals, and total cyanide. One blind duplicate, one MS/MSD, and one equipment rinse blank will be collected and analyzed for BTEX, PAHs, RCRA-8 metals and total cyanide. One trip blank sample will be submitted for BTEX analysis.

The parcel is presently a gravel/grass parking area. KeySpan will have to obtain property access to the parcel prior to drilling. Space is limited and significant underground utilities are anticipated within the parcel. The presence of these utilities will dictate the actual location of the borings. Each boring will be marked out by GEI or KeySpan personnel prior to the commencement of the drilling to identify possible conflicts with underground utilities.

Quality assurance/quality control samples will include one laboratory-blind duplicate sample, one MS/MSD sample, one equipment rinsate blank sample, and trip blank samples. Trip blanks will be submitted at a frequency of one trip blank set per day of sample shipment to the laboratory. Trip blank samples will be analyzed for BTEX; the other subsurface soil QA/QC samples will be analyzed for BTEX, PAHs, RCRA-8 metals, and TCN.

STL will provide New York State Category B data deliverables for the groundwater samples. The analytical results will be validated in accordance with New York requirements. Data will be provided in both electronic and printed format. The analytical results will be incorporated into the existing site-wide database.

Feasibility Studies (FS) and Interim Remedial Measure (IRM) Support Investigations

In addition to the supplemental RI activities described above, GEI will conduct additional work to support the FS for the 40 Willow Avenue parcel and to support the IRM planned to remediate lead in soils on the Lynhurst Avenue residential parcels.

Photographs/Sketch Lynhurst Avenue Residential Properties

To support the lead removal IRM, GEI will photograph, document, and sketch the backyards for the residential parcels located at #49 through #67 Lynhurst Avenue. This information will assist in the estimate of the potential areas for lead-impacted surficial soils to be removed at the parcels.

Former Relief Holder #2 Floor Profile

In November 2001, twelve Geoprobe® borings were completed around Relief Holder No. 2 on the 40 Willow Avenue parcel to provide refined extent of tar information for use in the FS. Three test pits were also completed in December 2001 to confirm the location, size, and integrity of the holder walls (Figure 1). Plate 3 presents cross sections for the borings completed around the relief holder and Plate 4 presents photographic documentation of the test pit activities.

In addition to the twelve Geoprobe® borings and three test pits already completed, additional data will be collected to support the feasibility study. To determine the configuration of the holder floor, and therefore, refine the materials volume estimate within the holder, a transect of Geoprobe® borings will be completed across the holder floor. Approximately six Geoprobe® borings (GP-13 through GP-18) will be completed inside the former Relief Holder No. 2 located on 40 Willow Street parcel. Figure 1 shows the proposed boring locations. Four borings (GP-13 through GP-16) will be drilled in a northeast to southwest transect to obtain information regarding the elevation and the geometry of the bottom of Relief Holder No. 2. Two additional borings (GP-17 and GP-18) will be completed inside the holder wall to determine the degree of tar present.

Each boring will be advanced until the bottom of the holder is encountered (approximately 20 feet bgs). Soil samples will be collected continuously from each boring using 4-foot long MacroCore® samplers equipped with a discrete sampler device. The samples will be described and screened in the field. No analytical soil samples will be collected from these borings.

Survey

The locations and elevations of each newly completed soil boring and temporary micro-well will be surveyed by a New York State licensed surveyor. These survey data will be incorporated into the site survey database.

RI Report Revision

The newly obtained data will be incorporated into the site-wide database, will be used to supplement the understanding of site conditions, and will be incorporated into the RI report for the site. Following evaluation of the analytical data and assuming that no further investigations are required, the existing RI report will be revised and submitted for NYSDEC review and approval. The revised RI report will include new boring completion logs, summaries of laboratory data, laboratory data reports, and an evaluation and discussion of the mobility of dissolved phase contaminants and DNAPL tar.

In addition, at the request of the NYSDEC, the laboratory summary data tables will include a column showing NYSDEC regulatory standards, criteria and guidance (SCGs) values. Summary tables for each media showing the contaminants of concern that exceed NYSDEC regulatory standards and SCGs will also be included in the RI report. These summary tables will include the media, class of contaminant, contaminant of concern, concentration in parts per billion, and frequency of exceedance and a comparison to SCG values per contaminant. The summary tables will also include a column or row for carcinogenic PAHs including benzo(a)pyrene, benzo(k)fluoranthene, chrysene, and dibenzo(a,h)anthracene).

Schedule

A detailed project schedule for the upcoming scope of work is attached as part of this revised work plan submittal. Field activities to drill the planned soil borings installations can commence following NYSDEC approval of this work scope. The field program is currently scheduled to start on May 20 and drilling activities will last for approximately three weeks.

- Relief Holder No. 2 characterization (GP-13 through GP-18) will be tentatively be started on May 20 and completed by May 21, 2002.
- Off-site evaluation of tar migration (SB-81, 82, and 83 with one of these borings tentatively being completed into monitoring well RW-19) will tentatively be started on Wednesday May 22 and tentatively completed by May 28.
- Lynhurst Avenue evaluation will tentatively be completed starting on Wednesday May 29 and tentatively completed by June 3, 2002.

- Soil investigation-Lynhurst Avenue residential parcels and groundwater assessment and evaluation of volatilization potential to indoor air-Lynhurst Avenue parcels, and photographs/sketch Lynhurst Avenue properties for interim remedial measure (IRM) activities will tentatively started on June 3, 2002 and completed by Friday June 7, 2002.

Issues affecting the start date include negotiation of access agreements, utility clearance for the offsite borings, and NYSDEC review and approval of this work plan letter. The schedule will address the field activities, data evaluation, report preparation, review, revision, and report submittal dates.

If you have any questions or require any additional information, please contact Ms. Tracey Bell at 718-403-3053 or by email at tbell@keyspanenergy.com.

Sincerely,

GEI CONSULTANTS, INC.

David B. Terry, P.G., LEP
Project Manager

DBT:amm
Enclosures
c: T. Bell
L. Liebs
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New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Western Remedial Action, 11th Floor
625 Broadway, Albany, New York 12233-7010
Phone: (518) 402-9662 • **FAX:** (518) 402-9679
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

April 12, 2002

Mrs. Tracey Bell
Manager
Environmental Asset Management
KeySpan Energy
One Metro Tech Center
Brooklyn, New York 11201-3850

Re: Former Clifton MGP Site
Supplemental Remedial Inve:
Site # 2-43-023

Dear Mrs. Bell:

We have reviewed the Supplemental Remedial Investigation Work Plan transmitted to us by GEI Consultants, Inc. in a letter dated March 14, 2002. In general, we concur with the proposed scope of additional site investigation with the exception of few areas as discussed below:

Soil Investigation - Lynhurst Avenue Residential Parcels

1. In addition to the need to determine the lateral extent of MGP related materials beneath the residential parcels, borings should be drilled deeper than the proposed depth to ascertain the extent of vertical impact at these locations. We request installation of a minimum of three borings with one placed within 55 and 53 Lynhurst Avenue. Two of these borings should be drilled till at least five (5) feet of visually clean material is encountered or to the extent allowed by the drilling equipment (which ever comes first).

Off-Site Evaluation of Tar Migration from 25 Willow Avenue Parcel

2. While we support the proposal to install three borings across Bay Street to evaluate the potential lateral extent of tar, provisions should be made to convert at least one of these borings into a monitoring well, should field condition indicate presence of potential recoverable MGP related by-products. In addition, groundwater samples must be obtained in this location as well.

RI Report Revision

3. The data tables in the revised report should include a column showing the NYSDEC regulatory standards, criteria and guidance (SCGs) values. In addition, the report should include a summary table(s) for each media showing contaminants of concern that exceeds the NYSDEC regulatory standards, criteria and guidance (SCGs) values. The table should

include at a minimum the following columns: Media, Class of Contaminant, Contaminant of Concern, Concentration range in parts per billion, Frequency of exceeding and a column for SCG values for each contaminant. Additionally, please provide separately, a column for carcinogenic PAHs including the following Indeno(1,2,3-cd) pyrene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)flouranthene, Chrysene, and Dibenzo(a,h)anthracene.

Please note that additional comments may be forthcoming from the New York State Department of Health. If you have any questions, please call me at (518) 402-9662.

Sincerely,

Amen M. Omorogbe, P.E.
Project Manager
Manufactured Gas Plants Remedial Section
Division of Environmental Remediation

cc: G. Laccetti/S. Selmer - NYSDOH

Appendix B

Soil Boring Logs and Monitoring Well Construction Logs

Site Id: GP-01A

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/13/01	Date Completed: 11/13/01
Remarks: Sunny, cold, ~ 36 F NA - Indicates Not Applicable		Ground Elevation: 13.14'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 22.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0-4	NA	65			0.0-0.9: Black to dark brown, fine to medium SAND and SILT, trace fill, coal fragments, trace ash, non-cohesive, loose, dry. (FI)					
			0 ppm		0.9-4.0: Red-brown SILT, trace to little fine sand, trace gravel, trace clay, slightly cohesive, moist. (ML)					10
4-8	NA	75								
			2.2 ppm		4.0-8.0: Red-brown SILT, little to some fine to medium sand, trace clay, slightly cohesive, moderate dense, moist. (ML)					
8-12	NA	45								
			1.1 ppm	10	8.0-12.0: Red-brown SILT, trace coarse sand, trace fine gravel, non-cohesive, moderately dense, damp. (ML)	No Samples Submitted			None	
12-16	NA	60								0
			0 ppm		12.0-16.0: Red-brown SILT, little fine gravel, little medium to coarse sand, silt nodules, non-cohesive, moderately dense, crumbly, dry. (ML)					

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-01A

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/13/01	Date Completed: 11/13/01
Remarks: Sunny, cold, ~ 36 F NA - Indicates Not Applicable		Ground Elevation: 13.14'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 22.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
16-20	NA	63	0 ppm		16.0-20.0: Red-brown SILT, little fine to coarse gravel, trace medium to coarse sand, non-cohesive, moderately dense to dense, dry. (ML)					
20-22	NA	80	4 ppm	20	20.0-22.0: Red-brown SILT, trace to little, medium to coarse sand, trace clay, slightly cohesive, moist to wet. Trace naphthalene odor. Refusal. (ML) 22.0: End of boring, offset 5-6' and resumed.				Trace	10

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-01B

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/13/01	Date Completed: 11/13/01
Remarks: cold, sunny ~36 F NA – Indicates Not Applicable		Ground Elevation: 13.28'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 45.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
				10	0.0–22.0: Refusal on GP–01A. Offset rig and blind probed to 22.0'. Commenced sampling of GP–01B at 22.0'					10 0

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-01B

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/13/01	Date Completed: 11/13/01
Remarks: cold, sunny ~36 F NA - Indicates Not Applicable		Ground Elevation: 13.28'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 45.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
				20						
22-26	NA	75	19 ppm		22.0-26.0: Red-brown SILT, trace fine gravel, non-cohesive, dense, crumbly, dry. Naphthalene-like/tar-like odor, sheen in veins, trace tar coating on gravel. (ML)					10
26-30	NA	45	21 ppm		26.0-30.0: Red-brown SILT, little fine sand, non-cohesive, soft to moderately dense, wet. Naphthalene odor, veins of sheen. (ML)				Moderate	

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-01B

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/13/01	Date Completed: 11/13/01
Remarks: cold, sunny ~36 F NA - Indicates Not Applicable		Ground Elevation: 13.28'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 45.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
30-34	NA	40			30.0-32.5: Red-brown SILT, little fine to medium sand, non-cohesive, loose, wet. Moderate to strong tar odor, tar-coated gravel. (ML)					
			189 ppm		32.5-34.0: SILT, trace to little gravel, moderate dense to dense, dry. Tar odor, tar-coated gravel. (ML)					-20
34-38	NA	75			34.0-38.0: Red-brown SILT, trace to little sand, trace fine to coarse gravel, moderate fine to medium sand lenses, non-cohesive, loose. Strong tar odor, sheen, tar-coated gravel, sporatic tar (NAPL)-coated fractures. (ML)	34-38 FT			Strong	
			257 ppm							
38-42	NA	65			38.0-42.0: Red-brown SILT, trace to little sand, trace fine to coarse gravel, moderate fine sand, non-cohesive, moderately dense. Strong tar odor, tar sheen. (ML)					
			284 ppm	40						
42-45	NA	33			42.0-45.0: Red-brown SILT, little fine to coarse sand, trace gravel, trace clay, slightly cohesive, moist. Strong naphthalene and tar odor, sheen, tar saturated fine sand and gravel lenses. (ML)	42-45 FT				-30
			683 ppm							
					45.0: End of Boring					

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-02

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/12/01	Date Completed: 11/12/01
Remarks: Cold, sunny, high around 45 NA – Indicates Not Applicable		Ground Elevation: 11.88'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 45.00'
		Drilling Method: Geoprobe	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0-4	NA	83	0 ppm		0.0-4.0: Brown to light brown, fine to medium SAND, trace gravel, trace brick, and trace coal fragments, non-cohesive, loose, moist. Slight fuel-type odor from 0.5 to 2.5'. (FI/SP)				None Slight	10
4-8	NA	85	0 ppm		4.0: Apparent groundwater table.				None	
8-12	NA	75	0 ppm	10	4.0-13.7: Brown-red, gravelly-SILT and CLAY, some fine to coarse sand, slightly pliable, cohesive, wet. (CL)					0
12-16	NA	88	0 ppm		13.7-16.0: Dark brown, fine to very fine SAND and SILT, little clay (in gray chunks), trace medium to coarse sand, trace fine round gravel				Slight	

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-02

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/12/01	Date Completed: 11/12/01
Remarks: Cold, sunny, high around 45 NA - Indicates Not Applicable		Ground Elevation: 11.88'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 45.00'
		Drilling Method: Geoprobe	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
					cohesive, moist. Very slight fuel/ hydrocarbon-like odor. (ML)					
			388 ppm		16.0-20.0: Dark brown, fine to very fine SAND and silt, little clay (in gray chunks), trace medium to coarse sand, trace fine round gravel, cohesive, moist. (ML) (19.5-19.8': medium sand lense with slight sheen and moderate tar-like odor). (SW)				None	
20-24	NA	100		20						
			127 ppm		20.0-22.1: Dark brown, fine to very fine SAND, and silt, little clay (in gray chunks), trace medium to coarse sand, trace fine, round gravel, cohesive, moist. Moderate tar-like odor, slight sheen. (ML)				Moderate	-10
			320 ppm		22.1-24.0: Red-brown, gravelly-SILT and CLAY, trace sub-rounded gravel and medium-coarse sand, very dense, very cohesive. Very slight tar-like odor with trace sheen in two microfractures. (CL)					
24-28	NA	78				24-28 FT			Slight	
			346 ppm		24.0-28.0: Red-brown, gravelly-SILT and CLAY, trace sub-rounded gravel and medium-coarse sand, very dense, very cohesive, moist. Trace tar coating one gravel in matrix. (CL)					
28-32	NA	83								
					28.0-32.0: Red-brown, gravelly-SILT and CLAY, trace sub-rounded gravel and medium-coarse sand, very dense, very cohe-					

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-02

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/12/01	Date Completed: 11/12/01
Remarks: Cold, sunny, high around 45 NA - Indicates Not Applicable		Ground Elevation: 11.88'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 45.00'
		Drilling Method: Geoprobe	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
			454 ppm		sive. Moderate tar odor throughout, trace sheen and trace tar coating gravel in matrix at 28.5, 29.5,and 31.5 feet, impacts limited to fractures. (CL)				
32-34	NA	75			32.0: Note: Borehole is not staying open. Switched to large bore macro-core sampler. 32.0-34.0: Red-brown, gravelly-SILT and CLAY, Trace sub-rounded gravel and medium-coarse sand, dense, very cohesive, moist. Moderate tar odor, trace sheen. (CL)				-20
34-36	NA	100	437 ppm		34.0-36.0: Dark brown-red, gravelly-SILT and CLAY, trace sub-rounded gravel and little to some medium-coarse sand, wet. Moderate tar odor, tar from 35.3-36" in sand, more than blebs, not saturated, staining. (SC)			Moderate	
36-38	NA	55			36.0-38.0: Red-brown SILT and CLAY, little medium to coarse sand, trace fine gravel, slightly cohesive, wet. Moderate tar odor, tar (NAPL) blebs and sheen. (ML)				
38-40	NA	60	333 ppm		38.0-40.0: Brown SILT and fine to medium SAND, some angular to sub-angular gravel, wet. Moderate tar odor, Moderate sheen, trace tar blebs, tar streaks in water. (SM)				
40-42	NA	50	231 ppm	40	40.0-42.0: Red-brown gravelly-SILT and CLAY, medium to coarse sand, dense, cohesive, moist. Very slight odor at 41.8', trace sheen at 41.8 to 42', tar-saturated lense at 42', tar-coated sand and fine gravel. (CL)			Slight Strong	-30
43-45	NA	100	99 ppm		43.0-45.0: Red-brown gravelly-SILT and CLAY, trace medium to coarse sand, dense, moist. No odor, sheen-covered sandstone gravel at bottom 0.1' of sample. (ML)	43-45 FT		None Slight	

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-03A

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/12/01	Date Completed: 11/13/01
Remarks: Sunny, cold ~35 F NA - Indicates Not Applicable		Ground Elevation: 11.62'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
0-4	NA	78	0 ppm		0.0-4.0: Fine to coarse SAND (FILL) with some brick, cinder and fine to coarse gravel, dry to moist, loose. (FI)			None	10
4-8	NA	80	406 ppm		4.0-8.0: Red-brown SILT and CLAY, some gravel medium to coarse sand, moist, cohesive, pliable. Moderate tar odor. (ML)				
8-12	NA	90	428 ppm	10	8.0-12.0: Red-brown SILT and CLAY, some gravel medium to coarse sand, wet, cohesive. Moderate tar odor, moderate sheen, trace tar streaks and tar stains, trace tar. (ML)			Moderate	0
12-16	NA	75	1408 ppm		12.0-16.0: Red-brown SILT and CLAY, some gravel medium to coarse sand, wet, cohesive. Moderate to strong tar odor, trace sheen, trace brown-tar (NAPL) coating on gravel. (ML)				

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-03A

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/12/01	Date Completed: 11/13/01
Remarks: Sunny, cold ~35 F NA - Indicates Not Applicable		Ground Elevation: 11.62'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
16-20	NA	100	959 ppm	20	16.0-20.0: Red-brown SILT and CLAY, some gravel medium to coarse sand, wet, cohesive. Strong tar odor, tar (NAPL)-coated gravel, tar blebs on gravel, trace tar saturated sand next to gravels. (ML) 20.0: Offset hole by 4' to gate. Commence GP-03B.	16-20 FT		Strong	-10

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-03B

GEI Consultants, Inc.

lient: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/12/01	Date Completed: 11/13/01
Remarks: 11/12/01 Weather, sunny, 45. 11/13/01 Weather, sunny, 55. NA - Indicates Not Applicable		Ground Elevation: 12.06'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 37.00'
		Drilling Method: Geoprobe	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
				10	Note: Refusal at GP-03A at 20.0'. Offset and blind probed to 20'. Commence sampling GP-03B.					10 0

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: GP-03B

GEI Consultants, Inc

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/12/01	Date Completed: 11/13/01
Remarks: 11/12/01 Weather, sunny, 45. 11/13/01 Weather, sunny, 55. NA - Indicates Not Applicable		Ground Elevation: 12.06'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 37.00'
		Drilling Method: Geoprobe	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
20-24	NA	100		20						
			290 ppm		20.0-23.4: Red-brown SILT and CLAY, some fine gravel, some medium to coarse sand, cohesive, medium firm, wet. Moderate tar odor, tar streaks and blebs, trace tar coats on gravel. (CH)				Moderate	-10
			41 ppm		23.4-24.0: Red-brown SILT and CLAY, trace fine to coarse gravels, little medium to coarse sand, very cohesive, extremely dense, moist. Slight tar-like odor, no visual contamination. (ML)				Slight	
24-28	NA	73								
			132 ppm		24.0-28.0: Red-brown SILT and very fine SAND, some fine sub-angular gravel, some medium to coarse sand, cohesive, very dense, moist. Slight to moderate tar odor, trace sheen patches. (ML)				Moderate	
28-32	NA	85								
					28.0-32.0: Red-brown SILT and very fine SAND, some fine, sub-angular gravel, some medium to coarse sand, large gravel in shoe, cohesive, very dense. Slight tar-like odor, trace sheen patches. (ML)					

Legend: Physical Observations — None; Sheen; Stoin; Heavy

Site Id: GP-03B

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/12/01	Date Completed: 11/13/01
Remarks: 11/12/01 Weather, sunny, 45. 11/13/01 Weather, sunny, 55. NA - Indicates Not Applicable		Ground Elevation: 12.06'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 37.00'
		Drilling Method: Geoprobe	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
			116 ppm			28-32 ft		Slight	
					32.0-33.0: Red-brown SILT and very fine SAND, some fine, sub-angular gravel, some medium to coarse sand, broken schist fragments at end of sample, cohesive, very dense. Slight tar odor. (ML)				
32-33	NA	80							-20
			371 ppm		33.0: Geoprobe refusal on likely cobble.				
33-37	NA	53			33.0-35.0: Red-brown fine SAND, little to some silt, soft, non-cohesive, wet. Moderate to strong tar odor. Tar blebs. (SM)				
			458 ppm		35.0-37.0: Red-brown SILT, trace gravel, dry, crumbly, non-cohesive. Strong tar odor, tar-coated grains, veins of sheen. (ML)				
					37.0-41.0: No Recovery.				
				40					
					41.0: End of boring.				-30

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-04

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/13/01	Date Completed: 11/13/01
Remarks: Sunny, cold ~36 F NA – Indicates Not Applicable		Ground Elevation: 11.86'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
0–4	NA	63	0.6 ppm		0.0–1.6: Brown SILT, trace to little, fine to coarse sand, trace gravel, non–cohesive, loose, dry. (FI) 1.6–2.4: Red crushed brick FILL, fine to coarse sand, non–cohesive, dry. (FI)			None	10
4–8	NA	28	110 ppm		2.4–4.0: Black stained, medium to coarse SAND and FILL, fragments of glass, brick fragments, asbestos fragments, non–cohesive, damp to moist. Slight naphthalene–like/petroleum odor, slight petroleum stain. (FI)				
8–12	NA	25	46 ppm		4.0–8.0: Black, stained, medium to coarse SAND, trace to little, medium to coarse gravel, brick fragments, saturated with water. Slight naphthalene odor, tar blebs, mixed product. (FI) Approximate groundwater table.			Slight	
12–16	NA	38	470 ppm	10	8.0–12.0: Black, medium to coarse SAND, trace to little gravel, trace fibrous material at bottom, non–cohesive, loose. Strong tar–like/naphthalene odor, residual product, tar stains sleeve of macro–core, sheen. (FI)				0
			785 ppm		12.0–16.0: Black TAR, semi–viscous. Strong tar odor.	12-16 FT		Strong	

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-04

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/13/01	Date Completed: 11/13/01
Remarks: Sunny, cold ~36 F NA - Indicates Not Applicable		Ground Elevation: 11.86'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
16-20	NA	13	962 ppm		16.0-20.0: Black TAR, viscous, weathered concrete fragments. Strong tar odor. (F) Likely bottom of relief holder #2 encountered.	16-20 FT		Strong	
				20	20.0: End of boring.				-10

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-05

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/14/01	Date Completed: 11/14/01
Remarks: Sunny, warm, slight breeze, 60 F NA - Indicates Not Applicable		Ground Elevation: 11.76'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 35.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
0-4	NA	75			0.0-1.3: Black to brown SAND and FILL, coal fragments, trace gravel, little silt, non-cohesive, loose. (FI)				
			0.7 ppm		1.3-4.0: Red-brown fine SILT, trace to little fine sand, trace gravel, non-cohesive, crumbly. (ML)			None	10
4-8	NA	53			4.0-5.5: Red-brown fine SILT, trace to little fine sand, little gravel, non-cohesive, moist to wet. Trace organic odor. (ML) Apparent groundwater table.				
			2 ppm		5.5-7.2: Grey medium to coarse SAND, trace clay, non-cohesive, wet. Trace organic odor. (SP)			Slight	
					7.2-8.0: Black to grey SILT, trace to little clay, cohesive. (OL)				
8-12	NA	63			8.0-10.4: Black to grey, SILT, trace red silt nodules, weathered till, trace to little clay, cohesive, plastic. (OL)				
			4 ppm	10				None	
					10.4-12.0: Red-brown to grey SILT, trace rootlets, trace to little gravel, trace to little clay, moist. (OL)				0
12-16	NA	38							
			232 ppm		12.0-16.0: Red-brown SILT, little medium to coarse sand, trace to little gravel, trace clay, slightly cohesive, wet. Slight to moderate tar odor, sheen in veins, NAPL-coated grains in sand layer. (ML)			Moderate	

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-05

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/14/01	Date Completed: 11/14/01
Remarks: Sunny, warm, slight breeze, 60 F NA - Indicates Not Applicable		Ground Elevation: 11.76'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 35.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
16-20	NA	40	551 ppm		16.0-20.0: Red-brown to grey SILT with sand layers, trace medium to coarse gravel, moderately cohesive, moist to wet. Strong tar odor, saturated with NAPL within sand layers, sheen in silt veins. (SM)	16-20 FT			Strong	
20-24	NA	60	255 ppm	20	20.0-24.0: Red-brown SILT, trace fine sand, trace gravel, moist. Slight to moderate naphthalene odor, sheen, trace tar-covered grains. (ML)				Moderate	-10
24-28	NA	75	444 ppm		24.0-28.0: Red-brown SILT, little fine to coarse gravel, dense, dry to damp. Moderate to strong tar odor, NAPL in veins around gravel, NAPL-coated grains. (ML)					
28-32	NA	63			28.0-32.0: Red-brown SILT, trace to little fine sand, trace to little gravel, non-cohesive, dense. Strong tar odor, tar				Strong	

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-05

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/14/01	Date Completed: 11/14/01
Remarks: Sunny, warm, slight breeze, 60 F NA – Indicates Not Applicable		Ground Elevation: 11.76'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 35.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			373 ppm		in veins, tar-coated grains and sheen in sand lense. (ML)					
32-35	NA	80			32.0-34.4: Red-brown SILT, little sand lenses. Strong tar odor, sand lenses saturated with tar. (SM)	32-35 FT				-20
			515 ppm		34.4-35.0: Fine SAND. Strong tar odor, saturated with tar, sheen. (SP)					
					35.0: End of boring. Geoprobe refusal.					
				40						-30

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: GP-12

GEI Consultants, Inc.

ant: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/14/01	Date Completed: 11/14/01
Remarks: Sunny, warm, 60 F NA – Indicates Not Applicable		Ground Elevation: 12.54'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 45.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			1599 ppm		damp. NAPL in fractures, tar-coated grains, residual product in seams. (ML)					
32-36	NA	53								-20
			1175 ppm		32.0-36.0: Red-brown SILT, little fine to coarse gravel, trace sand, non-cohesive. Strong tar odor, viscous black tar coating gravel in veins, tar (NAPL) in veins, viscous black tar. (ML)					
36-40	NA	60								
			1138 ppm		36.0-40.0: Red-brown SILT, little fine to coarse gravel, trace sand, non-cohesive, dense, moist. Strong tar odor, tar-coated gravel, sheen and NAPL in veins. (ML)				Strong	
40-45	NA	80		40						
			1154 ppm		40.0-45.0: Red-brown to black stained SILT, little fine sand, trace coarse gravel, non-cohesive, moist. Strong tar odor, tar veins and sheen, NAPL in sand layers. (ML)	40-45 FT				-30
					45.0: End of boring					

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-13

GEI Consultants, Inc

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 05/20/02	Date Completed: 05/20/02
Remarks: NA - Indicates Not Applicable		Ground Elevation: 12.95'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0-4	NA	56	0.0 ppm		0.0-4.0: Red brown, fine to medium SAND, trace gravel,trace silt, moist to wet. Trace naphthalene-like odor. (SP)					10
4-8	NA	4	1.8 ppm		4.0: Apparent groundwater table. 4.0-8.0: Red brown, fine to medium SAND, trace gravel,trace silt. Trace naphthalene-like odor. (SP)				Slight	
8-12	NA	13	20.2 ppm	10	8.0-12.0: Red brown, fine to medium SAND, trace fine gravel,little silt, non-cohesive, soft, wet. Slight to moderate naphthalene and tar like-odor. Trace tar stained grains. (SP)	No Samples Submitted			Moderate	
12-16	NA	32	53.9 ppm		12.0-15.3: Red brown, fine to medium SAND, trace gravel,little silt, saturated. Moderate tar-like odor. Trace tar blebs. (SP)					0

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-13

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 05/20/02	Date Completed: 05/20/02
Remarks: NA - Indicates Not Applicable		Ground Elevation: 12.95'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
16-20	NA	42	184.3 ppm		15.3-16.0: Grey-brown, SILT, trace clay, cohesive soft. Trace naphthalene-like odor. (ML)				Trace	
					16.0-18.0: Grey-brown, SILT, trace to little clay, moist, trace gravel, trace wood (roots), moist. Black-taffy-like tar and moderate tar odor. (ML)				Moderate	
					18.0-20.0: Grey-brown, SILT, trace to litle clay, moist, trace gravel, trace wood (roots), brick fragments, moist. No visual contamination. Trace naphthalene-like odor. (ML)				Trace	
				20	20.0: Concrete in the shoe of the macro-core. Probgble bottom of Relief Holder No. 2. (FI)					-10

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-14

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 05/20/02	Date Completed: 05/20/02
Remarks: NA – Indicates Not Applicable		Ground Elevation: 12.69'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 18.50'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0–4	NA	63			0.0–1.0: Red–brown, SILT, trace fine to coarse gravel, trace fill brick and rootlets, non–cohesive. (FI)					
			68.0 ppm		1.0–4.0: Red brown, fine to medium SAND, trace silt, non–cohesive, moist to wet. (SP)					10
					3.5: Apparent groundwater table encountered.					
4–8	NA	10							None	
			8.0 ppm		4.0–8.0: Red–brown, fine to medium SAND non–cohesive, wet. (SP)					
8–12	NA	13				No Samples Submitted				
			0.0 ppm	10	8.0–12.0: Red–brown, fine to medium SAND, trace to little silt, trace gravel, soft, non–cohesive, wet. Faint naphthalene odor. (SP)				Trace	
12–16	NA	4								0
					12.0–16.0: Red–brown, fine to medium SAND, trace to little silt. (SP)				None	

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-14

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 05/20/02	Date Completed: 05/20/02
Remarks: NA – Indicates Not Applicable		Ground Elevation: 12.69'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 18.50'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
					16.0–18.5: Brown–grey, SILT, trace to little sand and coarse gravel, non–cohesive, soft to moderately dense. Slight tar odor. (ML)				Slight	
					18.5: Brick encountered, tar coated brick and sand grains, strong tar odor. (Fl) Likely bottom of Relief Holder No. 2. End of Boring.					
				20						–10

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: GP-15

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 05/20/02	Date Completed: 05/20/02
Remarks: NA – Indicates Not Applicable		Ground Elevation: 12.67'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 16.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0–4	NA	75	0.0 ppm		0.0–3.5: Red–brown, fine to medium SAND, trace gravel, non–cohesive, loose. (SP)					10
4–8	NA	13	0.0 ppm		3.5–8.0: Red–brown, SILT, trace clay, cohesive, moist. (ML)	No Samples Submitted			None	
8–12	NA	29	18.0 ppm	10	8.0–12.0: Brown to brown/grey, SILT, trace clay, trace to little fine to coarse sub–rounded sand, trace to little fill (coal fragements, ash and wood particles),cohesive, moist. Faint naphthalene odor. (FI)				Trace	
12–16	NA	83	9349 ppm		12.0–14.0: Brown to grey/brown, SILT, trace to little clay, trace coarse gravel, trace fill (gravel sized slag) cohesive, soft, moist. Trace napthalene odor. (FI) 14.0–14.3: Red brick fragments (FILL). Tar staining around grains on brick and sheen. Moderate tar odor. (FI) Likely bottom of Relief Holder No. 2 encountered. 14.3–15.0: Grey weathered sand–sized to					0

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-15

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 05/20/02	Date Completed: 05/20/02
Remarks: NA – Indicates Not Applicable		Ground Elevation: 12.67'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 16.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
					gravel–sized CONCRETE. (CR)			Moderate	
					15.0–15.3: Grey coarse GRAVEL (sub–base type). Tar coated grains and tar blebs in water. Tar odor. (FI)				
					15.3–16.0: Red–brown, SILT, trace gravel within matrix, dense to very dense. Sheens and tar coated grains in viens around grains. (ML) End of Boring.				
				20					10

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-16

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 05/20/02	Date Completed: 05/20/02
Remarks: NA – Indicates Not Applicable		Ground Elevation: 12.61'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 15.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
0–4	NA	65			0.0–3.0: Red–brown to brown, SILT, trace to little sand, moist. Moderate napthalene–like odor. (ML)				
			10000 ppm		3.0–4.0: Brown to black, coarse gravel–sized FILL (red brick), moist to wet. heavily tar–coated grains, pore space contain liquid tar. Tar odor. (Fl)				10
4–8	NA	13			4.0–8.0: Coarse gravel–sized FILL (red brick) some brown to black silt, saturated with water. Heavy sheen and moderate tar and napthalene odor. (Fl)			Moderate	
			2257 ppm			No Samples Submitted			
8–12	NA	6							
			679 ppm	10	8.0–12.0: FILL, fragments of brick and wood, saturated with water. No visual contamination noted. Strong naphthalene odor. (Fl)			Strong	
12–14	NA	4			12.0–14.0: FILL, gravel–sized fragments of brick and timbers in the shoe of the spoon. Tar soaked timbers, sheen, moderate naphthalene–like odor. (Fl)				0
			542 ppm		14.0–15.0: Black, medium to coarse SAND, with fragements of concrete in the shoe of macro–core sampler. (Fl) Likely bottom of Relief Holder No. 2.			Moderate	
14–15	NA	4			15.0: End of Boring.				

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-17

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 05/21/02	Date Completed: 05/21/02
Remarks: Mostly ssunny, high expected in upper 60's. NA – Indicates Not Applicable		Ground Elevation: 12.87'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 17.50'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0-4	NA	88			0.0-3.0: Red-brown, SILT and fine SAND, trace fill (slag), soft, non-cohesive, moist. (FI)					
			0 ppm							10
					3.0-4.0: Brown, fine to medium SAND, well-sorted, little silt, wet. (SP) 3.5: Apparent groundwater table.					
4-8	NA	10							None	
			0 ppm		4.0-8.0: Brown, fine to medium SAND, some silt, trace coarse gravel, wet. (SM)					
						No Samples Collected				
8-12	NA	50								
					8.0-10.5: Red-brown to brown, fine to medium SAND some to and Silt, non-contamination, saturated with water. Trace fuel oil-type odor. (SM)					
			167 ppm	10						
					10.5-12.0: Dark brown to black SILT, trace gravel, trace fill (ash fragements), moist, Trace fuel oil-type odor. (FI)					
12-16	NA	35							Trace	
										0
			1.4 ppm		12.0-17.0: Dark brown-grey SILT, trace to little fill (glass, slag and ash fragments), moist. Trace fuel oil-type odor noted. (FI)					

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-17

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 05/21/02	Date Completed: 05/21/02
Remarks: Mostly ssunny, high expected in upper 60's. NA - Indicates Not Applicable		Ground Elevation: 12.87'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 17.50'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
16-17.5	NA	67			17.0-17.5: Brick fragments. Black stained with strong tar odor. Probable bottom of Relief Holder No. 2. (Fl) 17.5: End of Boring.			+	Strong	
				20						-10

Legend: Physical Observations

None | Sheen | Stoin | Heavy

Site Id: GP-18

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 05/21/02	Date Completed: 05/21/02
Remarks: NA – Indicates Not Applicable		Ground Elevation: 12.45'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0–4	NA	75	4.0 ppm		0.0–4.0: Red–brown, SILT, trace to little fine to medium sand, trace gravel and fill (oyster fragments and coal fragments). (FI)				None	10
4–8	NA	17	4.0 ppm		4.0–8.0: Dark brown, SILT, little clay, trace fine sand, trace fill (glass), cohesive, soft, wet. Trace fuel oil odor. (FI)				Slight	
8–12	NA	19	9.5 ppm	10	8.0–12.0: Brown to grey–brown,SILT, trace to little clay, trace fine sand and trace fill, (coal and ash), cohesive, soft, wet. Mixed fuel oil and naphthalene–like odor noted. (FI)	No Samples Submitted				
12–16	NA	29	78.0 ppm		12.5–12.8: Tar coated sand stringer with strong tar odor and napthalene–like odor. 12.0–16.0: Dark brown to red–brown, SILT, trace to little clay, trace fine sand, trace gravel, soft, cohesive, wet. Moderate napthalene odor throughout. (MH)				Moderate	0

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-18

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 05/21/02	Date Completed: 05/21/02
Remarks: NA - Indicates Not Applicable		Ground Elevation: 12.45'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
16-20	NA	29	513 ppm		16.0-19.5: Black, SILT, trace to little fine to medium sand, trace concrete fragments. Tar saturated, blebs and sheen viscous tar. Strong tar odor. (MH)			Strong	
					19.5-20.0: Concrete fragments encountered. Probable Relief holder No. 2 floor encountered. (CR)				
				20	20.0: End of boring.				-10

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: RW-04

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248 | Project Name: Clifton Former MGP

Remarks: Mostly cloudy, slightly breezy (~30 F)
Steven Wallett logged RW-4 80-90', and monitored well installation.

Date Started: 03/10/99	Date Completed: 03/12/99
Ground Elevation: 10.15'	Datum: NGVD
Contractor: ADT	Total Depth: 90.00'
Drilling Method: Hollow Stem Auger	
Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description (color, density, SOIL, admixture, moisture, other notes, ORIGIN.)	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)	Well Construction
75-77	17 21 18 17	42									
77.5-79.5	10 10 10 13	100	0.0 ppm		77.5-79.5: Brown, fine to coarse SAND, trace silt, some gravel, non-cohesive, very wet. (SM)				No Odors	-70	
				80	Screen Section: 80' to 90' bgs. 2" PVC, 10 slot	88-92 ft.					

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: RW-07

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 02/25/99	Date Completed: 03/03/99
Remarks: Feb. 25: Sunny with clouds, very breezy 15–20 mph), ~30 F. Depth to groundwater approximately 6.5'. Geology obtained from CF-SB-17 boring. NA indicates not available.		Ground Elevation: 12.80'	Datum: NGVD
		Contractor: ADT	Total Depth: 78.00'
		Drilling Method: Geoprobe and Hollow Stem Auger	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Vis. Signs of Contamination	Odors	Elevation (ft)	Well Construction (MP. EL. 12.80)
0–4		56	0.0 ppm		0.0–0.9: Brown, dark brown to grey, silty-SAND (Top Soil), trace clay, moist. (SM)						
					0.9–4.0: Red to red-brown, fine to medium, SAND, some silt and fine to medium sub-angular gravel, trace clay, non-cohesive, moist. (SM)						
			0.0 ppm						None	10	
4–8		30	0.0 ppm								
					4.0–6.5: Red to red-brown, sandy-SILT, coarse gravel, wet. (SM)						
			1.4 ppm		Groundwater table located approximately at 6.5' below ground surface.						
					6.5–8.0: Grey, SILT, some fine sand and clay, cohesive, slightly-plastic. Slight petroleum or naphtha-like odor. (SC)				Slight		
8–12		83	7.0 ppm		8.0–8.5: Grey, clayey-SILT, some fine sand, trace gravel, cohesive, plastic. Slight naphtha-like odor noted. (ML)						
					8.5–10.0: Red to red-brown, fine, sandy-SILT, some clay, trace gravel, moist to very moist. Moderate naphtha-like odor. Slight groundwater sheen noted. (SM)				Moderate		
			37.0 ppm	10							
					10.0–12.0: Red to red-brown, fine SAND, GRAVEL and SILT mixture, some clay, cohesive. Faint naphtha-like odor. (GM)						
12–16		75	6.0 ppm						Slight	0	
					12.0–14.5: Red-brown, silty-SAND, trace gravel, some clay cohesive, wet. Slight naphtha-like odor. Groundwater sheen noted. (SM)						
			110.0 ppm			13–16 ft.			Moderate		

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: RW-07

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248 | Project Name: Clifton Former MGP

Remarks: Feb. 25: Sunny with clouds, very breezy 15-20 mph), ~30 F.
Depth to groundwater approximately 6.5'.
Geology obtained from CF-SB-17 boring.
NA indicates not available.

Date Started: 02/25/99	Date Completed: 03/03/99
Ground Elevation: 12.80'	Datum: NGVD
Contractor: ADT	Total Depth: 78.00'
Drilling Method: Geoprobe and Hollow Stem Auger	
Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)	Well Construction
						13-16 ft.		Moderate		
16-20		83	55.0 ppm		14.5-17.5: Red-brown to grey-brown, silty-SAND, trace to some clay, trace gravel, cohesive, very moist. Moderate naphtha-like odor and tar odor. Black staining, groundwater sheen and tar-stained grains. (SM)					
					Note: Shoe of the spoon dislodged during 16-20' interval. Offset and re-drilled using spear tip to drill to 16.0' and commenced sampling.					
			77.0 ppm		17.5-18.5: Red to red-brown, fine SAND, some silt and clay, cohesive, slightly-plastic, loose. Moderate naphtha-like odor. Sheen noted. (SM)			Moderate to Strong		
					18.5-20.75: Brown to red-brown, fine SAND and SILT, some clay, trace fine gravel, slightly cohesive to cohesive, plastic. Moderate to strong naphtha- and tar odors. Tar-stained grains noted. (SM)					
20-24		50	311.0 ppm	20						
					20.75-22.00: Red to red-brown, SILT, some fine sand, clay, trace fine gravel, slightly-moist. Slight tar-like odor. Tar staining (0.2') noted at 21.75 feet. (ML)					
			20.0 ppm							
					22.0-24.0: Red to red-brown, SILT and SAND, trace to some gravel, some clay, slightly moist. Slight to moderate naphtha-like odor. (GM)			Slight	-10	
24-25		94	20-34 ppm							
25-28		83	30.0 ppm		24.0-26.0: Red to red-brown, fine silty-SAND, fine to medium gravel, clay mixture, dense, slightly-cohesive, slightly-plastic, moist. Faint tar-like odor. One inch tar-stained layer at 24.0'.(GM)					
			1389 ppm							
28-30		47	110-240 ppm		26.0-30.0: Red-brown, SILT, fine to medium SAND, some angular gravel, trace cobble (green crystalline), dense, slightly moist to wet. Tar odor noted. Tar-stained gravel and slight sheen.(GM)			Moderate		
			375 ppm							

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: RW-07

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248 | Project Name: Clifton Former MGP

Remarks: Feb. 25: Sunny with clouds, very breezy 15-20 mph), ~30 F.
Depth to groundwater approximately 6.5'.
Geology obtained from CF-SB-17 boring.
NA indicates not available.

Date Started: 02/25/99 | Date Completed: 03/03/99
Ground Elevation: 12.80' | Datum: NGVD
Contractor: ADT | Total Depth: 78.00'
Drilling Method: Geoprobe and Hollow Stem Auger
Logged By: Lynn Willey | Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)	Well Construction
30-32	11 40 30 22	60	25-40 ppm		30.0-32.0: Brown, fine SAND, SILT, and some fine, medium and coarse gravel, very tight, dry. Moderate to strong tar odor. Tar-stained sand and gravel. (GM)						
32-34	10 17 35 24	42	350 ppm							-20	
34-36	15 16 24 50	25	380-539 ppm						Moderate to Strong		
			300-340 ppm		32.0-38.0: Red to red-brown, SILT, some fine SAND, some fine to medium gravel, trace to some clay and cobble (in tip of shoe), moist to wet, non-cohesive. Moderate to strong tar odor noted. Slight sheen, tar staining, and tar saturated layer(0.25') at 35.75 throughout the sample. (GM)						
36-38	27 17 16 14	54	580 ppm								
38-40	13 15 17 19	42	1740 ppm								
			315 ppm		38.0-40.0: Brown to red-brown, fine, silty-SAND, trace silt and clay, slightly-cohesive, wet. Slight to moderate naphtha-like and tar odors. Tar staining at 38.0 to 38.6'.(SM)						
40-42	NA NA NA NA	46	615 ppm	40	40.0-41.0: Brown to dark brown, fine to medium SAND, trace to some gravel, trace silt, wet, non-cohesive. Moderate naphtha-like and tar odors. Slight sheen and tar staining (0.2') at 37.8'.(SW)				Slight to Moderate		
			120-305 ppm								
42-44	7 7 8 9	38			41.0-44.5: Red to red-brown, fine, sandy-SILT, some angular gravel,slightly-moist to wet, grey clay/silt nodules. Medium sand stringer (0.9')at 43.1' with sheen. Slight to moderate naptha-like odor.(GM)					-30	
			59-114 ppm								
44-46	7 10 9 17	54			44.5-46.0: Brown CLAY, trace to some silt, cohesive						

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: RW-07

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248 | Project Name: Clifton Former MGP

Remarks: Feb. 25: Sunny with clouds, very breezy 15-20 mph), ~30 F.
Depth to groundwater approximately 6.5'.
Geology obtained from CF-SB-17 boring.
NA indicates not available.

Date Started: 02/25/99	Date Completed: 03/03/99
Ground Elevation: 12.80'	Datum: NGVD
Contractor: ADT	Total Depth: 78.00'
Drilling Method: Geoprobe and Hollow Stem Auger	
Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)	Well Construction
			30-40 ppm		dense, plastic, slightly moist. Faint to slight naphtha-like odor. (CL)						
46-48	12 19 20 21	21									
			77 ppm		46.0-48.0: Red to red-brown, fine to medium silty-SAND, some gravel, loose, moist to wet. Slight naphtha-like odor. (GM)				Slight		
48-50	14 24 20 15	71			48.0-49.0: Red to red-brown, silty-SAND,(first 3" coarse to very coarse SAND),some gravel, non-cohesive, slightly-moist. Slight naphtha-like odor noted. (GP)						
			44 ppm								
50-52	22 22 26 26	45		50							
			40-50 ppm		49.0-54.0: Red-brown, fine to coarse silty-SAND, some medium to coarse gravel, trace cobble (in tip of spoon), red to red-brown rock fragments, moist to wet. Slight naphtha-like odor noted. (GM)						
52-54	28 85	38								-40	
			40-50 ppm								
54-56	40 44 37 23	0									
					54.0-58.0: No Recovery. All sample that was recovered was determined to be WASH from inside the augers.(UN)						
56-58	20 19 13 11	0							Unknown		
58-60	NA NA NA NA	0			58.0-60.0: No Recovery.(UN)						

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: RW-07

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248 | Project Name: Clifton Former MGP

Remarks: Feb. 25: Sunny with clouds, very breezy 15-20 mph), ~30 F.
Depth to groundwater approximately 6.5'.
Geology obtained from CF-SB-17 boring.
NA indicates not available.

Date Started: 02/25/99	Date Completed: 03/03/99
Ground Elevation: 12.80'	Datum: NGVD
Contractor: ADT	Total Depth: 78.00'
Drilling Method: Geoprobe and Hollow Stem Auger	
Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)	Well Construction
60-62	6 10 16 18	50	150 ppm		60.0-62.0: Red to red-brown, fine to medium SAND, some silt, some gravel, slightly-cohesive, moist. Slight to moderate naphtha-like odor. (GM)				Moderate		
62-64	41 30 17 24	30	50 ppm		62.0-65.0: Red to red-brown, silty-SAND, some gravel, trace clay, 3" of dark red crushed rock (possibly arkose), slightly-cohesive, moist. Slight naphtha-like odor noted. (GM)				Slight	-50	
			198 ppm								
65-68	25 22 24 24	71	30-83 ppm								
			147 ppm		65.0-67.8: Red to red-brown, fine, silty-SAND, trace clay, trace medium gravel, non-cohesive, moist. Slight to moderate naphtha-like odor noted. (SM) 67.8-68.0: Red to red-brown, fine silty-SAND, some gravel, moist. Slight to moderate naphtha-like and tar odors. Tar-staining. (GM)						
68-71	20 20 24 18	67	2121 ppm								
			75 ppm	70	68.0-72.5: Red-brown to brown, fine to very coarse, SAND, trace silt, some medium gravel, 3" brown rock fragments, wet, non-cohesive. Slight to moderate naphtha-like odor. (GP)				Slight to Moderate		
71-74	11 11 17 13	50	30-40 ppm							-60	
			130-150 ppm		72.5-74.0: Brown, fine to medium, SAND, trace silt, wet. Slight to moderate tar odor observed. (SW) Note: Driller augered too far. Begin sampling at 75'.						

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: RW-07

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248 | Project Name: Clifton Former MGP

Remarks: Feb. 25: Sunny with clouds, very breezy 15-20 mph), ~30 F.
Depth to groundwater approximately 6.5'.
Geology obtained from CF-SB-17 boring.
NA indicates not available.

Date Started: 02/25/99 | Date Completed: 03/03/99
Ground Elevation: 12.80' | Datum: NGVD
Contractor: ADT | Total Depth: 78.00'
Drilling Method: Geoprobe and Hollow Stem Auger
Logged By: Lynn Willey | Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)	Well Construction
75-78	32 30 35 33	58	2173 ppm		75.0-76.75: Dark grey to black, fine to medium SAND, wet. Strong tar odor. Tar-saturated with product.(SP)					
			675 ppm		76.75-78.0: Dark brown, fine to coarse, silty-SAND, some fine to medium gravel, rock with tar in fracture. Strong naphtho-like and tar odor. Tar stained.(GM)	76-78 ft.		Strong		
					78.0: End of Boring.					
					Well Construction: Screen Section from 65' to 75' bgs. 2" PVC, 10 slot screen. Sand from 60' to 78' bgs. Bentonite Slurry from 57' to 60' bgs. Cement-Bentonite Grout from 57' bgs to surface. Flush-mount pad installed.					
				80					-70	

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: RW-14

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 08/23/99	Date Completed: 08/27/99
Remarks: Geology for RW-14 was obtained from SB-42. Depth to groundwater approximately 8'. Resonant Sonic drilling rig used on RW-14. Resonant Sonic core barrel used for sampling.		Ground Elevation: 13.00'	Datum: NGVD
		Contractor: Boart Longyear	Total Depth: 135.00'
		Drilling Method: Resonant Sonic	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Vis. Signs of Contamination	Odors	Elevation (ft)	Well Construction
0-5	N/A	100			0.0-1.0: Light brown, fine to medium, silty-SAND, trace fine to medium rounded gravel, brick fragments, rootlets, non-cohesive, loose, dry. (FI)				None		
					1.0-2.0: Black, sandy-SILT, trace angular to sub-angular gravel, non-cohesive, loose, slightly moist. Strong coal tar-like odor. Black-stained.(SM)						
			474 ppm							10	
									Strong		
5-10	N/A	100			2.0-8.0: Red-brown, SILT, trace fine sand, trace fine to medium gravel (sub-angular), stiff to very stiff, slightly moist to moist. Strong coal tar odor. Viens with sheen and tar-coated grains.(ML)						
					8.0-10.0: Brown to dark brown, fine to medium SAND, some silt, trace rounded gravel, slightly-cohesive, medium dense, slightly-plastic. Moderate coal tar odor. Tar-coated grains.(SM)				Moderate		
			6508 ppm								
10-15	N/A	100		10							
					10.0-13.0: Brown to dark brown, fine to medium SAND, some silt, trace, rounded gravel, slightly-cohesive, slightly-plastic, wet. Strong tar odor. Tar saturated with tar covered grains. (SM)				Strong		
										0	
			3754 ppm								

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: RW-14

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248 | Project Name: Clifton Former MGP

Remarks: Geology for RW-14 was obtained from SB-42.
Depth to groundwater approximately 8'.
Resonant Sonic drilling rig used on RW-14.
Resonant Sonic core barrel used for sampling.

Date Started: 08/23/99	Date Completed: 08/27/99
Ground Elevation: 13.00'	Datum: NGVD
Contractor: Boart Longyear	Total Depth: 135.00'
Drilling Method: Resonant Sonic	
Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description (color, density, SOIL, admixture, moisture, other notes, ORIGIN.)	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)	Well Construction
15-25	N/A	80			13.0–15.0: Red-brown, SILT, trace fine to medium sand, trace fine gravel (rounded), dense, non-cohesive, moist. Tar and tar saturated grains present in veins.(ML)					
					15.0–20.0: Red-brown, SILT, fine to medium sand, trace gravel, loose, slightly-cohesive, non-plastic, wet. Tar-coated grains and sheen. (SM)			Moderate		
					Note: The 15 to 20' interval was re-run with sampled with 4" core barrel because initial run was dropped.					
				20						
			6275 ppm							
					20.0–25.0: Gray, SILT, trace fine to medium sub-rounded gravel, medium dense, slightly-cohesive, slightly-moist. Strong tar odor. Heavy sheen.(ML)				–10	
			10846 ppm			24-25 ft.				
25-30	N/A	100						Strong		
					25.0–30.0: Brown-grey to red-brown, SILT, trace fine to medium sand, some gravel, non-cohesive, medium dense, wet. Overpowering coal tar odor. Tar coated grains and sheen.(ML)					
			8287 ppm							

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: RW-14

GEI Consultants, Inc.

Client: Keyspan Energy	
Project Number: 98248	Project Name: Clifton Former MGP
Remarks: Geology for RW-14 was obtained from SB-42. Depth to groundwater approximately 8'. Resonant Sonic drilling rig used on RW-14. Resonant Sonic core barrel used for sampling.	

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Ground Elevation: 13.00'	Datum: NGVD
Contractor: Boart Longyear	Total Depth: 135.00'
Drilling Method: Resonant Sonic	
Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)	Well Construction
30-35	N/A	100	8276 ppm		30.0-35.0: Red-brown to gray brown, SILT, trace fine to medium sand, trace fine to medium gravel, non-cohesive, loose, moist. Strong coal tar odor and naphtha-like odor. Tar-stained and heavy sheen in veins within the sample.(ML)				-20	
35-45	N/A	100			35.0-36.5: Brown, SILT, trace fine sand and medium gravel (sub-rounded), non-cohesive, wet. Moderate to strong coal tar-like odor. Tar coated grains.(ML)			Strong		
			1826 ppm							
				40						
			2898 ppm		36.5-45.0: Brown to dark brown, SILT, some medium to coarse sand, trace coarse gravel (sub-rounded), trace clay, slightly-cohesive, slightly-plastic, saturated. Tar coated grains and heavy sheen throughout the sample. Tar product and tar saturation at 40 feet in silty sand layer.(SM)				-30	

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: RW-14

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248 | Project Name: Clifton Former MGP

Remarks: Geology for RW-14 was obtained from SB-42.
Depth to groundwater approximately 8'.
Resonant Sonic drilling rig used on RW-14.
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Ground Elevation: 13.00'	Datum: NGVD
Contractor: Boart Longyear	Total Depth: 135.00'
Drilling Method: Resonant Sonic	
Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)	Well Construction
45-55	N/A	50			45.0-47.0: Brown, medium to coarse, silty-SAND, trace clay, non-plastic, slightly-cohesive, saturated. Slight tar odor. (SM) Note: Based upon a 5 foot recovery because of cobble in the core barrel.			Slight		
			444 ppm	50	47.0-55.0: Red-brown, gravely- fine to coarse SAND, trace grey silt, loose, saturated. Slight naphtha-like coal tar odor. Slight sheen noted.(GP)				-40	
55-65	N/A	100						Slight		
					55.0-63.0: Red-brown, fine to medium, silty-SAND, some gravel, trace sub-angular cobble, non-cohesive, saturated. Slight naphtha-like odor. (GM)	58-61 ft.				

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: RW-14

GEI Consultants, Inc.

Client: Keyspan Energy	
Project Number: 98248	Project Name: Clifton Former MGP
Remarks: Geology for RW-14 was obtained from SB-42. Depth to groundwater approximately 8'. Resonant Sonic drilling rig used on RW-14. Resonant Sonic core barrel used for sampling.	

Date Started: 08/23/99	Date Completed: 08/27/99
Ground Elevation: 13.00'	Datum: NGVD
Contractor: Boart Longyear	Total Depth: 135.00'
Drilling Method: Resonant Sonic	
Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)	Well Construction
						58-61 ft.					
					63.0-64.0: Brown, SILT, trace fine to medium sand, trace gravel, soft, saturated. Slight coal tar-like odor. Irridescent sheen noted.(MH)					-50	
			1711 ppm								
65-75	N/A	70			64.0-65.0: Brown, coarse, silty-SAND, trace cobble, saturated. Strong coal tar-like odor. Irridescent sheen and tar product around cobbles.(SM) Note: The 55 to 65 interval was based upon an 8 foot sample recovery.				Strong		
					65.0-67.0: Brown, fine to coarse, gravelly-SILT, trace fine to coarse sand, loose, saturated. Strong coal-tar like odor. Tar stained grains.(GM)				Moderate		
					67.0-68.0: Red-brown, SILT, trace fine sand and gravel, very dense, moist. Moderate coal tar-like odor.(ML)						
				70							
			6300 ppm		68.0-75.0: Black, silty, fine GRAVEL and coarse SAND, loose, non-cohesive, saturated. Moderate to heavy coal tar-like odor. Black stained and tar saturated, runny tar product. (GM)				Strong		
										-60	

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: RW-14

GEI Consultants, Inc.

ent: Keyspan Energy

Project Number: 98248 | Project Name: Clifton Former MGP

Remarks: Geology for RW-14 was obtained from SB-42.
Depth to groundwater approximately 8'.
Resonant Sonic drilling rig used on RW-14.
Resonant Sonic core barrel used for sampling.

Date Started: 08/23/99	Date Completed: 08/27/99
Ground Elevation: 13.00'	Datum: NGVD
Contractor: Boart Longyear	Total Depth: 135.00'
Drilling Method: Resonant Sonic	
Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)	Well Construction
75-85	N/A	60	2999 ppm	80	75.0-80.0: Grey, medium to coarse, gravelly-SAND, trace silt, non-cohesive, loose, saturated. Moderate coal tar-like odor. Tar blebs, tar-coated grains and tar saturated. (GP)	78-78.5ft.		Moderate	-70	
			1067 ppm		80.0-85.0: Red-brown, fine, silty-SAND, trace fine gravel, non-cohesive, medium dense, saturated. Moderate tar odor noted. Slight sheen on groundwater.(SM)					
85-95	N/A	100	2409 ppm		85.0-90.0: Brown, fine to medium SAND, upward fining noted within the sample, trace silt, trace gravel, loose, saturated. Moderate coal tar-like odor. Tar blebs floating in ground water within the sample.(SP)			Moderate		

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: RW-14

GEI Consultants, Inc.

Client: Keyspan Energy	
Project Number: 98248	Project Name: Clifton Former MGP
Remarks: Geology for RW-14 was obtained from SB-42. Depth to groundwater approximately 8'. Resonant Sonic drilling rig used on RW-14. Resonant Sonic core barrel used for sampling.	

Date Started: 08/23/99	Date Completed: 08/27/99
Ground Elevation: 13.00'	Datum: NGVD
Contractor: Boart Longyear	Total Depth: 135.00'
Drilling Method: Resonant Sonic	
Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)	Well Construction
			74.0 ppm		90.0–95.0: Brown, coarse to very coarse SAND, medium to coarse gravel, trace cobble, trace silt, upward fining within the sample, saturated. Moderate coal-tar like odor. Sheen noted. (SW)				Moderate	-80	
95-105	N/A	30			95.0–100.0: Brown, fine to medium, silty-SAND, loose, non-cohesive, saturated. Moderate coal tar-like odor. Tar blebs noted within the groundwater in the sample.(SM)						
				100							
			172 ppm		100.0–105.0: Brown, coarse to very coarse SAND, some medium to coarse gravel (sub-angular), non-cohesive, loose. Slight naphtha-like odor. (SW) Note: 95–105 foot sample description was based upon three foot recovery.				Slight	-90	

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: RW-14

GEI Consultants, Inc.

Client: Keyspan Energy	
Project Number: 98248	Project Name: Clifton Former MGP
Remarks: Geology for RW-14 was obtained from SB-42. Depth to groundwater approximately 8'. Resonant Sonic drilling rig used on RW-14. Resonant Sonic core barrel used for sampling.	

Date Started: 08/23/99	Date Completed: 08/27/99
Ground Elevation: 13.00'	Datum: NGVD
Contractor: Boart Longyear	Total Depth: 135.00'
Drilling Method: Resonant Sonic	
Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)	Well Construction
105-115	N/A	100		110	105.0-115.0: Brown, fine to medium SAND, trace silt and cobble, non-cohesive, loose, wet. Moderate coal tar-like odor. (SW) Note: Sample was re-run by driller because of cobbles and poor sample recovery. Driller appears to be pushing a large cobble through the smaller sand matrix, attempts multiple runs during the sample collection to move cobble out of the way. Heaving sands are encountered within the casing.				Moderate	-100	
115-120	N/A	100	1284 ppm		115.0-124.0: Brown, fine to medium SAND, trace coarse sand, non-cohesive, loose, saturated	119-119.5			Strong		

Legend: Physical Observations

- None
- Sheen
- Stain
- Heavy

Site Id: RW-14

GEI Consultants, Inc.

Client: Keyspan Energy	
Project Number: 98248	Project Name: Clifton Former MGP
Remarks: Geology for RW-14 was obtained from SB-42. Depth to groundwater approximately 8'. Resonant Sonic drilling rig used on RW-14. Resonant Sonic core barrel used for sampling.	

Date Started: 08/23/99	Date Completed: 08/27/99
Ground Elevation: 13.00'	Datum: NGVD
Contractor: Boart Longyear	Total Depth: 135.00'
Drilling Method: Resonant Sonic	
Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)	Well Construction
120-125	N/A	10			Strong naphtha-like odor noted. (SW)						
					Note: Driller re-sampled 115 to 120 foot sample with 6" core barrel through previous 4' sample run.				Strong	-110	
			3065 ppm		124.0-125.0: Brown, gravelly-SILT, some fine sand, slightly-cohesive, non-plastic, soft. Slight naphtha-like odor.				Slight		
125-130.5	N/A	100			Note: The 120-125 foot sample was based upon sample remaining within shoe of the core barrel. Drillers dropped sample into soil cuttings drum because of excessive amount of water in the core barrel.						
			26 ppm		125.0-126.0: Tan to grey, SILT with mica flakes, some clay, very dense, cohesive, non-plastic, dry.(ML)	126-126.5			None		
					126.0-129.0: Grey, fine to medium SAND, some mica flakes, some clay, dense, non-cohesive. (SP)						
				130							
			0.0 ppm		129.0-135.0: Red-brown, CLAY, with mica layers (SAPROLITE) [Weathered Bedrock], dense, non-cohesive. (CL)				None	-120	
					Well Construction: Screen Section from 119' to 129' bgs. Filter Sand from 116' to 135' bgs. Bentonite Chips from 105' to 116' bgs. Cement-Bentonite Grout from 105' bgs to surface 4" PVC with 10 slot screen, 1' sump. Flushmount pad with manhole.						
					135.0: End of Boring						

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-18

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 03/02/99	Date Completed: 03/08/99
Remarks: Partly sunny, breezy (~ 10-15 mph), cold (~30 F) Depth to groundwater approx. 4 feet. Soils from the boring were also logged by Steven Wallett from GEI Consultants, Inc.		Ground Elevation: 10.43'	Datum: Mean Sea Level
		Contractor: ADT	Total Depth: 84.00'
		Drilling Method: Geoprobe and Direct Push Methods	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0-4		21	0.0 ppm		Note: Star bit through 0.25' ASPHALT and began sampling 0.0-0.4 with geoprobe. 0.0-2.0: FILL (SILT, some fine to medium sand, some gravel, slightly moist, non-cohesive). (FI)					10
			0.7 ppm		2.0-4.0: Red to red-brown, SILT, fine sand, some gravel, slightly cohesive, slightly moist. (GM) Note: Large piece of gravel noted in the tip of the spoon.				None	
4-7.5		29	0.2 ppm		4.0-5.14: Black, FILL (sandy-SILT, pieces of glass, wet). (FI)					
					5.14-7.0: Brown to dark brown, fine to medium, SAND, some silt, wet. Faint fuel oil odor. (SW)	4-7.5 ft.			Faint Fuel Oil Odor	
			0.2 ppm		7.0-7.5: Black, silty-CLAY, dense, cohesive. (ML) Note: Large, green to light grey, crystaline rock in the tip of the spoon. Geoprobe refusal at 7.5'. Offset 2' towards Bay Street, pushed to 7.5' and commenced drilling.					
7.5-12		85	0.0 ppm		7.5-8.5: Black to olive-green, CLAY, dense, cohesive, slightly moist. (CL)					
					8.5-9.3: Olive-green, CLAY, some silt, some fine sand, moist. (ML)					
					9.3-9.9: Brown, silty-fine to medium, SAND, slightly cohesive, moist. (SM)					
			0.0 ppm	10	9.9-12.0: Brown to red-brown, SILT, SAND, CLAY mixture, some gravel, cohesive, slightly moist. (SC)				None	0
12-16		27	0.0 ppm		12.0-14.5: Brown to red-brown, SILT, some fine sand, trace gravel, trace clay, cohesive, moist. (ML)					
			0.0 ppm		14.5-16.0: Brown to red-brown, very fine sandy SILT, trace gravel, trace clay					

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-18

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 03/02/99	Date Completed: 03/08/99
Remarks: Partly sunny, breezy (~ 10–15 mph), cold (~30 F) Depth to groundwater approx. 4 feet. Soils from the boring were also logged by Steven Wallett from GEI Consultants, Inc.		Ground Elevation: 10.43'	Datum: Mean Sea Level
		Contractor: ADT	Total Depth: 84.00'
		Drilling Method: Geoprobe and Direct Push Methods	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
					green crystaline rock fragments at the top of interval. (ML)					
16–20		27	0.0 ppm		16.0–17.25: Red–brown, fine to medium SAND, some fine gravel, some silt, trace clay, wet. (SW)				None	
			0.0 ppm		17.25–22.0: Red to red–brown, SILT, fine SAND, GRAVEL, CLAY mixture, cohesive, slightly moist to moist. (GM)					
20–24		50	0.0 ppm	20						–10
			0.0 ppm		22.0–27.0: Red to red–brown, SILT, SAND, GRAVEL, CLAY mixture, dense, cohesive, slightly moist. (GM)				None	
24–27		61	0.0 ppm							
			0.0 ppm							
					Note: Driller began using drive and wash drilling method using circulating water. No sheen observed on the circulating water. Non–continuous 5' split–spoon sampling.					

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-18

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 03/02/99	Date Completed: 03/08/99
Remarks: Partly sunny, breezy (~ 10–15 mph), cold (~30 F) Depth to groundwater approx. 4 feet. Soils from the boring were also logged by Steven Wallett from GEI Consultants, Inc.		Ground Elevation: 10.43'	Datum: Mean Sea Level
		Contractor: ADT	Total Depth: 84.00'
		Drilling Method: Geoprobe and Direct Push Methods	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
30–32	50 13 17 15	60	0.0–0.8 ppm		30.0–32.0: Brown, fine SAND and SILT, some clay, trace fine to medium gravel, few coarse angular to sub–angular gravel at 31–32', moist. (GM)				None	–20
35–37	18 40 32 30	42	0.0 ppm		35.0–37.0: Red to red–brown, fine SAND, SILT, some clay, some sub–rounded gravel, very tight, moist. (GM)				None	
40–42	10 10 12 12	0	0.0 ppm	40	40.0–42.0: WASH (fine to medium sand and fine to medium angular gravel, some silts, some clay, wet. (UN)				None	–30

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-18

GEI Consultants, Inc.

ient: Keyspan Energy

Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 03/02/99	Date Completed: 03/08/99
Remarks: Partly sunny, breezy (~ 10–15 mph), cold (~30 F) Depth to groundwater approx. 4 feet. Soils from the boring were also logged by Steven Wallett from GEI Consultants, Inc.		Ground Elevation: 10.43'	Datum: Mean Sea Level
		Contractor: ADT	Total Depth: 84.00'
		Drilling Method: Geoprobe and Direct Push Methods	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
45–47	22 9 10 20	65	0.0–1.0 ppm		45.0–45.75: Brown, fine to coarse, SAND and fine to coarse GRAVEL, some silt, tight, moist. (SP) 45.75–46.25: Intermittent layers of fine SAND and SILT. Fine to medium sand depositional layering, tight, moist.(SM) 46.25–47.0: Brown, fine to coarse, SAND and SILT, very tight, some fine to medium gravel, some clay, moist. (SM)				None	
50–52	51 R	0		50	50.0–52.0: NO RECOVERY. Spoon refusal at 50'. Driller believes that cobble zone is at depth. Driving casing to 55' bgs.				Unknown	–40
55–57	29 17 42 36	46	1.3 ppm 0.9 ppm		55.0–55.7: Red–brown, fine to coarse SAND, some gravel, some silt, wet. (GM) 55.7–56.8: Red–brown, silty–SAND, some gravel, trace clay, non–cohesive to slightly cohesive, wet. (GM) 56.8–57.0: Dark green, crystalline rock fragments in the tip of spoon.				None	

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-18

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 03/02/99	Date Completed: 03/08/99
Remarks: Partly sunny, breezy (~ 10–15 mph), cold (~30 F) Depth to groundwater approx. 4 feet. Soils from the boring were also logged by Steven Wallett from GEI Consultants, Inc.		Ground Elevation: 10.43'	Datum: Mean Sea Level
		Contractor: ADT	Total Depth: 84.00'
		Drilling Method: Geoprobe and Direct Push Methods	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
60–62	14 36 24 18	50			60.0–62.0: NO RECOVERY. Spoon refusal. Spoon is damaged beyond repair.				Unknown	–50
			0.0–1.0 ppm		65.0–67.0: Brown, fine, SAND and SILT, some fine to coarse gravel, large cobble fragments. Slight tar–like odor at 66.0'. (GM)				Slight	
70–72	30 32 32 31	90	25 ppm	70	70.0–70.9: Fine brown, SAND and SILT, some fine to coarse gravel, large cobble fragments. (GM)				None	–60
			150 ppm		70.9–71.5: COBBLE, GRAVEL, and fine SAND. Slight to moderate tar–like odor. Tar–stained. (GM)			+	Slight to Moderate Tar Odor	
			216 ppm		71.5–72.0: COBBLE, GRAVEL, and fine SAND. Slight to moderate tar–like odor. Sheen noted. (GW)					
73–76	24 32 32 18	100			73.0–73.9: Red to red–brown, silty–SAND, some gravel, trace clay, moist. Slight to moderate tar–like odor noted. Slight sheen noted. (GM)				Moderate	
					73.9–75.2: Red–brown, fine to medium SAND, trace silt, some gravel, non–cohesive, moist. Slight to moderate tar–like odor–naphthalene. Slight sheen in	73–76 ft.				

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-18

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 03/02/99	Date Completed: 03/08/99
Remarks: Partly sunny, breezy (~ 10–15 mph), cold (~30 F) Depth to groundwater approx. 4 feet. Soils from the boring were also logged by Steven Wallett from GEI Consultants, Inc.		Ground Elevation: 10.43'	Datum: Mean Sea Level
		Contractor: ADT	Total Depth: 84.00'
		Drilling Method: Geoprobe and Direct Push Methods	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			10–20 ppm		discrete veins of interval. (GP)					
					75.2–76.0: Brown, sandy–SILT, dense slightly cohesive, slightly moist. Slight tar–like odor noted. (SM)	73–76 ft.				
76–79	11 15 10 11	25			76.0–79.0: Brown, medium to very coarse, SAND, some angular to sub–angular gravel, some silt, wet. Faint tar–like odor noted (GP)				Slight/ Faint	
			20.0 ppm		Note: Recovered 1.17' of wash in 76–79' interval. Driller is having problems with sand blow–in.					
79–82	41 12 9 22	100	0.5 ppm		79.0–79.9: Brown, medium to coarse GRAVEL, some fine to medium sand, some silt, very wet. Faint tar–like odor. (GP)					
			0.7 ppm	80	79.9–80.8: Brown, fine to medium, SAND, some silt, very wet. Faint tar–like odor noted. Slight sheen. (SP)					–70
					80.8–82.0: Brown to light brown, medium to coarse GRAVEL, some fine to coarse sand, wet. Slight tar–like odor noted. Slight sheen at top of the interval. (GP)					
82–84	50 40 43 21	0	2.4 ppm		82.0–84.0: WASH (Brown, fine to medium sand, trace silt, trace gravel, wet. Slight tar–like odor noted. (UN)				Slight/ Faint	
			0.5–0.1 ppm		84.0: End of Boring. NOTE: Driller unable to advance the roller bit down to depth. Shards of metal are coming out of the wash water. Driller believes that the bottom of the casing is not circular causing the bit to grind against the casing. Upon removal of the casing, the next to last section of casing was severly ground by the roller bit.					

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-21

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 02/24/99	Date Completed: 02/24/99
Remarks: Sunny, slightly breezy, cold (~30 F). Depth to groundwater approx. 3'.		Ground Elevation: 12.99'	Datum: NGVD
		Contractor: ADT	Total Depth: 12.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
					Note: Hand augered first 3' due to high pressure gas mains.				
					0.0–1.0: Brown to red–brown, silty fine SAND, non–cohesive, dry. (FI)				
					1.0–3.0: FILL, (Red to red–brown, fine to medium sand, some silt, some clinker, some concrete), slightly moist. (FI)			No Odors	
3–7		60	2–3 ppm		3.0–6.0: Red–brown to brown, fine to medium, SAND, some silt, wet. Slight tar–like odor. (FI)			Slight	10
			151 ppm		6.0–6.75: Brown to black, fine to medium SAND, some silt, wet. Black staining. Strong tar–like odor. (FI)	5–7 ft.	+ +	Strong	
7–11		48			6.75–7.0: FILL, (Red, SILT with gravel, some fine sand, clinker, wet). Moderate tar–like odor. Black stained. (FI)		+		
			32.0 ppm		7.0–10.0: Red to red–brown, fine to very fine SAND, some silt, wet. Slight to moderate tar–like odor. (FI)			Moderate	
			32.0 ppm	10	10.0–10.5: Grey to dark grey, very coarse SAND, some fine gravel, some silt. Slight tar–like odor. Tar–stained. (FI)		+	Slight	
11–12		10			10.5–12.0: FILL, (Red–brown, silty, fine SAND, wood pieces, wet.) Moderate to strong tar odor. Tar–stained wood fragments. (FI)		+ + + +	Strong	
			152.0 ppm		12.0: Geoprobe refusal at 12.0'. End of Boring.				
					Note: Offset 3 feet and commence drilling. Refusal at approximately 8'. Piece of wood in the tip of the spoon, pine and sweet odor.				0

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-22

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 02/25/99	Date Completed: 03/01/99
Remarks: Sunny, slightly breezy, (~30 F) Steven Wallett logged SB-22 30-57'		Ground Elevation: 11.76'	Datum: NGVD
		Contractor: ADT	Total Depth: 61.00'
		Drilling Method: Geoprobe and Hollow Stem Auger	
		Logged By: A.Brey/S.Wallet	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
					0.0-1.5: Brown to red-brown, silty-SAND, some fine to medium sub-rounded gravel, non-cohesive, dry. (FI)			None	
2-4	4 3 4 5	35	2.1 ppm		1.5-2.5: FILL,(Black, medium to coarse SAND, some silt, some gravel, wood particles). Stained. (FI)	2-3 ft.	+ +		10
					2.5-3.0: FILL, (Medium to coarse, angular GRAVEL, some medium to coarse sand, trace silt, wet.)Strong tar-like odor. Tar-saturated. (FI)				
					3.0-4.0: FILL, (Bentonite from previous geoprobe run, trace industrial fill). (FI)				
4-4.2	51 R2	10	2.7 ppm		4.0-4.5: FILL, (Dark brown, sand and gravel mixture). Light tar-like odor. Black tar staining noted.) (FI)				
					4.5-6.0: Auger refual. Auger through to 6.0'. Brick and concrete cuttings. (Possible structure)			Slight	
6-8	3 2 3 2	95	3.3 ppm		6.0-8.0: FILL, (Dark red, fine SAND and SILT, dark brown, silty clay stringer at 7.75'. Slight tar-like odor. (FI)				
			45 ppm						
8-10	2 2 1 3	55	6.9-7.2 ppm		8.0-10.0: Dark gray to black, CLAY, some mottling, dense, pliable, some organics(leaves and roots). Moderate tar-like (sweet) odor. Some staining. (OL)		+ + + + + +		
			170 ppm						
10-12	4 4 5 4	90	89.0 ppm	10	10.0-11.0: Red-brown, fine SAND and SILT, trace fine gravels and coarse sand. Moderate tar-like odor. (SM)			Moderate	
			7.8 ppm		11.0-12.0: Dark brown, SAND, SILT matrix, trace coarse sand, trace gravel. Light to moderate tar-like odor. (GM)				0
12-14	5 4 5 6	75	35.0 ppm		12.0-16.3: Brown/Red, fine SAND and SILT matrix, trace coarse sand, trace gravel. Slight tar-like odor. (SM)				
			124.0 ppm					Slight	
14-16	8 10 14 16	35	94-97 ppm						

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-22

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 02/25/99	Date Completed: 03/01/99
Remarks: Sunny, slightly breezy, (~30 F) Steven Wallett logged SB-22 30-57'		Ground Elevation: 11.76'	Datum: NGVD
		Contractor: ADT	Total Depth: 61.00'
		Drilling Method: Geoprobe and Hollow Stem Auger	
		Logged By: A.Brey/S.Wallet	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
16-18	7 7 9 8	65			16.0: Broken SANDSTONE in the tip of the spoon. Slight tar-like odor. (SM)					
			95-169 ppm		16.3-20.0: Brown, medium to coarse, SAND, some fine gravel, saturated. Light tar-like odor. (GW)				Slight	
18-20	7 6 5 8	35			18.0-20.0: Light tar-like odor. Moderate (rainbow) sheen in coarse sand sections.					
			27-67 ppm							
20-22	7 6 5 8	55	361.0 ppm	20	20.0-20.75: Brown, medium to coarse SAND, some fine gravel, saturated. Heavy sheen and some tar in sand and gravel. (GW)	20-21 ft.				
			54.0 ppm		20.75-22.0: Brown, fine SAND and SILT, some very fine trace gravel, tight. Moderate tar-like odor. (GM)					-10
22-24	7 6 6 7	75			22.0-24.0: Brown, fine SAND and SILT, some coarse sand, some gravel, tight. Moderate tar-like odor. One coarse gravel with tar product and sheen. (GM)				Moderate	
			69-294 ppm							
24-26	51 R/5"	67	301.0 ppm		24.0-25.0: Same as 22-24. Tar-stained and tar saturated with sheen. (GM)					
			1100 ppm		25.0-26.0: Coarse SAND and GRAVEL. Strong tar-like odor. Saturated with tar (runny-black liquid). (GW)					
					Note: Auger refusal at approximately 25.0'. Augered past refusal, drilling in rock material. Pulled the center plug and augers filled with blow-in to 15.0'.				Strong	
29-31	NA NA NA NA	0			29.0-31.0: NO RECOVERY.					

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-22

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 02/25/99	Date Completed: 03/01/99
Remarks: Sunny, slightly breezy, (~30 F) Steven Wallett logged SB-22 30-57'		Ground Elevation: 11.76'	Datum: NGVD
		Contractor: ADT	Total Depth: 61.00'
		Drilling Method: Geoprobe and Hollow Stem Auger	
		Logged By: A.Brey/S.Wallet	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
31-33	7 9 10 13	75	40-50 ppm		31.0-31.25: Coarse, GRAVEL. Tar-stained. (GW) 31.25-32.6: Brown, fine SAND and SILTS, some clays, some fine to medium clean gravel. (SM)				-20
33-35	5 5 7 9	40	900.0 ppm 250.0 ppm		32.6-34.0: Fine, SAND, fractured cobbles, wet. Saturated with tar.(SW) 34.0-39.8: Brown, fine SAND and SILT, some fine to coarse gravel, trace clays, low moisture, cobbles 1-15". Strong tar-like odor. (GM)			Strong	
35-37	8 11 11 13	40	60-675 ppm						
37-39	8 7 9 11	50	100.0 ppm						
39-41	8 9 12 15	50	200.0 ppm 900 ppm	40	39.8-43.0: Coarse, GRAVEL. TAR. (GW)			Strong	
41-43	NA NA NA NA	50	100.0 ppm 60-300 ppm						-30
43-45	8 7 3 6	50	20-250 ppm		43.0-49.0: Fine, SAND and SILT, some fine to medium gravel. Strong to moderate tar-like odor. (GM)			Moderate to Strong	

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-22

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 02/25/99	Date Completed: 03/01/99
Remarks: Sunny, slightly breezy, (~30 F) Steven Wallett logged SB-22 30-57'		Ground Elevation: 11.76'	Datum: NGVD
		Contractor: ADT	Total Depth: 61.00'
		Drilling Method: Geoprobe and Hollow Stem Auger	
		Logged By: A.Brey/S.Wallet	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
45-47	7 9 12 15	20	5-65 ppm						Moderate to Strong	
47-49	12 12 14 14	25	6-60 ppm							
49-51	NA NA NA NA	60	100-382 ppm	50	49.0-51.0: Fine, SAND and SILT, some fine to medium gravel, 0.2' layer of fine SAND of serpentine. Strong tar-like odor noted. Tar stained/saturated sand layer. (GM)					
51-53	26 28 30 27	0			51.0-53.0: NO RECOVERY.				Strong	-40
53-55	10 30 51 R/3"	20	70-80 ppm		53.0-55.0: Reddish-brown, fine, SAND and SILT, cobble fragments in tip of spoon. Moderate tar-like odor. (SM)				Moderate	
55-57		0			55.0-57.0: Spoon refusal. Roller bit to 57' bgs.					
57-59	8 72 R/2	0			57.0-59.0: Spoon refusal at 57.7' bgs No recovery. Mud rotary set-up; Drill and wash to 59' bgs.				Unknown	
59-61	51 R/2	0			59.0-61.0: Spoon refusal. No recovery. Drill and wash to 61' bgs.					

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-22

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 02/25/99	Date Completed: 03/01/99
Remarks: Sunny, slightly breezy, (~30 F) Steven Wallett logged SB-22 30-57'		Ground Elevation: 11.76'	Datum: NGVD
		Contractor: ADT	Total Depth: 61.00'
		Drilling Method: Geoprobe and Hollow Stem Auger	
		Logged By: A.Brey/S.Wallet	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
									Unknown	
					61.0: Attempt spoon at 61' bgs. Cobbles fall back in hole. Terminate drilling at SB-22 due to limitations of the drilling method.					-50
				70						-60

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-23

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 03/02/99	Date Completed: 03/11/99
Remarks: Partly cloudy, breezy (10–15 mph), cold (30F) Groundwater at approx. 2' bgs.		Ground Elevation: 10.31'	Datum: NGVD
		Contractor: ADT	Total Depth: 111.00'
		Drilling Method: Geoprobe and Hollow Stem Auger	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0–4	NA	31	0.0 ppm		0.0–0.25: ASPHALT.(AS) 0.25–2.0: Red to red–brown, fine to medium, SAND, moist. (FI)	-				10
			0.0 ppm		2.0–4.0: Brown to black, FILL, (ash, coal fragments, brown fine to medium sand, silt). (FI)					
4–8	NA	100	0.0 ppm		4.0–5.3: Black to dark brown, very coarse, SAND, some gravel, some white fragments (fill), non–cohesive, wet. (GP)				None	
			0.0 ppm		5.3–6.6: Red to reddish–brown, SILT, some fine to medium sand, some gravel, moist. (ML)	4–8 ft.				
					6.6–8.0: Dark brown, clayey–SILT, moist, cohesive, slightly plastic. (ML)					
8–12	NA	100	0.0 ppm		8.0–9.3: Olive–green to gray, CLAY, some silt, plastic, cohesive, moist. (CL)					
			4.0 ppm	10	9.3–10.6: Olive–green to red–brown, fine to medium SAND, some silt, non–cohesive, orange mottling, moist. Slight naphtha–like odor. (SM)				Slight Naphtha	0
			2.7 ppm		10.6–12.0: Brown, silty–fine SAND, some fine gravel, slightly cohesive, moist. (GM)					
12–16	NA	31	0.0 ppm		12.0–12.8: Dark gray, CLAY, moist to very moist, plastic, cohesive. (CL)					
					12.8–14.2: Red to red–brown, SILT–SAND–GRAVEL mixture, dense, cohesive, slightly moist. (GM)				None	
			0.0 ppm		14.2–14.5: Gray, CLAY, moist to very moist, plastic, cohesive. (CL)					

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-23

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 03/02/99	Date Completed: 03/11/99
Remarks: Partly cloudy, breezy (10-15 mph), cold (30F) Groundwater at approx. 2' bgs.		Ground Elevation: 10.31'	Datum: NGVD
		Contractor: ADT	Total Depth: 111.00'
		Drilling Method: Geoprobe and Hollow Stem Auger	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
					14.5-16.7: Red to red-brown, SILT-SAND-GRAVEL mixture, dense, cohesive, moist to wet. (GM)					
16-20	NA	46	0.0 ppm		16.7-17.4: Green-olive, crushed crystalline ROCK, moist. (GM)					
			0.0 ppm		17.4-20.0: Red to red-brown, SILT-SAND-GRAVEL mixture, dense, cohesive, slightly plastic, moist. (GM)					
20-24	NA	25	0.0 ppm	20	20.0-23.0: Red to red-brown CLAY-SILT-SAND-GRAVEL mixture, dense, slightly cohesive, slightly plastic, very moist. Large olive-green crystalline rock observed in split-spoon. (GM)				None	-10
					23.0-24.0: Red to red-brown, fine to medium, SAND, some silt, some gravel, non-cohesive, moist. (GM)					
24-26	2 5 2 8	0			24.0-26.0: NO RECOVERY, all is WASH (red to red-brown fine to medium SAND, some silt, some fine to medium angular gravel, very wet. (UN)					
			0.0 ppm		26.0-29.0: Augered through to 29.0 feet. No sample collected.(UN)				Unknown	
29-31	6 7 12 5	46			29.0-31.0: Red to red-brown, fine, SAND-SILT-CLAY-GRAVEL mixture, dense, slightly moist, cohesive. (GM)	29-31 ft.			None	

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-23

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 03/02/99	Date Completed: 03/11/99
Remarks: Partly cloudy, breezy (10–15 mph), cold (30F) Groundwater at approx. 2' bgs.		Ground Elevation: 10.31'	Datum: NGVD
		Contractor: ADT	Total Depth: 111.00'
		Drilling Method: Geoprobe and Hollow Stem Auger	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			0.0 ppm			29-31 ft.				-20
					31.0–34.0: Augered through to 34.0 feet. No sample collected. (UN)				Unknown	
34–36	6 10 10 10	75	0.0 ppm		34.0–36.0: Same material as 29.0–31.0 foot interval, moist. (GM)				None	
					36.0–39.0: Augered through to 39.0 feet. No sample collected.(UN)				Unknown	
39–41	8 13 15 17	33	0.0 ppm	40	39.0–41.0: Same material as 29.0–31.0 foot interval, however, trace more sand than previous, moist. Large rocks encountered at 39.5, 40.0 and 41.5 feet. (GM)				None	-30
					41.0–44.0: Augered through to 44.0 feet. No sample collected. (UN)				Unknown	
44–46	68 21 15 7	50			44.0–46.0: Same material as 29.0–31.0 foot interval, slightly moist. Large rock encountered at 45.5 feet. (GM)				None	

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-23

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 03/02/99	Date Completed: 03/11/99
Remarks: Partly cloudy, breezy (10-15 mph), cold (30F) Groundwater at approx. 2' bgs.		Ground Elevation: 10.31'	Datum: NGVD
		Contractor: ADT	Total Depth: 111.00'
		Drilling Method: Geoprobe and Hollow Stem Auger	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			0.0 ppm						None	
					46.0-49.0: Augered through to 49.0 feet. No sample collected.(UN)				Unknown	
49-51	9 17 12 18	25			49.0-51.0: Red to red-brown, silty-fine SAND, some gravel (possible wash), wet. (SP)					
			0.0 ppm	50					None	-40
					51.0-54.0: Augered through to 54.0 feet. No sample collected.(UN)				Unknown	
54-56	27 50 45 41	21			54.0-56.0: Red to red-brown, fine to medium, SAND, trace silt, non-cohesive, very moist. (SW)					
			0.0 ppm						None	
					56.0-59.0: Augered through to 59.0 feet. No sample collected.(UN)				Unknown	
59-61	10 9 10 12	50			59.0-61.0: Brown, fine to medium SAND, fine to medium gravel, some silt, non-cohesive, moist. (GM)				None	

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-23

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 03/02/99	Date Completed: 03/11/99
Remarks: Partly cloudy, breezy (10–15 mph), cold (30F) Groundwater at approx. 2' bgs.		Ground Elevation: 10.31'	Datum: NGVD
		Contractor: ADT	Total Depth: 111.00'
		Drilling Method: Geoprobe and Hollow Stem Auger	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
									None	-50
					61.0–64.0: Augered through to 64.0 feet. No sample collected.(UN)				Unknown	
64–66	12 13 10 9	58			64.0–64.9: Red–brown, silty–gravelly, medium to coarse, SAND, non–cohesive, moist. (GM)				None	
			4.0 ppm		64.9–66.0: Red–brown, medium to coarse, SAND, some sub–angular gravel, some silt, little clay, non–cohesive, moist. (GP)					
					66.0–69.0: Augered through to 69.0 feet. No sample collected.(UN)				Unknown	
69–71	17 18 18 20	58			69.0–69.9: Red–brown silt, fine to medium SAND, some subangular gravel, cohesive, moist. Slight tar–like odor. (SM)					
			28–62 ppm	70	69.9–70.1: Fine to medium SAND, wet. Moderate tar–like odors and sheen noted. (SW)					-60
					70.1–71.0: Red–brown silty SAND, trace clay, slightly moist. Slight tar–like odors. (SM)					
71–73	4 8 19 22	46			71.0–72.1: Red to red–brown silty, fine to medium SAND, some gravel, moist to wet. Slight tar–like odors and sheen noted. (GM)				Slight to Moderate	
			50 ppm		72.1–73.0: Same material as noted above (71.0–72.1 foot interval). (GM)					
73–75	30 25 30 21	50	10 ppm		73.0–74.9: Red to red–brown, silty–fine SAND, some fine to medium gravel, slightly–moist, slightly cohesive, trace clay. Slight tar–like odors and sheen. (GM)					
			4–12 ppm							

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-23

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 03/02/99	Date Completed: 03/11/99
Remarks: Partly cloudy, breezy (10-15 mph), cold (30F) Groundwater at approx. 2' bgs.		Ground Elevation: 10.31'	Datum: NGVD
		Contractor: ADT	Total Depth: 111.00'
		Drilling Method: Geoprobe and Hollow Stem Auger	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
75-77	7 12 23 20	75	40-50 ppm		74.9-75.0: Light brown, very fine SAND and SILT, slightly moist. (ML) 75.0-77.0: Red-brown, silty- fine SAND, trace clay, some fine to medium angular to sub-angular gravel, wet. Slight to moderate tar-like odors and slight sheen. (GP)				Moderate	
77-79	10 17 20 27	88	20 ppm 124 ppm		77.0-77.5: Red-brown, silty-fine SAND, some gravel, moist to very moist. Slight to moderate naphtha-like odor. (GM) 77.5-78.3: Brown, medium to coarse, well-sorted SAND, some silt, non-cohesive, wet. Moderate naphthalene odor and sheen noted. (SW)				Strong	
79-81	17 16 17 30	0		80	78.3-79.0: Brown to gray, coarse to very coarse, GRAVEL, fine to coarse sand, trace silt, very wet. Strong tar-like odors and moderate irridescent sheen noted. (GP) 79.0-81.0: NO RECOVERY. (UN)				Unknown	-70
81-83	3 5 9 9	0	34 ppm		81.0-85.0: NO RECOVERY. Slight-moderate tar-like odors and slight sheen. (UN)					
83-85	NA NA NA NA	0	75 ppm						Moderate	
85-86	34 39	21			85.0-87.0: Red-brown to brown, medium to coarse, SAND, trace silt, some medium to coarse gravel, wet. Faint tar-like odor. (GM)					
87-89	26 24 15 15	42	82-87 ppm		87.0-92.0: Red-brown, medium to coarse, SAND, trace to some silt, some fine to medium gravel, wet. Faint to slight tar-like odor. (GM)				Faint	

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-23

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 03/02/99	Date Completed: 03/11/99
Remarks: Partly cloudy, breezy (10–15 mph), cold (30F) Groundwater at approx. 2' bgs.		Ground Elevation: 10.31'	Datum: NGVD
		Contractor: ADT	Total Depth: 111.00'
		Drilling Method: Geoprobe and Hollow Stem Auger	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
90–92	12 22 14 12	50	10–17 ppm						Faint	–80
92–94	7 12 14 16	54	130 ppm		92.0–93.2: Brown, fine to medium, SAND, trace silt, wet. slight to moderate tar–like odor. Tar stain and sheen. (SW) 93.2–94.0: Brown, medium to coarse SAND, some silt, some gravel, weathered rock. Slight to moderate tar–like odor. (SM)	92–94 ft.			Slight to Moderate	
94–96	8 10 15 15	63	30–40 ppm 10–40 ppm		94.0–100.0: Brown, fine to coarse SAND, trace to some silt, some fine sub–angular gravel, wet. Faint tar–like odors. (SP)					
96–98	6 9 11 14	50	10–20 ppm							
98–100	5 7 11 15	63	8–10 ppm						Faint/ Slight	
100–102	NA NA NA NA	75	20–50 ppm	100	100.0–111.0: Brown, fine to coarse, well–sorted SAND, trace silt, trace gravel, non–cohesive, moist. Faint to slight tar–like odors noted. (SW)					–90
102–104	9 12 12 12	50	19–35 ppm							
104–106	NA 12 17 24	100								

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-23

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 03/02/99	Date Completed: 03/11/99
Remarks: Partly cloudy, breezy (10–15 mph), cold (30F) Groundwater at approx. 2' bgs.		Ground Elevation: 10.31'	Datum: NGVD
		Contractor: ADT	Total Depth: 111.00'
		Drilling Method: Geoprobe and Hollow Stem Auger	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			4–13 ppm							
106–108	4 6 11 19	67								
			3–15 ppm						Faint/ Slight	
109–111	13 13 14 25	100								
			5–15 ppm	110		109–111 ft.				10
					111.0: End of Boring.					

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-36

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 03/02/99	Date Completed: 03/02/99
Remarks: Sunny, high clouds, warm (~50 F), 15mph winds. Groundwater at approx. 10' bgs.		Ground Elevation: 10.02'	Datum: NGVD
		Contractor: ADT	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0–4		48	0.0 ppm		0.25' ASPHALT 0.25–0.9: FILL, (red brick, fine to medium sand and silt, rock fragments). (FI) 0.9–4.0: Red to red–brown, fine SAND, some silt, some gravel, trace clay, dense, slightly moist. Slightly cohesive. (GM)					10
			0.0 ppm						No Odors	
4–8		33	0.0 ppm		4.0–6.0: FILL, (Red brick, silt, and fine sand.) (FI)					
			0.0 ppm		6.0–10.0: Olive–green, CLAY, dense, cohesive plastic, some silt and red–brown mottles. Slightly moist. Slight septic odor (6'–8'). (CL)	4–8 Ft.			Slight Septic Odors	
8–12		54	0.0 ppm							
			0.0 ppm	10	10.0–12.0: Brown, fine to medium, silty SAND some gravel, very moist. (SM)				No Odors	0
12–16		43	0.0 ppm		12.0–12.75: Olive green to brown, silty–CLAY plastic, very wet. (CL) 12.75–16.0: Brown, fine to medium SAND, some silt and gravel, wet. (SM)					
			0.0 ppm							

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-36

GEI Consultants, Inc.

ent: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 03/02/99	Date Completed: 03/02/99
Remarks: Sunny, high clouds, warm (~50 F), 15mph winds. Groundwater at approx. 10' bgs.		Ground Elevation: 10.02'	Datum: NGVD
		Contractor: ADT	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
16-20		32	0.0 ppm		16.0-20.0: Red to red-brown, SAND, SILT, CLAY, some fine to medium gravel, dry to slightly moist. (SM)					
			0.0 ppm			16-20 Ft.			No Odors	
				20	20.0: End of boring. Note: Driller lost 20-24' interval from the macro-sampler.					-10

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-40

GEI Consultants, Inc.

Client: Clifton, Staten Island, NY			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 07/27/99	Date Completed: 07/27/99
Remarks: 140 lb. hammer with 2" pit spoons used. Borehole grouted and abandoned.		Ground Elevation: 12.83'	Datum: NGVD
		Contractor: ADT	Total Depth: 18.20'
		Drilling Method: Hollow Stem Auger	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
0-2	40 40 23 50	80	127 ppm		0.0-2.0: Brown-light to brown, fine silty-SAND, non-cohesive, loose, dry. Slight coal tar-like odor. Black staining at 0.9'. (SM)		+	Slight	
2-4	14 17 12 12	65	429 ppm		2.0-4.0: Brown to dark brown, SILT and SAND, trace gravel, coal, brick and concrete fragments, non-cohesive, loose, dry. Moderate naphtha-like odor and slight sheen. (SM)			Moderate	10
4-6	4 5 3 3	45	1500 ppm		4.0-6.0: Brown, fine SAND, some silt, some sub-angular gravel slightly cohesive, loose, moist. Strong tar-like odor. Tar is evident throughout sample. (SM)	4-6 ft.		Strong	
6-8	2 2 3 2	55	1299 ppm		6.0-8.0: Red-brown, fine silty-SAND, trace medium gravel, cobble, soft, cohesive. Strong tar -like odor. Tar present in layers. (SM)				
8-10	6 5 4 4	65	656 ppm		8.0-10.0: Brown, fine sandy-SILT, soft, cohesive, moist. Slight coal tar-like odor. (SM)			Slight	
10-12	3 4 5 27	70	2489 ppm	10	10.0-12.0: Red to Red brown, fine to medium silty-SAND, trace yellow and red brick fragments, moist. Moderate to strong tar-like odors. Taffy-like black tar below 11'. (SM)			Moderate to Strong	
12-14	NA	50	1115 ppm		12.0-14.0: Gray-brown, sandy-SILT, soft, cohesive, moist. Slight to moderate tar-like odors. (SM)			Slight to Moderate	0
14-16	10 30 51 R/4"	50			14.0-16.0: Gray, clayey-SILT, cohesive, moist to wet. Slight tar-like odors. Tar blebs and sheen apparent. (SC)				

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-40

GEI Consultants, Inc.

Client: Clifton, Staten Island, NY	
Project Number: 98248	Project Name: Clifton Former MGP
Remarks: 140 lb. hammer with 2" plit spoons used. Borehole grouted and abandoned.	

Date Started: 07/27/99	Date Completed: 07/27/99
Ground Elevation: 12.83'	Datum: NGVD
Contractor: ADT	Total Depth: 18.20'
Drilling Method: Hollow Stem Auger	
Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			318 ppm							
16-18	3 4 3 4	45			16.0-18.0: Gray and brown, fine silty-SAND, trace brick, glass and coal fragments, cohesive, very moist. Slight to moderate tar odors. Tar coated grains and tar present in discrete layers. (SM)	16-18 ft.			Slight to Moderate	
			1500 ppm							
18-18.2	51 R/2"	100	2478 ppm		18.0: Spoon refused after 2". Black, viscous tar mixed with very soft SILT and concrete chips. (CR) Holder bottom estimated at 18' bgs.	18-20 ft.			Strong	
					18.0: End of Boring.					
				20						10

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-41

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 07/28/99	Date Completed: 07/28/99
Remarks: Hot, humid, high expected 80's to 90's. Depth to groundwater approximately 9'. Three inch split spoons used. Borehole was grouted and abandoned.		Ground Elevation: 13.04'	Datum: NGVD
		Contractor: ADT	Total Depth: 30.00'
		Drilling Method: Hollow Stem Auger	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
0–2	35 23 23 22	90	1.1 ppm		0.0–2.0: Brown to light brown, fine to medium, silty–fine SAND (FILL), some coal fragments, coal dust, brick fragments, and angular cobbles, non–cohesive, loose, dry. Faint coal tar–like odor. (FI,SM)			Faint	
2–4	10 12 18 18	50	0.7 ppm		2.0–4.5: Brown to light brown, fine, silty–SAND, trace to some medium to coarse angular gravel, non–cohesive, loose, dry. (SM)				10
4–6	5 7 8 9	75	0.7 ppm		4.5–6.0: Red–brown, SILT, some fine sand and angular to sub–angular gravel, trace cobble, non–cohesive, soft, moist. (SM)				
6–8	9 7 8 7	90	0.5 ppm		6.0–8.0: Red–brown, SILT, SAND, and fine to medium GRAVEL, trace cobble, non–cohesive, medium dense. (GM)			None	
8–10	5 8 12 17	65	0.5 ppm		8.0–14.0: Red–brown, SILT, SAND and fine to medium GRAVEL, cohesive, dense to very dense. (GM) Groundwater at approx 9'–10' bgs.				
10–12	6 8 12 20	80	0.5 ppm	10		10–12 ft.			
12–14	6 12 17 19	20			Note: Auger refusal at 12'. Offset approximately 5' towards the gate and commenced sampling.			None	0
14–16	4 7 12 15	70			14.0–18.0: Red–brown, SILT, some sand and fine to coarse gravel, cohesive, non–plastic, moderate stiff to stiff, moist. (GM)				

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-41

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 07/28/99	Date Completed: 07/28/99
Remarks: Hot, humid, high expected 80's to 90's. Depth to groundwater approximately 9'. Three inch split spoons used. Borehole was grouted and abandoned.		Ground Elevation: 13.04'	Datum: NGVD
		Contractor: ADT	Total Depth: 30.00'
		Drilling Method: Hollow Stem Auger	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			0.3 ppm							
16-18	12 15 32 22	70	0.3 ppm						None	
18-20	38 15 18 15	75	31.9 ppm		18.0-20.0: Red-brown, fine to medium, silty-SAND, some fine to coarse gravel, slightly-cohesive, dense, moist to wet. Slight naphtha-like odor. (SM)	18-20 ft.				
20-22	5 11 20 26	80	21.6 ppm	20	20.0-22.0: Red-brown, SILT, some fine sand, little fine to medium gravel, slightly-cohesive, non-plastic, stiff. Slight naphtha-like odor. (SM)					
22-24	12 22 30 38	50	29.1 ppm		22.0-24.0: Red-brown, SILT with fine to medium SAND, trace fine to coarse gravel, slightly-cohesive to non-cohesive, non-plastic, medium dense, moist. Slight naphtha-like odor. (SM)				Slight	-10
24-26	11 30 28 25	55	29.4 ppm		24.0-28.0: Red-brown, fine to medium SAND and SILT, trace angular gravel, slightly-cohesive, non-plastic, medium dense, moist. Slight naphtha-like odor. (SM)					
26-28	15 21 32 30	55	34.0 ppm							
28-30	20 20 22 28	48	444.0 ppm		28.0-30.0: Red-brown, SILT, trace fine sand and angular gravel, large cobble, non-cohesive, medium dense, moist. Strong coal tar-like odor. Tar coated grains.(ML)	28-30 ft.			Strong	
					30.0: End of Boring.					

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-43

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 07/28/99	Date Completed: 07/28/99
Remarks: Hot, humid, high expected in the 90's. Depth to groundwater is approximately 6'. Three inch split spoons used. Borehole grouted and abandoned.		Ground Elevation: 12.13'	Datum: NGVD
		Contractor: ADT	Total Depth: 30.00'
		Drilling Method: Hollow Stem Auger	
		Logged By: David Terry	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
0-2	33 15 15 15	30	1.1 ppm		0.0-3.0: Red-brown, fine to medium, sandy-SILT, some fine to medium gravel, large green-yellow coated rock (sandstone)in tip of spoon, dry. (SM)			None	
2-4	18 11 11 12	90	1.3 ppm		3.0-4.0: Red-brown, SILT, trace sand, cohesive, non-plastic, rock pieces, stiff, dry. Slight petroleum odor. (ML)			Slight	10
4-6	8 8 6 5	40	1.1 ppm		4.0-6.0: Red-brown, SILT, some medium to coarse gravel (TILL), cohesive, medium stiff, moist. (GM)			None	
6-8	2 3 7 12	50	332 ppm		6.0-8.0: Red-brown, sandy-SILT, some coarse gravel, very soft, wet. Naphtha-like odor. Heavy sheen and grey stained. (SM)	6-8 ft.	+	Slight	
8-10	6 3 3 5	54	511 ppm		8.0-10.0: Red-brown, sandy-SILT, little medium gravel, very soft, wet. Strong naphthalene odor. Heavy sheen noted throughout.(SM)				
10-12	2 3 3 4	65	546 ppm	10	10.0-12.0: Red-brown, sandy-SILT, little fine to medium gravel, non-plastic, cohesive, wet. Strong naphthalene odor. Black-stained, heavy sheen and trace tar blebs throughout. (SM)		+	Strong	
12-14	2 3 3 4	65	748 ppm		12.0-14.0: Red-brown, sandy-SILT, little fine to medium gravel, cohesive, non-plastic very soft, wet. Strong naphthalene odor. Black to gray stained, heavy sheen and tar coated grains. (SM) 14.0-16.0: Red-brown, sandy-SILT, little fine to medium gravel, cohesive, non-plastic, very soft, wet. Strong naphthalene odor. Very heavy sheen, free product tar blebs throught spoon, grains completely coated with tar. (SM)		+		0
14-16	3 5 5 10	70							

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-43

GEI Consultants, Inc

ent: Keyspan Energy

Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 07/28/99	Date Completed: 07/28/99
Remarks: Hot, humid, high expected in the 90's. Depth to groundwater is approximately 6'. Three inch split spoons used. Borehole grouted and abandoned.		Ground Elevation: 12.13'	Datum: NGVD
		Contractor: ADT	Total Depth: 30.00'
		Drilling Method: Hollow Stem Auger	
		Logged By: David Terry	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			973 ppm							
16-18	7 10 13 7	30	678 ppm		16.0-18.0: Grey-brown, sandy-SILT, one piece of coarse-grained sandstone, very soft, cohesive, wet. Strong naphthalene odor. Heavy sheen. (SM)				Strong	
18-20	2 2 3 7	70	1225 ppm		18.0-20.0: Gray to red-brown, sandy-SILT, little medium to coarse gravel, verysoft, non-plastic, cohesive, wet. Very strong naphthalene odor. Nearly tar saturated, free product tar blebs in void spaces an coating the entire soil matrix. (SM)					
20-22	3 3 5 7	75	1605 ppm	20	20.0-24.0: Gray-green, sandy-SILT, little gravel, soft, wet. Heavy sheen, free product tar throughout in void spaces. (SM)				V. Strong	
22-24	8 8 8 10	30	1481 ppm							-10
24-26	8 10 10 14	60	615 ppm		24.0-28.0: Red-brown, sandy-SILT, little fine to medium gravel, medium stiff, wet. Moderate naphthalene odor. Slight sheen, few blebs around pockets of coarser-grained matrix.(SM)					
26-28	13 15 19 19	75	1286 ppm						Moderate	
28-30	20 20 30 30	80	2383 ppm		28.0-30.0: Red-brown, sandy-SILT, little gravels, dense. Strong naphthalene odor. Few tar blebs and tar layer 29.5-29.7. (SM)	28-30 ft.			V. Strong	
					30.0: End of Boring.					

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-44

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 07/26/99	Date Completed: 07/27/99
Remarks: Hot, calm, sunny, high expected in 90's. Depth to groundwater approximately 9.0'. Three inch split spoons used. Borehole was grouted and abandoned.		Ground Elevation: 11.09'	Datum: NGVD
		Contractor: ADT	Total Depth: 31.00'
		Drilling Method: Hollow Stem Auger	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0-1	99 R	0			0.0-3.0: Split spoon refusal and no sample recovery. Augered to 3' and commenced sampling. Sulfur-like odor (possible purifier-like odor) noted during augering.	-			None	10
1-3	99 R	0								
3-5	6 12 10 6	60			3.0-3.5: Brown-tan, SILT, trace clay, loose, cohesive, moist. Trace coal tar-like odor. (SM)	3-5 ft.			Trace	
			2.0 ppm		3.5-5.0: Gray to brown, fine, sandy-SILT, some sub-angular gravel, non-cohesive loose, dry. (SM)				None	
5-7	18 32 27 15	90			5.0-6.0: Gray-brown, SILT, trace fine sand, and fine gravel (fill), trace red and brown brick fragments, cohesive, loose, moist. Faint burnt odor and unknown petroleum odors. Black stain at 6.0'. (GM)			+	Faint Burnt Odor	
			0.6 ppm		6.0-7.0: Red-brown, SILT, fine GRAVEL and fine SAND mixture, cohesive, dense. (GM)				None	
7-9	15 20 18 18	70			7.0-9.0: Gray and red-brown, SILT, some fine sand and sub-rounded medium to coarse gravel, slightly-cohesive, very soft, moist. Faint unknown odor. (SM)				Faint Unknown Odor	
			0.1 ppm							
9-11	19 21 45 40	70			Note: Groundwater approx. 9' bgs. 9.0-11.0: Gray to red-brown, fine to medium SAND, trace medium sub-rounded gravel, slightly-cohesive, stiff. (SW)					
			0.1 ppm	10						
11-13	18 35 32 41	5			11.0-13.0: Brown-gray, SILT, some fine to medium sand, non-cohesive, loose, wet. (SM)				None	0
			0.0 ppm							
13-15	10 13 15 22	60			13.0-15.0: Red-brown, SILT, some fine sand, trace coarse gravel, cohesive, stiff, moist. (SM)					
			0.0 ppm							

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-44

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 07/26/99	Date Completed: 07/27/99
Remarks: Hot, calm, sunny, high expected in 90's. Depth to groundwater approximately 9.0'. Three inch split spoons used. Borehole was grouted and abandoned.		Ground Elevation: 11.09'	Datum: NGVD
		Contractor: ADT	Total Depth: 31.00'
		Drilling Method: Hollow Stem Auger	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
15–17	10 20 18 18	60	0.0 ppm		15.0–19.0: Red–brown, fine, sandy–SILT, little fine to medium gravel, cohesive, stiff, wet. (SM)					
17–19	18 23 42 50	35	0.1 ppm						None	
19–21	12 18 30 15	75	0.4 ppm	20	19.0–27.0: Red–brown, SILT, SAND and medium to coarse GRAVEL, cohesive, stiff, moist. (GM)					–10
21–23	12 15 20 34	70	0.6 ppm							
23–25	6 15 20 23	65	0.4 ppm							
25–27	6 11 16 24	90	0.4 ppm						None	
27–29	12 25 36 32	65	0.4 ppm		27.0–29.0: Red–brown, SILT and fine SAND, cohesive, soft, moist. (SM)					
29–31	18 18 25 31	55			29.0–31.0: Red–brown, SILT, fine SAND and fine to medium sub–angular GRAVEL, stiff, cohesive, moist. (GM)	29–31ft.				

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-44

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 07/26/99	Date Completed: 07/27/99
Remarks: Hot, calm, sunny, high expected in 90's. Depth to groundwater approximately 9.0'. Three inch split spoons used. Borehole was grouted and abandoned.		Ground Elevation: 11.09'	Datum: NGVD
		Contractor: ADT	Total Depth: 31.00'
		Drilling Method: Hollow Stem Auger	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			0.4 ppm		29.0-31.0: Red-brown, SILT, fine SAND and fine to medium sub-angular GRAVEL, stiff, cohesive, moist. (GM)	29-31ft.			None	-20
					31.0: End of Boring.					
				40						-30

Legend: Physical Observations

- None
- Sheen
- Stain
- Heavy

Site Id: SB-58

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 11/29/99	Date Completed: 11/29/99
Remarks: Sunny, cold ~30 F, very brisk wind Aprroximate groundwater table at 2.0 feet. NA indioctes not applicable.		Ground Elevation: 11.40'	Datum: NGVD
		Contractor: Vironex	Total Depth: 18.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0–4	NA	40	0 ppm		0.0–4.5: Red–brown to grey, FILL (silt, some fine to medium sand, trace coarse gavel and trace coal fragments, some white ash, glass fragments), moist to wet. (Fl) Approximate groundwater table at 2.0 feet below ground surface.	No Odors			0–4 ft.	10
4–8	NA	80	0.1 ppm		4.5–6.0: Grey to red–brown, FILL (fine sand, some silt, trace shells, wood fragments, brick fragments and ash) non–cohesive, non–plastic, moist. (Fl)				4–6 ft.	
			0.2 ppm		6.0–8.0: Dark grey, SILT, trace rock fragments and coarse sand, non–cohesive, non–plastic, moist. (ML)					
8–12	NA	50	0 ppm		8.0–10.0: Grey, SILT, some fine sand, trace clay, slightly cohesive, non–plastic, wet. (SM)					
				10	10.0–12.0: Red–brown, SILT, little fine sand, trace fine gravel and grey silt nodule, non–cohesive, non–plastic, dense, wet. (ML)					0
			0 ppm							
12–16	NA	50	0 ppm		12.0–16.0: Red–brown, fine to medium SAND, little coarse sand, some silt, non–cohesive, non–plastic, wet. (SM)	No Odors				

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-58

GEI Consultants, Inc.

Client: Keyspan Energy	
Project Number: 98248	Project Name: Clifton Former MGP
Remarks: Sunny, cold ~30 F, very brisk wind Aprroximate groundwater table at 2.0 feet. NA indiactes not applicable.	
Date Started: 11/29/99	Date Completed: 11/29/99
Ground Elevation: 11.40'	Datum: NGVD
Contractor: Vironex	Total Depth: 18.00'
Drilling Method: Geoprobe	
Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
16-18	NA	85	0 ppm		16.0-18.0: Red-brown, very fine to fine SAND, trace to little silt, non-cohesive,non-plastic, dense, moist to wet. (SW)	No Odors				
					18.0: Refusal at 18' bgs. End of boring.					
				20						10

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-59

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 11/29/99	Date Completed: 11/29/99
Remarks: Sunny to partly cloudy, cold, ~33 F. Approximate groundwater table at 2.0'. NA indicates not applicable.		Ground Elevation: 11.00'	Datum: NGVD
		Contractor: Vironex	Total Depth: 18.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0-4	NA	38			0.0-4.0: Dark brown to black, SILT, some fine sand, trace sub-angular gravel, trace wood fragments, non-cohesive, loose, moist to wet. (SM)					10
			0.1 ppm		Approximate groundwater table located at 2.0 feet below ground surface.	0-4 ft.			No Odors	
4-8	NA	38			4.0-6.0: Grey to dark grey, CLAY, trace to some silt, slightly plastic, moist to wet. Slight swampy odor.(CL)					
			0.3 ppm							
					6.0-8.0: Red-brown, SILT, little fine to medium sand, trace clay, non-plastic, soft, moist. (ML)					
			0.1 ppm							
8-12	NA	50			8.0-8.5: Dark grey to black-grey, fine to medium, FILL (fine to medium ash and coal fragments, trace medium sand). Saturated. (FI)					
			0.1 ppm		8.5-10.0: Red-brown to grey, silty-CLAY, slightly cohesive. (CL)	8-10 ft.				
				10	10.0-12.0: Red-brown, SILT with fine sand, trace medium to coarse sand and fine subrounded gravel, trace clay, slightly cohesive, non-plastic, wet. (SM)					0
			0.1 ppm						No Odors	
12-16	NA	25			12.0-16.0: Red-brown, SILT, trace to some clay, trace fine sand, slightly cohesive, non-plastic, moist to wet. (ML)					
			0.1 ppm							

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-59

GEI Consultants, Inc.

Client: Keyspan Energy	
Project Number: 98248	Project Name: Clifton Former MGP
Remarks: Sunny to partly cloudy, cold, ~33 F. Approximate groundwater table at 2.0'. NA indicates not applicable.	
Date Started: 11/29/99	Date Completed: 11/29/99
Ground Elevation: 11.00'	Datum: NGVD
Contractor: Vironex	Total Depth: 18.00'
Drilling Method: Geoprobe	
Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
16-18	NA	100	0.1 ppm		16.0-17.0: Red-brown, fine to medium SAND, trace silt, non-cohesive, non-plastic, loose, saturated. (SW) 17.0-18.0: Red-brown, SILT, some fine to medium sand, trace fine gravel, dense, moist. (SM) 18.0: Geoprobe refusal. End of boring.			No Odors	
				20					-10

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-60

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 11/30/99	Date Completed: 11/30/99
Remarks: Sunny to partly cloudy, cold. 32F. Approximate groundwater table at 4' bgs NA indicates not applicable		Ground Elevation: 10.96'	Datum: NGVD
		Contractor: Vironex	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0–4	NA	60			0.0–4.0: Moist, gray SILT with trace clay. Trace fine sand. Trace coal fragments. Trace ash. Non–plastic. Slightly cohesive. (FI)	0–4 ft.			No Odors	10
4–8	NA	85	0 ppm		4.0–4.5: Wet, red–brown SILT with some fine sand. Trace clay. Soft. Slightly cohesive. (SM)					
					4.5–5.0: Dry, black SILT. Crumbly. Medium dense. Non–cohesive. (ML)	4–8 ft.				
					5.0–10.0: Moist, gray–brown SILT with some clay. Orange–gray mottling. Trace fine sand. Cohesive. Non–plastic. (ML)					
8–10	NA	50								
10–12	NA	55	0.3 ppm	10						0
					10.0–12.0: Wet, red–brown SILT with some fine sand. Trace coarse sand. Trace gravel. Trace clay. Medium dense. Slightly cohesive. Non–plastic. (ML)					
12–16	NA	50	0.3 ppm		12.0–16.0: Moist, red–brown SILT with little fine sand. Some medium to coarse gravel. Very dense. Non–plastic. Non–cohesive. (ML)				No Odors	

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-60

C-E Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 11/30/99	Date Completed: 11/30/99
Remarks: Sunny to partly cloudy, cold. 32F. Approximate groundwater table at 4' bgs NA indicates not applicable		Ground Elevation: 10.96'	Datum: NGVD
		Contractor: Vironex	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
16-20	NA	70	0.1 ppm		16.0-20.0: Wet, red-brown SILT with some fine sand, trace fine gravel. Very dense. Non-cohesive. (ML)				No Odors	
				20	20.0: End of Boring.					-10

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-67

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 11/30/99	Date Completed: 11/30/99
Remarks: Very windy, 20F. Approximate groundwater table at 4' bgs. NA indicates not applicable.		Ground Elevation: 0.00'	Datum: NGVD
		Contractor: Vironex	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
					to 16' bgs with spear tip; assures that no refusal will occur at 15' bgs again. No recovery from 15' to 16' bgs.					
16-20	NA	90								
			0 ppm		16.0-18.0: Wet, red-brown SILT with some clay. Slightly plastic. Cohesive. (ML)				No Odors	
			0.1 ppm		18.0-20.0: Wet, red-brown to brown medium to coarse SAND. Some silt. Loose. Non-cohesive. (SW)					
				20	20.0: End of Boring.					-20

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-77

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/20/01	Date Completed: 11/20/01
Remarks: NA - Indicates Not Applicable		Ground Elevation: 12.90'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 39.50'
		Drilling Method: Geoprobe	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0-4	NA	63			0.0-1.3: Dark brown LOAM with rootlets, trace fine gravel and coarse sand, loose, slightly moist. (FI)				None	
			2 ppm		1.3-4.0: Red-brown SILT and very fine sand, few coarse sand and fine gravel, cohesive, soft, moist. (ML)				None	10
4-8	NA	68								
			1.9 ppm		4.0-8.0: Red-brown SILT and very fine sand, few coarse sand and fine gravel, several 0.1-0.2' lenses of dark gray clay, cohesive, soft, moist. (ML)				None	
8-12	NA	80								
			0.6 ppm	10	8.0-12.0: Red-brown SILT and very fine sand, few coarse sand, trace fine to coarse gravel, cohesive, medium soft, moist. (ML)				None	
12-16	NA	93								0
			12 ppm							

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-77

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/20/01	Date Completed: 11/20/01
Remarks: NA - Indicates Not Applicable		Ground Elevation: 12.90'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 39.50'
		Drilling Method: Geoprobe	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
16-20	NA	85	44 ppm		12.0-25.2: Red-brown SILT and very fine sand, some fine gravel, some medium to coarse sand, slightly cohesive, medium soft, moist. (ML)				None	
20-24	NA	85	27 ppm	20						-10
28-32	NA	63	304 ppm		25.2-32.0: Red-brown SILT and very fine sand, some fine gravel, some medium to coarse sand, slightly cohesive, medium soft, moist. Very slight MGP-like odor, small stringers of light sheen patches. (ML)	24-28 FT			Slight	

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-77

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/20/01	Date Completed: 11/20/01
Remarks: NA - Indicates Not Applicable		Ground Elevation: 12.90'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 39.50'
		Drilling Method: Geoprobe	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
			366 ppm						
32-35	NA	37			32.0-35.0: Red-brown, SILT and very fine sand, some fine gravel, some medium to coarse sand, slightly cohesive, medium soft, wet. Slight tar/naphthalene-like odor, trace NAPL blebs, stringers of light sheen at 33.5-35 feet. (ML)			Slight	20
			512 ppm						
35-37	NA	70			35.0-37.0: Red-brown very fine SAND and silt, trace fine gravel, trace medium to coarse sand, wet. Moderate MGP-like odor, trace sheen, NAPL-coated grains at 36.7-37.0 feet. (SM)			Moderate	
			674 ppm						
37-39	NA	45			37.0-39.0: Red-brown very fine SAND, and silt, trace fine gravel, trace medium to coarse sand, wet. Slight tar/MGP odor, trace tar (NAPL) blebs scattered, light sheen with blebs. (SM)	37-39 FT		Slight	
			513 ppm						
39-39.5	NA	20			39.0-39.5: Red-brown SILT and very fine sand, wet. Slight tar-like odor, trace sheen. (SM)				
					39.5: End of boring.				
				40					30

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-78

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 12/13/01	Date Completed: 12/13/01
Remarks: NA - Indicates Not Applicable		Ground Elevation: 16.24'	Datum: NAVD 88
		Contractor: Prosonic	Total Depth: 135.00'
		Drilling Method: Resonant Sonic	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0-5	NA	100								
5-10	NA	100			0.0-5.0: Potholed with utility-clearing machine.				None	
					5.0-10.0: Red-brown, various-colored SILT and CLAY, some mottling, fine to coarse sand, fine gravel, very cohesive, dense, moist. (ML)					10
10-15	NA	100	0 ppm	10	10.0-12.2: Brown, fine to medium SAND, few coarse sand, some various-colored gravels, slightly cohesive, moist. (SP)				None	
					12.2-16.0: Dark brown CLAY and SILT, little very fine to fine sand, few medium sub-rounded coarse sand, fine to medium gravel, polymict, till-like, cohesive, dense, moist. (ML)				None	

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-78

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 12/13/01	Date Completed: 12/13/01
Remarks: NA - Indicates Not Applicable		Ground Elevation: 16.24'	Datum: NAVD 88
		Contractor: Prosonic	Total Depth: 135.00'
		Drilling Method: Resonant Sonic	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
15-25	NA	100	0 ppm		16.0-17.7: Red-brown, fine to very fine SAND, little medium to coarse sand, trace fine to coarse gravel and cobbles, loose, non-cohesive, moist. (SP)				None	0
			0 ppm	20	17.7-25.0: Red-brown SILT, some clay, few medium to coarse sand, few fine to coarse subangular coarse gravel, trace small cobbles, very cohesive, very dense, moist. (ML)				None	
25-35	NA	100	0 ppm							-10

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-78

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 12/13/01	Date Completed: 12/13/01
Remarks: NA - Indicates Not Applicable		Ground Elevation: 16.24'	Datum: NAVD 88
		Contractor: Prosonic	Total Depth: 135.00'
		Drilling Method: Resonant Sonic	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			0 ppm							
					25.0-44.0: Red-brown SILT, some clay, some medium to coarse sand, fine to coarse, angular to subrounded gravel, trace small cobbles, polymict, very cohesive, dense, moist. (ML)				None	
35-45	NA	100	0 ppm							-20
			0 ppm	40						
			112.4 ppm		44.0-45.0: Red-brown, fine to very fine SAND, some medium to coarse sand, some fine gravel, loose, moist. Slight naphthalene-like odor, very light sheen. (SP)				Slight	

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-78

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 12/13/01	Date Completed: 12/13/01
Remarks: NA – Indicates Not Applicable		Ground Elevation: 16.24'	Datum: NAVD 88
		Contractor: Prosonic	Total Depth: 135.00'
		Drilling Method: Resonant Sonic	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
45-55	NA	100								
					45.0–50.0: Red–brown, fine to very fine SAND, some medium to coarse sand and fine gravel, loose, moist. Moderate tar–like/MPG odor, light sheen, trace tar blebs on coarse–grained material. (SP)				Moderate	–30
			578 ppm			49–50 FT				
				50						
					50.0–55.0: Red–brown SILT and CLAY, little medium to coarse sand, some fine to coarse gravel, polymict, very cohesive, very dense, moist. (ML)				None	
			11 ppm							
55-65	NA	39			55.0–57.6: Brown to various–colored medium SAND, uniform, loose, wet. (SW)				None	–40
					57.6–59.4: Red–brown, SILT and very fine SAND, trace coarse sand, trace fine gravel, very cohesive, dense, moist. (ML)				None	

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-78

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 12/13/01	Date Completed: 12/13/01
Remarks: NA - Indicates Not Applicable		Ground Elevation: 16.24'	Datum: NAVD 88
		Contractor: Prosonic	Total Depth: 135.00'
		Drilling Method: Resonant Sonic	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			0 ppm		59.4-65.0: Brown to various-colored, medium SAND, trace fine to coarse gravel, trace coarse sand, loose, wet. (SP)				None	
65-75	NA	42	0 ppm							-50
			0 ppm	70	65.0-75.0: Brown to various-colored SILT and fine various-colored SAND, some medium to coarse sand, grades to trace fine gravel, one large cobble in end of sample, non-cohesive, loose, wet. (ML)				None	

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-78

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 12/13/01	Date Completed: 12/13/01
Remarks: NA – Indicates Not Applicable		Ground Elevation: 16.24'	Datum: NAVD 88
		Contractor: Prosonic	Total Depth: 135.00'
		Drilling Method: Resonant Sonic	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
75–85	NA	23							
									–60
				80	75.0–85.0: Various colored, medium to coarse SAND, trace fine gravel, trace silt, large gray cobble at end of sample, loose, wet. (SP)			None	
85–95	NA	98	0 ppm		85.0–88.2: Various–colored to brown, fine to coarse SAND, few fine to coarse gravel, trace small cobbles, loose, wet. (SW)			None	–70

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-78

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 12/13/01	Date Completed: 12/13/01
Remarks: NA - Indicates Not Applicable		Ground Elevation: 16.24'	Datum: NAVD 88
		Contractor: Prosonic	Total Depth: 135.00'
		Drilling Method: Resonant Sonic	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			0 ppm		88.2-95.0: Brown to various-colored, very fine to fine SAND, some silt, trace coarse sand, loose, wet. (SM)				None	
95-105	NA	93	0.6 ppm							-80
			2.4 ppm	100	95.0-105.0: Brown to various-colored, very fine to fine SAND, little silt, trace medium to coarse sand, loose, wet. (SP)				None	
			39.1 ppm							

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-78

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 12/13/01	Date Completed: 12/13/01
Remarks: NA - Indicates Not Applicable		Ground Elevation: 16.24'	Datum: NAVD 88
		Contractor: Prosonic	Total Depth: 135.00'
		Drilling Method: Resonant Sonic	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
105-115	NA	87								-90
			38.5 ppm	110	105.0-115.0: Brown, very fine to fine SAND and SILT, trace coarse sand, non-cohesive, firm, wet. Very faint organic/swampy odor. (SM)				V. Slight	
			33.2 ppm			114-115 FT				
115-125	NA	86								-10
					115.0-125.0: Brown with some grey, very fine to fine SAND, trace various-colored fine sand, little silt, well-sorted, grey and black clay lense at 116.7-116.9', firm, wet				V. Slight	

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-78

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 12/13/01	Date Completed: 12/13/01
Remarks: NA – Indicates Not Applicable		Ground Elevation: 16.24'	Datum: NAVD 88
		Contractor: Prosonic	Total Depth: 135.00'
		Drilling Method: Resonant Sonic	
		Logged By: Andrew Brey	Certified By: Lynn Wilkey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			3.1 ppm		Very faint organic/swampy odor. (SP)					
125-135	NA	100	0 ppm							-11
			0 ppm	130	125.0-135.0: Red, white, grey, green, rust yellow SAPROLITE, relic schist, heavy mica content, extremely cohesive, extremely dense, soapy texture, slight moist. (CL)				None	
					135.0: End of boring.					

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-79

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 06/04/02	Date Completed: 06/05/02
Remarks: Mostly cloudy, breezy 06-04-2002. Heavy rain 06-05-02. NA - Indicates Not Applicable		Ground Elevation: 14.95'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 38.50'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
					0.0-2.5: Hand cleared due to electric conduit, bones found.				
2.5-4	NA	100	0.0 ppm		2.5-4.0: Red-brown to brown SILT, trace fine sand, trace fine gravel, trace clay, slightly cohesive, moist. (ML)				
4-8	NA	83			4.0-5.7: Light brown SILT, clay, cohesive, plastic, soft, moist to wet (first 4"). (MH) Apparent groundwater table.				
			0.0 ppm		5.7-7.6: Red-brown SILT, trace to little fine sand, trace fine to coarse gravel, non-cohesive, dense, firm. (ML)				
					7.6-8.0: Brown SILT, trace to little clay, cohesive, moderately firm. (MH)				
8-12	NA	75			8.0-8.6: Brown SILT, little clay, cohesive, soft, moist to wet. No odor or visual contamination. (MH)				
					8.6-10.4: Red-brown SILT, trace fine to coarse sand, trace serpentanite gravel, non-cohesive, dry to damp. (MH)				
			0.0 ppm	10	10.4-11.0: Brown fine SAND, trace gravel, trace to little silt, medium stiff, wet. (SW)				
12-16	NA	75			12.0-12.6: Brown fine SAND, trace gravel, trace to little silt, medium stiff, wet. (SW)			None	
					12.6-15.0: Red-brown to brown SILT, trace fine sand, trace gravel (angular), non-cohesive, very dense, damp to dry. (ML)				
			0.0 ppm						0

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-79

Client: Keyspan Energy

Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 06/04/02	Date Completed: 06/05/02
Remarks: Mostly cloudy, breezy 06-04-2002. Heavy rain 06-05-02. NA - Indicates Not Applicable		Ground Elevation: 14.95'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 38.50'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
16-20	NA	81	0.0 ppm		16.0-20.0: Red-brown SILT, trace fine sand, trace fine gravel, very stiff, non-cohesive, non-plastic, damp. (ML)				
20-24	NA	75	4.3 ppm	20	20.0-20.6: Red-brown SAND, fine, wet, possible wash. (SW) 20.6-24.0: Red-brown SILT, trace fine to coarse gravel, very stiff, non-cohesive, non-plastic. Trace naphthalene-like odor at bottom 2" of sample. (MH)	20-24 FT			
24-28	NA	67	153.2 ppm		24.0-27.9: Red-brown SILT, trace gravel, trace fine sand, non-cohesive, non-plastic, damp. Faint naphthalene odor. (ML) Sheen of fine sand, moderate naphthalene-like odor at 27.9-28.0'.			Trace	-10
28-32	NA	75			28.0-28.8: Brown fine SAND, little to some silt, trace fine gravel, slightly cohesive, soft, wet. Moderate mixed naphthalene and tar-like odor, irridescent sheen. (SW) 28.8-32.0: Red-brown SILT, trace to little fine to coarse sand, trace to coarse gravel, medium stiff to stiff. Trace naphtalene-like odor. (SW)			Moderate	

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-79

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 06/04/02	Date Completed: 06/05/02
Remarks: Mostly cloudy, breezy 06-04-2002. Heavy rain 06-05-02. NA - Indicates Not Applicable		Ground Elevation: 14.95'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 38.50'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
			119.0 ppm					Trace	
32-36	NA	58			32.0-34.0: Red-brown SILT, with little to some fine sand, trace coarse sand, trace fine, angular gravel, medium stiff to stiff, damp. Moderate napthalene odor, trace sheen patches. (ML)				
					34.0-36.0: Brown fine SAND, non-cohesive, non-plastic, soft. Moderate to strong tar odor, heavily saturated, tar-coated grains. (SW)			Moderate	
			343.0 ppm		36.0-36.9: Brown fine SAND, little to some silt, non-cohesive, soft. Moderate tar odor, tar-coated grains. (SM)				
36-38.5	NA	40			36.9-38.5: Red-brown SILT, little fine sand, trace coarse gravel. Trace to moderate naphthalene odor, patchy sheen. (ML)			Trace	
			444.0 ppm						
					38.5: End of boring.				
				40					30

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-79A

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 06/05/02	Date Completed: 06/05/02
Remarks: Offset from SB-79, pushed to 39' bgs. Hazy, 80's. NA - Indicates Not Applicable		Ground Elevation: 14.99'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 55.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
				10	Note: Geoprobe rig refusal on boring SB-79. Offset and commence SB-79A at 39.0					10

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-79A

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 06/05/02	Date Completed: 06/05/02
Remarks: Offset from SB-79, pushed to 39' bgs. Hazy, 80's. NA - Indicates Not Applicable		Ground Elevation: 14.99'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 55.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
				20	Note: Geoprobe rig refusal on Boring SB-79. Offset and commence SB-79A at 39.0'.					-10

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-79A

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 06/05/02	Date Completed: 06/05/02
Remarks: Offset from SB-79, pushed to 39' bgs. Hazy, 80's. NA - Indicates Not Applicable		Ground Elevation: 14.99'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 55.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
										-20
39-43	NA	69		40	39.0-40.3: Brown fine SAND, some silt, trace gravel, trace clay, cohesive, slightly plastic. Overpowering odor, saturated with runny tar. (SM)				Strong	
			713 ppm		40.3-43.0: Red-brown SILT, trace fine sand, trace coarse gravel, crumbly. Moderate naphthalene and tar odor, patchy sheen. (ML)				Moderate	
43-47	NA	90			43.0-43.2: Wash. (ML) 43.2-43.8: Brown to red-brown SILT, trace to little clay, trace fine sand, cohesive, soft, wet. Moderate naphthalene-like odor, patchy irridescent sheen. (ML)					
					43.8-47.0: Red-brown SILT, trace fine sand, trace coarse gravel, non-cohesive					-30

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-79A

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 06/05/02	Date Completed: 06/05/02
Remarks: Offset from SB-79, pushed to 39' bgs. Hazy, 80's. NA - Indicates Not Applicable		Ground Elevation: 14.99'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 55.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
			255 ppm		crumbles, stiff to very stiff, moist to damp, Naphthalene odor on bottom of sample. (ML)			Trace	
47-51	NA	79			47.0-48.3: Reb-brown SILT, trace fine to medium sand, moderately stiff. Trace to moderate naphthalene-like odor. (ML)				
					48.3-49.5: Red-brown fine SAND, little coarse gravel, chunks of large gravel. Moderate naphthalene odor. (GM)			Moderate	
			485 ppm	50	49.5-51.0: Red-brown fine SAND, little coarse gravel, chunks of large gravel. Strong tar odor, heavy tar-coated grains of sand, stained sampler sleeve. (GM)				
51-55	NA	58			51.0-52.0: Brown to red-brown fine to medium SAND, trace to little silt, non-cohesive, soft. Strong tar odor, liquid tar saturated. (SP)				
					52.0-54.4: Red-brown SILT, trace coarse sand, trace fine to coarse gravel, non-cohesive, crumbly, moderately stiff, damp. Strong naphthalene-like odor. (ML)			Strong	
			888 ppm		54.4-54.9: Red-brown coarse SAND and GRAVEL, non-cohesive, loose. Moderate to strong tar odor, heavily tar-coated grains, liquid tar stains sleeve. (GM)	51-55 FT			
					54.9-55.0: Red-brown SILT, little sand, trace gravel, crumbly, damp. Tar-coated grains. (ML)				-40
					55.0: End of boring.				

Legend: Physical Observations — None, Stain, Sheen, Heavy

Site Id: SB-80

Client: Keysapn Energy			
Project Number:	Project Name: Clifton Former MGP	Date Started: 06/03/02	Date Completed: 06/04/02
Remarks: NA - Indicates Not Applicable		Ground Elevation: 12.02'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 56.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description (color, density, SOIL, admixture, moisture, other notes, ORIGIN.)	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
0-4	NA	58	0.6 ppm		0.0-2.0: Brown to dark brown SILT, little fine to medium sand in gravel. Damp to moist. Trace fill ash fragments, coal fragments. (FI)	0-4 FT		None	10
					2.0-4.0: Brown to red brown SILT, trace clay, trace gravel. No odor or visual contamination. (ML)				
					3.5: Apparent groundwater table.				
4-8	NA	33	0.1 ppm		4.0-4.5: Coarse GRAVEL, saturated non-cohesive, loose. (GP)				
					4.5-8.0: Brown to red brown SILT, little clay, trace ash, cohesive, plastic, wet. (MH)			None	
8-12	NA	50	0.0 ppm	10	8.0-12.0: Red-brown SILT, trace to little fine sand, trace clay, slightly cohesive, moist, moderately stiff. (ML)			None	0
12-16	NA	56			12.0-14.1: Red-brown SILT, little to some fine sand, trace grey nodules silt, moist, moderately stiff. (ML)				
			0.0 ppm		14.1-14.8: Brown to red-brown, fine to medium SAND, moist to wet. (SW)			None	
					14.8-16.0: Red-brown SILT, little to some fine				

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-80

Client: Keysapn Energy			
Project Number:	Project Name: Clifton Former MGP	Date Started: 06/03/02	Date Completed: 06/04/02
Remarks: NA – Indicates Not Applicable		Ground Elevation: 12.02'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 56.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
					sand, trace grey nodules silt, trace fine gravel, moderate dense. (ML)					
16–20	NA	79								
			0.0 ppm		16.0–20.0: Red–brown SILT, trace fine to coarse gravel, fine to medium sand, trace clay, stiff to very stiff, slightly plastic, damp. (ML)				None	
20–24	NA	44		20						
			0.0 ppm		20.0–24.0: Red–brown SILT, trace to little fine sand, trace gravel, non–cohesive, non–plastic, very stiff, dry to damp. (ML)				None	–10
24–28	NA	79								
			0.0 ppm		24.0–28.0: Red–brown SILT, trace to little fine sand, coarse sand, trace coarse gravel, non–cohesive, non–plastic, stiff to very stiff, dry to damp. (ML)				None	
28–32	NA	65								
					28.0–32.0: Red–brown SILT, trace coarse sand, trace coarse gravel, trace medium sand, non–cohesive, non–plastic					

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-80

Client: Keysapn Energy			
Project Number:	Project Name: Clifton Former MGP	Date Started: 06/03/02	Date Completed: 06/04/02
Remarks: NA – Indicates Not Applicable		Ground Elevation: 12.02'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 56.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			0.0 ppm		damp. (ML)				None	
32-36	NA	75			32.0-33.8: Red-brown SILT, trace coarse sand, trace coarse gravel angular, trace medium sand, non-cohesive, non-plastic, damp to moist. (ML)					-20
			0.0 ppm		33.8-34.8: Red-brown SILT, saturated, loose, trace coarse gravel, non-cohesive, saturated. (ML)				None	
					34.8-36.0: Red-brown SILT, trace to little fine sand, non-cohesive, non-plastic. (ML)					
36-40	NA	0								
			0.0 ppm		36.0-40.0: No recovery. Tube is wet.				None	
40-44	NA	58		40						
			0.0 ppm		40.0-44.0: Red-brown to brown fine SAND, trace to little silt, wet, non-cohesive, moderately stiff to soft. (SP)				None	-30
44-48	NA	65								

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-80

Client: Keysopn Energy			
Project Number:	Project Name: Clifton Former MGP	Date Started: 06/03/02	Date Completed: 06/04/02
Remarks: NA – Indicates Not Applicable		Ground Elevation: 12.02'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 56.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			0.0 ppm		44.0–48.0: Red–brown to brown SILT, trace fine to coarse sand, trace fine gravel, wet, stiff, non–cohesive, non–plastic. (ML)				None	
48–52	NA	54								
			0.0 ppm	50	48.0–52.0: Red–brown to brown SILT, little fine to coarse sand, trace fine gravel, moist, stiff, non–cohesive, non–plastic. (ML)				None	
52–56	NA	71								–40
			0.0 ppm		52.0–56.0: Red–brown SILT, trace coarse sand, trace coarse gravel, trace fine sand, non–cohesive, stiff, crumbly, dry to damp. (ML)	52–56 FT			None	
					56.0: End of boring.					

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-84

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 06/17/02	Date Completed: 06/21/02
Remarks: 06/21/02 Weather: Mostly sunny, 80's NA - Indicates Not Applicable		Ground Elevation: 16.87'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 52.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
					0.0-8.0: Utility cleared with Vac-Tron.					
										10
8-12	NA	0								
			0.0 ppm	10	8.0-12.0: Brown fine SAND, trace coarse sand, trace gravel, little silt, non-cohesive, non-plastic, soft, moist. (SP)				None	
12-16	NA	56								
			0.0 ppm		12.0-16.0: Red-brown SILT, trace to little fine sand, trace fine sub-round gravel, non-cohesive, non-plastic, moderately stiff damp. (ML)				None	

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-84

GEI Consultants, Inc.

Client: Keyspan Energy	
Project Number: 982482-1	Project Name: Clifton Former MGP
Remarks: 06/21/02 Weather: Mostly sunny, 80's NA - Indicates Not Applicable	

Date Started: 06/17/02	Date Completed: 06/21/02
Ground Elevation: 16.87'	Datum: NAVD 88
Contractor: ADT/ Diamond	Total Depth: 52.00'
Drilling Method: Geoprobe	
Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
16-20	NA	79	0.0 ppm		16.0-20.0: Red-brown SILT, trace to little fine sand, trace fine to coarse sub-rounded gravel, non-cohesive, non-plastic, moderately stiff. (ML)				None	0
20-24	NA	85	0.0 ppm	20	20.0-20.9: Red-brown SILT, trace to little fine sand, trace coarse sand, trace fine sub-round gravel, non-cohesive, plastic, moderately stiff to stiff, damp. (ML) 20.9-21.3: Red-brown to brown fine SAND and SILT, non-cohesive, non-plastic, soft, moist. (SM) 21.3-24.0: Red-brown SILT, trace to little fine sand, trace coarse sand, trace fine sub-rounded gravel, non-cohesive, plastic, moderately stiff to stiff, damp. (ML)				None	
24-28	NA	75	0.0 ppm		24.0-28.0: Red-brown SILT, little fine sand, trace coarse sand, trace fine gravel, non-cohesive, non-plastic, stiff to very stiff, damp. (ML)				None	-10
28-32	NA	0			28.0-32.0: Red-brown SILT, little fine to medium sand, non-cohesive, moderately stiff					

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-84

GEI Consultants, Inc.

Client: Keyspan Energy	
Project Number: 982482-1	Project Name: Clifton Former MGP
Remarks: 06/21/02 Weather: Mostly sunny, 80's NA - Indicates Not Applicable	
Date Started: 06/17/02	Date Completed: 06/21/02
Ground Elevation: 16.87'	Datum: NAVD 88
Contractor: ADT/ Diamond	Total Depth: 52.00'
Drilling Method: Geoprobe	
Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOiL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			0.0 ppm		(ML)				None	
32-36	NA	69								
					32.0-36.0: Red-brown SILT, trace to little fine to medium sand, trace fine gravel, non-cohesive, crumbly, medium stiff, damp. (ML)					
			0.0 ppm						None	
36-40	NA	63								-20
					36.0-40.0: Red-brown SILT and fine sand, trace fine gravel, little coarse sand, non-cohesive, non-plastic, moist. (ML)					
			0.0 ppm						None	
40-44	NA	100		40	40.0-41.0: Red-brown fine to medium SAND, trace to little silt, non-cohesive, saturated, patchy sheen in water, Trace naphthalene odor. (SP)				Trace	
			26.1 ppm		41.0-44.0: Red-brown SILT, trace to little silt, trace coarse gravel, very stiff. Trace to moderate naphthalene-like odor, irregular sheen within 1" layer of fine sand. (ML)	40-44 FT			Trace to Moderate	
44-48	NA	71								

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-84

GEI Consultants, Inc.

Client: Keyspan Energy	
Project Number: 982482-1	Project Name: Clifton Former MGP
Remarks: 06/21/02 Weather: Mostly sunny, 80's NA - Indicates Not Applicable	

Date Started: 06/17/02	Date Completed: 06/21/02
Ground Elevation: 16.87'	Datum: NAVD 88
Contractor: ADT/ Diamond	Total Depth: 52.00'
Drilling Method: Geoprobe	
Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			2.2 ppm		44.0–48.0: Red–brown SILT, trace to little fine sand, trace coarse sand, non–cohesive, non–plastic. (ML)				Trace	
48–52	NA	73								-30
			0.0 ppm	50	48.0–52.0: Red–brown SILT and fine sand, trace coarse gravel, non–cohesive, non–plastic, stiff to very stiff, crumbles, damp to moist. (ML)	48–52 FT			None	
					52.0: End of boring.					-40

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-85

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 06/18/02	Date Completed: 06/19/02
Remarks: 06-19-02 Weather: Cloudy, light rain. NA - Indicates Not Applicable		Ground Elevation: 15.47'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 51.50'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
					0.0-8.0: Utilities cleared with Vac-Tron.					10
8-12	NA	77								
			0.0 ppm	10	8.0-12.0: Red-brown SILT, little fine to medium sand, trace coarse gravel, damp to moist, moderately stiff. (ML)				None	
12-16	NA	77								
			0.0 ppm		12.0-16.0: Red-brown SILT, some fine sand, trace fine to coarse gravel, non-cohesive, non-plastic, moderately stiff to soft, moist. (SM)				None	

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-85

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 06/18/02	Date Completed: 06/19/02
Remarks: 06-19-02 Weather: Cloudy, light rain. NA - Indicates Not Applicable		Ground Elevation: 15.47'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 51.50'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
										0
16-20	NA	58			16.0-16.8: Red-brown fine to medium well sorted SAND, little silt, non-cohesive, non-plastic, soft, wet. (SP)					
					16.8-17.7: Red-brown SILT, trace fine sand, non-cohesive, non-plastic, soft, moist. (ML)					
			0.0 ppm		17.7-18.8: Red-brown SILT with interbedded fine to medium sand, non-cohesive, non-plastic, wet. (SM)				None	
					18.8-20.0: Red-brown SILT, trace fine sand, trace fine to coarse gravel, non-cohesive, non-plastic, wet. (ML)					
20-24	NA	56		20	20.0-20.8: Red-brown to brown fine to medium SAND, trace coarse sand with gravel, non-cohesive, soft, wet. (SW)					
			0.0 ppm		20.8-24.0: Red-brown SILT and fine SAND, non-cohesive, soft, moist. (SM)				None	
24-28	NA	0								
			0.0 ppm		24.0-28.0: Red-brown SILT, some to and fine to medium SAND, trace gravel, non-cohesive, non-plastic, stiff, damp. (SM)				None	-10
28-32	NA	58								
					28.0-32.0: Red-brown SILT, some to and fine SAND, trace fine gravel, non-cohesive, non-plastic, soft to moderately stiff					

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-85

GEI Consultants, Inc.

Client: Keyspan Energy	
Project Number: 982482-1	Project Name: Clifton Former MGP
Remarks: 06-19-02 Weather: Cloudy, light rain. NA - Indicates Not Applicable	

Date Started: 06/18/02	Date Completed: 06/19/02
Ground Elevation: 15.47'	Datum: NAVD 88
Contractor: ADT/ Diamond	Total Depth: 51.50'
Drilling Method: Geoprobe	
Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			0.0 ppm		moist to wet. (SM)				None	
32-36	NA	67								
			0.0 ppm		32.0-36.0: Red-brown SILT, little to some fine sand, trace coarse sand, trace to little fine sub-angular gravel, soft to moderately stiff, moist. (SM)				None	-20
36-40	NA	85			36.0-36.9: Red-brown SILT and fine sand, trace coarse gravel, non-cohesive, non-plastic, moist to wet. (SM)					
			0.0 ppm		36.9-37.8: Brown fine to medium well-sorted SAND, trace silt, soft, loose, saturated. (SP) 37.8-38.6: Brown medium to coarse SAND, trace fine sub-angular gravel, trace coarse sand. (SW)				None	
					38.6-40.0: Red-brown SILT, trace coarse sand and sub-rounded gravel, moist to wet. (ML)					
40-44	NA	73		40	40.0-40.8: Red-brown medium to coarse SAND and gravel, little silt, non-cohesive, non-plastic, wet to saturated. (SW)					
					40.8-41.9: Red-brown fine to very fine SILT, trace clay, slightly cohesive, slightly plastic. (ML)					
			0.0 ppm		41.9-44.0: Red-brown to brown fine to very fine SAND, little silt, non-cohesive, soft, saturated, black discoloration-possibly mineral. (SP)	40-44 FT			None	
44-48	NA	35								

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-85

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 06/18/02	Date Completed: 06/19/02
Remarks: 06-19-02 Weather: Cloudy, light rain. NA - Indicates Not Applicable		Ground Elevation: 15.47'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 51.50'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			0.0 ppm		44.0-48.0: Brown fine to very fine SAND, some silt, non-cohesive, soft, saturated. (SM)				None	-30
48-51.5	NA	48			48.0-49.6: Brown medium to coarse SAND, little fine gravel, trace silt, coarsens downward, non-cohesive, saturated. (SW)					
			0.0 ppm	50	49.6-51.5: Brown fine to coarse GRAVEL, non-cohesive, saturated. (GP)	48-51.5 FT			None	
					51.5: Geoprobe refusal, end of boring.					-40

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-86

GEI Consultants, Inc.

lient: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 06/20/02	Date Completed: 06/20/02
Remarks: 06/20/02 Weather: clear, sunny, 80's. NA - Indicates Not Applicable		Ground Elevation: 13.43'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 52.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
					0.0–8.0: Utility cleared with Vac-Tron.					10
8–12	NA	69								
			0.0 ppm	10	8.0–12.0: Red-brown SILT, some to and fine sand, trace coarse sub-round gravel, moderately stiff to stiff, wet. (SM)				None	
12–16	NA	63								
			0.0 ppm		12.0–16.0: Red-brown SILT, little fine sand, trace coarse gravel, fine gravel, non-cohesive, moderately stiff, damp. (ML)				None	0

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-86

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 06/20/02	Date Completed: 06/20/02
Remarks: 06/20/02 Weather: clear, sunny, 80's. NA - Indicates Not Applicable		Ground Elevation: 13.43'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 52.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
16-20	NA	25	0.0 ppm		16.0-20.0: Red-brown medium to coarse SAND and SILT, trace gravel, non-cohesive, non-plastic, soft, saturated. (SM)				None	
20-24	NA	81	0.0 ppm	20	20.0-23.1: Red-brown to brown fine to medium SAND, little silt, trace coarse gravel, increasing fines throughout sample, non-cohesive, non-plastic, saturated. (SM)				None	
24-28	NA	75	0.0 ppm		23.1-24.0: Red-brown fine SAND, little silt, non-cohesive, non-plastic, soft, saturated. (SM) 24.0-26.2: Red-brown to brown fine to medium well-sorted SAND, little silt, non-cohesive, non-plastic, wet to saturated. (SP) 25.6-25.9: Trace red-brown SILT stringer. (ML) 26.2-28.0: Red-brown SILT, little clay, trace fine sand, cohesive, slightly plastic, moist to wet. (ML)				None	-10
28-32	NA	75			28.0-30.1: Red-brown SILT and SAND, trace coarse sub-rounded gravel, moist to wet. (SM)					

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-86

GEI Consultants, Inc.

ient: Keyspan Energy			
Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 06/20/02	Date Completed: 06/20/02
Remarks: 06/20/02 Weather: clear, sunny, 80's. NA - Indicates Not Applicable		Ground Elevation: 13.43'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 52.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
			0.0 ppm		30.1-32.0: Red-brown SILT, trace to little fine sand, trace to little sub-round fine gravel, moderately stiff, damp. (ML)			None	
32-36	NA	81							
			0.0 ppm		32.0-36.0: Red-brown SILT, trace to little coarse sand, trace fine sub-rounded gravel, trace clay, soft to moderately stiff, damp. (ML)			None	-20
36-40	NA	65							
			0.0 ppm		36.0-40.0: Red-brown to brown SILT, some to and coarse SAND and GRAVEL, non-cohesive, non-plastic, moist. (GM)			None	
40-44	NA	56		40					
			0.0 ppm		40.0-44.0: Red-brown to brown SILT, little to some fine sand, trace gravel, non-cohesive, non-plastic, soft. (SM)	40-44 FT		None	-30
44-48	NA	50							

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-86

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 982482-1	Project Name: Clifton Former MGP	Date Started: 06/20/02	Date Completed: 06/20/02
Remarks: 06/20/02 Weather: clear, sunny, 80's. NA - Indicates Not Applicable		Ground Elevation: 13.43'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 52.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			0.0 ppm		44.0–48.0: Brown fine uniform SAND, trace silt, soft, loose, saturated. (SW)				None	
48–52	NA	56								
			0.0 ppm	50	48.0–52.0: Brown SILT, trace coarse gravel, non-cohesive, non-plastic, wet. (ML)	48–52 FT			None	
					52.0: End of boring.					
										-40

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-87

Client: Keyspan Energy			
Project Number:	Project Name: Clifton Former MGP	Date Started: 06/12/02	Date Completed: 06/13/02
Remarks: 06/12/02 weather: hot, muggy, 90's thunderstorm in pm. 06/13/02 weather: cloudy, cool, low 70's. NA - Indicates Not Applicable		Ground Elevation: 11.63'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 64.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
0-4	NA	54	0.0 ppm		0.0-4.0: Red-brown SILT, trace to little clay, trace gravel, fine sand, cohesive, slightly plastic, soft to moderately stiff. (ML)			None	10
					3.0: Apparent groundwater table.				
4-8	NA	27	0.0 ppm		4.0-8.0: Light brown SILT, little to some clay, cohesive, plastic, soft, damp. (ML)			None	
8-12	NA	68	0.0 ppm	10	8.0-8.4: Light black SILT, little to some clay, cohesive, plastic, soft, damp. (ML) 8.4-12.0: Red-brown SILT, trace clay, trace fine sand, trace coarse sand and gravel, cohesive, slightly plastic, damp to moist. (ML)			None	0
12-16	NA	50	0.0 ppm		12.0-16.0: Red-brown SILT, little to some medium sand, trace fine sub-angular gravel, non-cohesive, non-plastic, medium stiff to stiff. (ML)			None	

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-87

Client: Keyspan Energy			
Project Number:	Project Name: Clifton Former MGP	Date Started: 06/12/02	Date Completed: 06/13/02
Remarks: 06/12/02 weather: hot, muggy, 90's thunderstorm in pm. 06/13/02 weather: cloudy, cool, low 70's. NA – Indicates Not Applicable		Ground Elevation: 11.63'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 64.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
16–20	NA	58								
			0.0 ppm		16.0–20.0: Red–brown SILT, trace to little fine to medium sand, trace gravel, trace clay, non–cohesive, non–plastic, moderately stiff. (ML) 18.6–18.7: Micro sand layer, fine SAND. (SP)				None	
20–24	NA	65		20						
			0.0 ppm		20.0–24.0: Red–brown SILT, trace to little fine sand, trace fine to coarse sub–angular gravel, trace clay, slightly cohesive, moderately stiff, damp. (ML)				None	–10
24–28	NA	0								
			0.0 ppm		24.0–28.0: Red–brown SILT, trace clay, trace coarse sand and gravel, stiff to very stiff. (ML)				None	
28–32	NA	67								
					28.0–32.0: Red–brown SILT, trace fine to coarse sand, trace gravel, non–cohesive, non–plastic, crumbly. (ML)					

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-87

ient: Keyspan Energy			
Project Number:	Project Name: Clifton Former MGP	Date Started: 06/12/02	Date Completed: 06/13/02
Remarks: 06/12/02 weather: hot, muggy, 90's thunderstorm in pm. 06/13/02 weather: cloudy, cool, low 70's. NA – Indicates Not Applicable		Ground Elevation: 11.63'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 64.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			0.6 ppm						None	
32–36	NA	63			32.0–34.9: Red–brown SILT, trace to little fine to medium sand, trace gravel, trace clay, damp to moist. (ML)					–20
			3.1 ppm		34.9–36.0: Red–brown fine to medium SAND, some silt, trace gravel, loose, wet to saturated. (SW)				None	
36–40	NA	48			36.0–40.3: Red–brown medium to coarse SAND, little gravel, non–cohesive, soft, wet and saturated. Slight naphthalene–like odor. (SW)					
			58 ppm						Slight	
40–44	NA	50		40	40.3–42.2: Red–brown SILT, trace gravel, wet, moderately stiff. Slight naphthalene–like odor. (ML)					–30
			114 ppm		42.2–42.8: Red–brown fine SAND, little to some silt, moderately stiff. (SM)				Slight	
					42.8–44.0: Red–brown SILT, trace sub–angular and sub–rounded gravel, little to some sand, moderately stiff. (ML)					
44–48	NA	46			44.0–46.0: Red–brown SILT, little fine sand, soft, saturated. Trace naphthalene odor. (ML)					

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-87

Client: Keyspan Energy			
Project Number:	Project Name: Clifton Former MGP	Date Started: 06/12/02	Date Completed: 06/13/02
Remarks: 06/12/02 weather: hot, muggy, 90's thunderstorm in pm. 06/13/02 weather: cloudy, cool, low 70's. NA – Indicates Not Applicable		Ground Elevation: 11.63'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 64.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
			60 ppm		46.0–48.0: Red–brown medium to coarse SAND, trace to little fine to coarse gravel, trace to little silt, wet. Slight naphthalene–like odor. (SP)			Trace	
48–52	NA	67			48.0–49.2: Brown to grey fine to medium SAND, trace silt, well sorted, moist to wet. Medium to strong naphthalene and tar odor, heavy sheen, tar blebs. (SP)				
			3262 ppm	50	49.2–51.4: Brown medium to coarse well–sorted SAND, trace to little silt, soft, medium–stiff. Heavy tar odor, blebs progressing to tar saturated. (SP)	48–52 FT		Moderate to Heavy	
					51.4–52.0: Red–brown SILT, wet, trace coarse sand, soft. Moderate to heavy tar odor, moderate sheen. (ML)				–40
52–56	NA	69			52.0–54.9: Brown SILT and CLAY, trace coarse sand, trace fine gravel, soft, wet. Naphthalene odor. (ML)				
			246 ppm		54.9–56.0: Red–brown coarse SAND, fine gravel, little silt, saturated with water. Trace naphthalene odor. (SP)			Trace	
56–60	NA	65			56.0–60.0: Red–brown medium to coarse SAND, little to some silt, trace coarse angular gravel, soft, saturated with water. Strong tar odor, sheen throughout, black tar in water, tar stains in sampler liner. (SM)				
			243 ppm					Strong	

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-87

Client: Keyspan Energy

Project Number:	Project Name: Clifton Former MGP	Date Started: 06/12/02	Date Completed: 06/13/02
Remarks: 06/12/02 weather: hot, muggy, 90's thunderstorm in pm. 06/13/02 weather: cloudy, cool, low 70's. NA – Indicates Not Applicable		Ground Elevation: 11.63'	Datum: NAVD 88
		Contractor: ADT/ Diamond	Total Depth: 64.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
60–64	NA	65	0.5 ppm		60.0–61.6: Red–brown SILT and CLAY, trace fine sand, moderately stiff, saturated with water. Trace naphthalene odor. (ML) 61.6–61.9: Red–brown fine to medium SAND, trace gravel, little silt, stiff. Trace naphthalene–like odor. (SP) 61.9–62.0: Red–brown fine to medium SAND, little silt, moderately dense, saturated with water. Trace naphthalene odor. (SP) 62.0–64.0: Red–brown SILT, some clay, stiff to very stiff, trace naphthalene–like odor. (ML) 64.0: End of boring.	60–64 FT			Trace	–50 –60
				70						

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: RW-04

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 03/10/99	Date Completed: 03/12/99
Remarks: Mostly cloudy, slightly breezy (~30 F) Steven Wallett logged RW-4 80-90', and monitored well installation.		Ground Elevation: 10.15'	Datum: NGVD
		Contractor: ADT	Total Depth: 90.00'
		Drilling Method: Hollow Stem Auger	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Vis. Signs of Contamination	Odors	Elevation (ft)	Well Construction
					See SB-36 boring log for geology from 0.0-20.0'. Augered to 60.0'; began sampling at 60' bgs.	-			-	10	MP. EL. 10.15
				10						0	

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-61

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 11/29/99	Date Completed: 11/29/99
Remarks: Sunny to partly cloudy, cold, ~ 33 F. Approximate groundwater table 1.0 feet. NA indicates not applicable.		Ground Elevation: 11.30'	Datum: NGVD
		Contractor: Vironex	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0-4	NA	35			0.0-1.0: Top Soil. Dark brown-black silty SAND and trace clay. Non-plastic. Slightly cohesive. Soft. Wet. (SM)					
			0.1 ppm		1.0-4.0: Wet, gray-brown medium to coarse GRAVEL. Loose. (GW)	0-4 ft.			No Odors	10
4-8	NA	35			4.0-7.0: Wet, gray-black FILL conprised of clinker, coal fragments, ash and coke. Coarse gravel and coarse sand. Loose. Non-cohesive. (FI)					
			0.1 ppm		7.0-8.0: Red-brown clayey SILT with trace coarse sand. Cohesive. Slightly plastic. (ML)	4-8 ft.				
8-12	NA	80			8.0-10.0: Moist, gray to dark gray CLAY with some silt. Dense. Slightly plastic. Cohesive. (CL)					
			0.3 ppm							
				10	10.0-12.0: Wet, red-brown fine SAND with some silt. Dense. Non-cohesive. Non-plastic. Fine sand stringer at 11'. (SW)					0
			0.3 ppm							
12-16	NA	75			12.0-14.0: Wet, red-brown fine to medium SAND. Trace silt. Loose. Non-cohesive.(SW)				No Odors	
					14.0-19.0: Red-brown fine to very fine SAND. Trace silt. Loose. Non-cohesive.(ML)					

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-61

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 11/29/99	Date Completed: 11/29/99
Remarks: Sunny to partly cloudy, cold, ~ 33 F. Approximate groundwater table 1.0 feet. NA indicates not applicable.		Ground Elevation: 11.30'	Datum: NGVD
		Contractor: Vironex	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
16-20	NA	88							No Odors	
					19.0-20.0: Moist, red-brown SILT with trace fine sand. Trace coarse gravel. Non-cohesive. Very dense. (ML)					
				20	20.0: End of Boring.					-10

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-62

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 11/29/99	Date Completed: 11/29/99
Remarks: Sunny to partly cloudy, cold,~33F. Depth to groundwater approximately 3.0'. NA indicates not applicable.		Ground Elevation: 12.14'	Datum: NGVD
		Contractor: Vironex	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0-4	NA	66	0.0 ppm		0.0-1.5: Dark brown, fine silty SAND.(Organic Top Soil), non-cohesive, moist.(SM)	0-4 ft.			No Odors	10
					1.5-4.0: Red-brown, fine silty-SAND, trace clay and fine gravel, slightly cohesive, non-plastic, moist to wet. (SM)					
					Groundwater table located at approximately 3.0 feet below ground surface.					
4-8	NA	78	0.1 ppm		4.0-6.0: Dark brown-grey, clayey-SILT, plastic, cohesive, moist. (CL)	4-6 ft.				
			0.1 ppm		6.0-8.0: Red-brown, SILT, some fine to medium sand, non-plastic, non-cohesive, moist. (SM)					
8-12	NA	83	0.1 ppm							
			0.1 ppm	10	8.0-12.0: Red-brown, SILT, some fine to coarse sand, trace clay slightly cohesive, non-plastic, dense, wet to saturated. (SM)					
12-16	NA	75	0.1 ppm						No Odors	0
			0.1 ppm							

Legend: Physicol Observations — None, Sheen, Stain, Heavy

Site Id: SB-62

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 11/29/99	Date Completed: 11/29/99
Remarks: Sunny to partly cloudy, cold,~33F. Depth to groundwater approximately 3.0'. NA indicates not applicable.		Ground Elevation: 12.14'	Datum: NGVD
		Contractor: Vironex	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
16-20	NA	53	0.1 ppm		12.0-20.0: Red-brown, fine, SAND, trace to some silt, some coarse sand, trace coarse gravel, medium dense, non-cohesive, non-plastic, moist. (SM)				No Odors	
				20	20.0: Geoprobe refusal at 20.0 feet below ground surface. End of boring.					10

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-65

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 11/30/99	Date Completed: 11/30/99
Remarks: Very windy, 20F. Approximate groundwater table at 4' bgs. NA indicates not applicable.		Ground Elevation: 0.00'	Datum: NGVD
		Contractor: Vironex	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Wilkey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0-4	NA	100	0 ppm		0.0-4.0: Moist, red-brown SILT with some fine sand. Trace coarse sand and angular gravel. Loose. Non-cohesive.(ML)	0-4 ft.			No Odors	
4-8	NA	50	0 ppm		4.0-8.0: Wet, red-brown to brown fine to medium SAND. Little silt. Trace fine gravel. Loose. Non-cohesive. (SW)	4-8 ft.				
8-12	NA	70	0.5 ppm	10	8.0-12.0: Wet, brown to red-brown fine to coarse SAND. Some fine sand. Little silt. Loose. Non-cohesive. (SW)					-10
12-16	NA	30	0 ppm		12.0-16.0: Wet, red-brown SILT with little				No Odors	

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-65

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 11/30/99	Date Completed: 11/30/99
Remarks: Very windy, 20F. Approximate groundwater table at 4' bgs. NA indicates not applicable.		Ground Elevation: 0.00'	Datum: NGVD
		Contractor: Vironex	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
					clay and fine sand. Trace gravel (sbrnd). Slightly cohesive. Non-plastic. (ML)					
16-20	NA	60								
			0 ppm		16.0-18.0: Wet, red-brown to brown fine to medium SAND. Little silt, trace clay. Soft. Slightly cohesive. Non-plastic.(SW)				No Odors	
			0 ppm		18.0-20.0: Same as 16'-18' but with little fine gravel (subangular). (SW)					
				20	20.0: End of Boring.					

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: SB-66

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 11/30/99	Date Completed: 11/30/99
Remarks: Very windy, 20F. Approximate groundwater table at 4' bgs. NA indicates not applicable.		Ground Elevation: 0.00'	Datum: NGVD
		Contractor: Vironex	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0-4	NA	65	1.3 ppm		0.0-2.0: Moist, brown to black fine SAND with some silt. Non-cohesive. Loose. Non-plastic. Slight/ faint tar-like odor.(SW)	0-2 ft.			Slight Tar-like Odors	
			0.8 ppm		2.0-4.0: Moist, red-brown SILT. Non-cohesive. Non-plastic. Medium dense. (ML)				No Odors	
4-8	NA	70	0.9 ppm		4.0-6.0: Wet, red-brown SILT with little clays. Cohesive. Slightly plastic. Soft. (ML)					
			1.0 ppm		6.0-8.0: Wet, brown to dark brown medium to coarse SAND. Some silt. Trace fine gravel. Non-cohesive. Loose.(SW)					
8-12	NA	45	8.3 ppm	10	8.0-12.0: Wet, gray-brown fine to medium SAND. Little silt. Trace fine gravel. Loose. Non-cohesive. (SW)				No Odors	-10
12-16	NA	40	57.4 ppm		12.0-16.0: Wet, dark brown to gray coarse to very coarse SAND. Little silt. Some fine to coarse gravel (subangular). Non-cohesive. Non-plastic. Slight naphthalene odor.(SW)	12-16 ft.			Slight Naphthalene Odors	

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: SB-66

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 11/30/99	Date Completed: 11/30/99
Remarks: Very windy, 20F. Approximate groundwater table at 4' bgs. NA indicates not applicable.		Ground Elevation: 0.00'	Datum: NGVD
		Contractor: Vironex	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Wilkey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
16-20	NA	55	20.7 ppm		16.0-20.0: Wet, same as 12'-16' bgs. Slight naphthalene odor.(SW)	12-16 ft.			Slight Naphthalene Odors	
				20	20.0: End of Boring.					

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-66

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 11/30/99	Date Completed: 11/30/99
Remarks: Very windy, 20F. Approximate groundwater table at 4' bgs. NA indicates not applicable.		Ground Elevation: 0.00'	Datum: NGVD
		Contractor: Vironex	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
						12-16 ft.				
16-20	NA	55								
			20.7 ppm		16.0-20.0: Wet, same as 12'-16' bgs. Slight naphthalene odor.(SW)				Slight Naphthalene Odors	
				20	20.0: End of Boring.					-20

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: SB-67

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248	Project Name: Clifton Former MGP	Date Started: 11/30/99	Date Completed: 11/30/99
Remarks: Very windy, 20F. Approximate groundwater table at 4' bgs. NA indicates not applicable.		Ground Elevation: 0.00'	Datum: NGVD
		Contractor: Vironex	Total Depth: 20.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0–4	NA	50			0.0–4.0: Moist, red–brown fine SAND. Little medium sand and silt. Loose. Non–cohesive. (SW)					
			1.7 ppm			0–4 ft.			No Odors	
					At ~3' bgs: 0.2'–thick black–stained layer with little porcelain and glass.					
4–8	NA	80			4.0–5.0: Wet, red–brown to brown medium to coarse SAND. Trace fine gravel. Non–cohesive. (SW)					
			0 ppm			4–6 ft.				
					5.0–8.0: Wet, red–brown SILT. Non–plastic. Slightly cohesive. (ML)					
			0 ppm							
8–12	NA	45								
					8.0–11.0: Wet, red–brown SILT with little clay. Soft. Slightly plastic. Cohesive. (ML)					
			0 ppm	10						–10
12–15	NA	85			11.0–12.0: Wet, red–brown fine to medium SAND. Some silt. Loose. Non–cohesive. Non–plastic. (SW)				No Odors	
					12.0–15.0: Wet, brown to gray–brown SAND. Little to some silt. Loose. Non–plastic. Non–cohesive. (SW)					
			0.1 ppm							
					15.0: Refusal. Move rig over and drive					

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: RW-04

GEI Consultants, Inc.

ient: Keyspan Energy	
Project Number: 98248	Project Name: Clifton Former MGP
Remarks: Mostly cloudy, slightly breezy (~30 F) Steven Wallett logged RW-4 80-90', and monitored well installation.	

Date Started: 03/10/99	Date Completed: 03/12/99
Ground Elevation: 10.15'	Datum: NGVD
Contractor: ADT	Total Depth: 90.00'
Drilling Method: Hollow Stem Auger	
Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)	Well Construction
				20						-10	

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: RW-04

GEI Consultants, Inc.

Client: Keyspan Energy	
Project Number: 98248	Project Name: Clifton Former MGP
Remarks: Mostly cloudy, slightly breezy (~30 F) Steven Wallett logged RW-4 80-90', and monitored well installation.	

Date Started: 03/10/99	Date Completed: 03/12/99
Ground Elevation: 10.15'	Datum: NGVD
Contractor: ADT	Total Depth: 90.00'
Drilling Method: Hollow Stem Auger	
Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)	Well Construction
				40						-20 -30	

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: RW-04

GEI Consultants, Inc.

Client: Keyspan Energy	
Project Number: 98248	Project Name: Clifton Former MGP
Remarks: Mostly cloudy, slightly breezy (~30 F) Steven Wallett logged RW-4 80-90', and monitored well installation.	

Date Started: 03/10/99	Date Completed: 03/12/99
Ground Elevation: 10.15'	Datum: NGVD
Contractor: ADT	Total Depth: 90.00'
Drilling Method: Hollow Stem Auger	
Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)	Well Construction
				50						-40	

Legend: Physical Observations

None | Sheen | Stain | Heavy

Site Id: RW-04

GEI Consultants, Inc.

Client: Keyspan Energy	
Project Number: 98248	Project Name: Clifton Former MGP
Remarks: Mostly cloudy, slightly breezy (~30 F) Steven Wallett logged RW-4 60-90', and monitored well installation.	
Date Started: 03/10/99	Date Completed: 03/12/99
Ground Elevation: 10.15'	Datum: NGVD
Contractor: ADT	Total Depth: 90.00'
Drilling Method: Hollow Stem Auger	
Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)	Well Construction
60-62	7 3 6 9	58	0.0 ppm		60.0-61.0: Silty-SAND, trace gravel, trace clay, slightly moist. (SM)					-50	
					61.0-62.0: Red-brown, CLAY, some silt, layers of possible saprolite (weatered rock) throught interval, slightly moist. (CL)						
			0.0 ppm								
65-67	6 6 8 9	92	1.0 ppm		65.0-67.0: Brown, CLAY, layers of possible saprolite, slightly plastic, dense, slightly moist.(CL)						
			1.0 ppm						No Odors		
70-72	6 8 7 10	100		70						-60	
			0.3-1.0 ppm		70.0-72.5: Red to red-brown, CLAY, dense, with layers of possible saprolite throught, trace silt, dry. (CL)						
72-74	8 12 12 21	58									
			0.0-0.1 ppm								
					72.5-77.0: Red-brown to brown, silty fine SAND, slightly moist, slightly cohesive (SM)						

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-06

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/16/01	Date Completed: 11/16/01
Remarks: NA – Indicates Not Applicable		Ground Elevation: 11.87'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 44.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0–4	NA	100			0.0–4.0: HAND DUG, red brown sand, FILL (topsoil). (FI)					10
4–8	NA	75			4.0–7.2: Red–brown SILT, trace to little, medium to coarse sand, trace gravel, wood fragments, trace clay, moist to wet. (CL)					
			44 ppm		7.2–8.0: Grey–brown SILTY–CLAY, trace gravel, cohesive, plastic, moist. (CL)				None	
8–12	NA	60			8.0–11.3: Grey–brown SILTY–CLAY, trace gravel, soft, wet. (CL)					
			107 ppm	10						
12–16	NA	85			11.3–13.6: Grey SILTY–CLAY, red till, large rip–up clasts at 12.1', some minor sand lenses, moderately dense. (CL)					0
			216 ppm		13.6–16.0: Grey to Red–brown gravelly SILT, trace clay, coarse gravel, trace coarse sand, moist. Moderate naphthalene				Moderate	

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-06

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/16/01	Date Completed: 11/16/01
Remarks: NA - Indicates Not Applicable		Ground Elevation: 11.87'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 44.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
					odor, sheen. (ML)				
16-20	NA	58			16.0-16.5: Fine to medium well-sorted SAND, saturated with black, liquid tar, loose. Strong tar odor. (SW)				
					16.5-17.7: Sandy SILT, trace clay, wet, blebs. Strong tar odor. (ML)				
			1064 ppm		17.7-20.0: Fine to medium well-sorted SAND, saturated with black, liquid tar, loose. Strong tar odor. (SW)				
20-24	NA	60		20	20.0-20.8: Fine to medium well-sorted, medium to coarse SAND, little gravel, non-cohesive, loose. Strong tar odor, black liquid tar (NAPL). (SW)				
			1917 ppm		20.8-24.0: Red-brown SILT, trace clay, little tar-coated gravel, moderately dense, damp. Strong tar odor, tar and sheen in veins, tar-coated gravels. (ML)				-10
			986 ppm						
24-28	NA	60			24.0-24.8: Red-brown to grey SILT, soft, sheen and tar blebs. Strong tar odor. (ML)				
					24.8-27.1: Lense of SAND, saturated with black, liquid tar. Strong tar odor. (SW)				
			1734 ppm		27.1-28.0: Red-brown to grey SILT, trace to little gravel, little sand, soft. Strong tar odor, sheen, tar blebs. (ML)				
28-32	NA	75			28.0-29.7: BLACK, SAND, some silt and clay, little gravel, saturated with black NAPL, drainable liquid. Strong tar odor. (SC)				

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-06

GEI Consultants, Inc.

ent: Keyspan Energy

Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/16/01	Date Completed: 11/16/01
Remarks: NA – Indicates Not Applicable		Ground Elevation: 11.87'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 44.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
			2165 ppm		29.7–31.6: Red–brown SILT, trace to little gravel, dry, crumbly. Strong tar and naphthalene odor. (ML)	28–32 FT		Strong	
32–36	NA	63			31.6–32.0: Black medium to coarse SAND, non–cohesive, dense. Strong tar odor, tar–coated grains. (SW) 32.0–32.8: Black medium to coarse SAND, non–cohesive, dense. Strong tar odor, tar–coated grains, saturated. (SW)				–20
			980 ppm		32.8–36.0: Red–brown SILT, trace to little gravel, non–cohesive, dry. Strong tar odor, veins of sheen, tar–coated grains in till. (ML)				
36–40	NA	75							
			2206 ppm		36.0–40.0: Red–brown SILT, non–cohesive, dense, dry, crumbly. Strong tar odor, veins of tar (NAPL) around gravel. (ML)				
40–44	NA	40		40					
			310 ppm		40.0–44.0: Red–brown, SILT, trace gravel, trace sand, non–cohesive, damp. Strong tar odor near top of sample, slight naphthalene odor on bottom of sample, trace tar surrounds large gravel, sheen. (ML)	40–44 FT		Slight	–30
					44.0: End of Boring.				

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-07

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/19/01	Date Completed: 11/19/01
Remarks: NA - Indicates Not Applicable		Ground Elevation: 11.25'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 45.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
0-4	NA	70			0.0-1.1: Brown FILL, including silt and topsoil, non-cohesive, loose, dry. (FI)				10
			0 ppm		1.0-4.0: Red-brown FILL, including silt, gravel-sized coal fragments, trace gravel, loose, dry, non-cohesive. (FI)			None	
4-8	NA	30			4.0-5.0: Red-brown FILL, including silt, gravel-sized coal fragments, trace gravel, loose, moist to wet. (FI)				
			2 ppm		5.0-7.3: Red-brown, fine to medium SAND, trace silt, trace gravel, non-cohesive, wet. Trace naphthalene odor. (SM)				
					7.3-8.0: Grey-brown SILT, little clay, cohesive, slightly plastic. Trace naphthalene odor. (OL)				
8-12	NA	75			8.0-10.6: Light brown to black CLAY, little silt, soft to moderate-firm, cohesive. Organic odor. (OH)				
			78 ppm	10	10.6-12.0: Black to red-brown, fine to medium SAND, little silt, trace gravel, saturated. Trace naphthalene odor. (SM)			Slight	0
12-16	NA	83			12.0-13.2: Black, fine to medium CLAY, brown peat on top of sample, cohesive, wet. Trace naphthalene odor. (OH)				
			34 ppm		13.2-14.8: Grey to olive-grey SANDY CLAY, little silt, trace to little mica flakes, soft, saturated. (SC)	12-16 FT			
					14.8-16.0: Red-brown SILT, crumbly, dense, damp.				

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-07

GEI Consultants, Inc.

Client: Keyspan Energy

Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/19/01	Date Completed: 11/19/01
Remarks: NA – Indicates Not Applicable		Ground Elevation: 11.25'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 45.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
					Trace petroleum odor. (ML)					
16–20	NA	55								
					16.0–18.7: Red–brown SILT, trace to little clay, little sand, trace gravel, soft. Slight naphthalene odor. (ML)					
			3175 ppm			16–20 FT				
					18.7–19.2: Large, green–grey, serpentanite cobble. (GW)					
					19.2–20.0: Red–brown, fine to medium SAND, little silt stringer, non–cohesive, wet. Moderate to strong tar odor, NAPL–coated grains, sheen within sand lenses. (SW)					
20–24	NA	38		20	20.0–21.3: Black stained SAND, fine to medium, trace, coarse, loose sand, non–cohesive. Strong tar odor, tar saturated. (SW)				Strong	–10
			1947 ppm		21.3–24.0: Red–brown to grey SILT, trace gravel, non–cohesive, firm, damp. Trace naphthalene odor. (ML)					
24–28	NA	55								
					24.0–26.5: Red–brown to grey SANDY SILT, trace clay, non–cohesive, moist. Naph–thalene odor. (SM)				Slight	
			512 ppm							
					26.5–27.2: Grey to olive SILT, trace gravel (till), very dense, dry. Trace naphthalene odor. (ML)					
					27.2–28.0: Red–brown SILT, little sand, moderately dense. sheen and tar in veins, tar–coated grains. (ML)					
28–32	NA	83								
					28.0–29.9: Red–brown SILT, trace to little fine sand, trace gravel, non–cohesive, dense, dry, crumbly. Moderate tar odor, veins of sheen, tar–coated grains. (SC)					
					29.9–30.2: Layers of medium to coarse SAND and					

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-07

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/19/01	Date Completed: 11/19/01
Remarks: NA - Indicates Not Applicable		Ground Elevation: 11.25'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 45.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
			2775 ppm		gravel. Strong tar odor, tar saturated. (SW) 30.2-32.0: Red-brown SILT, trace to little fine sand, trace gravel, non-cohesive, dense, dry, crumbly. Moderate tar odor, veins of sheen, tar-coated grains. (ML)			Moderate	-20
32-36	NA	80							
			1275 ppm		32.0-36.0: Red-brown SILT, trace large gravel, fine sand, 0.2' layers of sand within till and gravel, moderately dense, dry to damp. Strong tar-like odor, veins of tar sheen, tar-coated grains, tar appears to fill smaller layers of sand within silt. (ML)			Strong	
36-40	NA	55							
			464 ppm		36.0-40.0: Red-brown, SILT, trace gravel, trace sand, non-cohesive, moderate dense, damp. Moderate tar odor, trace tar sheen, tar-coated grains. (ML)				
40-45	NA	46		40				Moderate	-30
			328 ppm		40.0-45.0: Red-brown SILT, trace to little gravel, non-cohesive, crumbly, dry to damp. Moderate tar odor, tar-coated grains in 0.1' layers around large gravels, minor tar sheen. (ML)				

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-08

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/16/01	Date Completed: 11/16/01
Remarks: NA – Indicates Not Applicable		Ground Elevation: 12.43'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 23.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
0–4	NA	55	10 ppm		0.0–3.5: Red–brown, fine to medium SAND, little silt, trace gravel, trace rootlets, non–cohesive, dry. (SM)				10
					3.5–4.0: Grey–brown, FILL, brick and coal fragments, trace clay and silt, cohesive, moist. Fuel oil–like odor. (Fl)				
4–8	NA	18	14 ppm		4.0–8.0: Red–brown to grey–brown, SILT, trace clay, trace sand and gravel, co–hesive. Slight fuel oil odor. (MH)			Slight	
8–12	NA	0		10	8.0–12.0: No Recovery.			Unknown	0
12–16	NA	20	121 ppm		12.0–16.0: Grey, SILT, trace clay, trace gravel and fine sand, trace rootlets, (peat–like brown) cohesive. Moderate tar odor. (ML)	12–16 FT		Moderate	

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-08

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/16/01	Date Completed: 11/16/01
Remarks: NA – Indicates Not Applicable		Ground Elevation: 12.43'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 23.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
16-20	NA	50	2145 ppm		16.0-20.0: Black tar, FILL, concrete, steel, trace sand, wood fragments, semi-viscous to runny tar. (FI)	16-20 FT		Strong	
20-23	NA	0		20	20.0-23.0: Liquid, runny black tar, concrete and brick fragements. Strong tar odor. (FI)				-10
					23.0: Refusal. End of boring.				

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-09

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/16/01	Date Completed: 11/16/01
Remarks: NA - Indicates Not Applicable		Ground Elevation: 12.99'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 16.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
0-4	NA	65			0.0-0.5: Brown to bark brown SILT (topsoil), trace gravel-sized slag, trace gravel, non-cohesive, dry. (FI)				
			0 ppm		0.5-4.0: Red-brown, fine to medium SAND, trace silt, trace fine gravel, non-cohesive, moist to wet. (FI)			None	10
4-8	NA	15			4.0: Refusal. Drills with spear bit. Apparent groundwater table.				
			233 ppm		4.0-8.0: Black taffy-like TAR, trace sand grains and wood fragments, slight to moderate tar odor. (FI)	4-8 FT			
8-12	NA	38							
			251 ppm	10	8.0-12.0: Brown-grey SILT, trace to little fine sand, trace gravel, saturated, tar chunks, tar blebs sheen, tar coated grains at bottom of sample, moderate tar odor. (FI)			Moderate	
12-16	NA	38							0
			607 ppm		12.0-16.0: Black coarse, gravel-sized concrete and wood chunks, FILL, tar-coated grains, sheen, moderate tar odor, residual product. (FI)	12-16 FT			

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-09

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/16/01	Date Completed: 11/16/01
Remarks: NA - Indicates Not Applicable		Ground Elevation: 12.99'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 16.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
					16.0: Refusal. End of boring.				
				20					-10

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-10

GEI Consultants, Inc.

ient: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/15/01	Date Completed: 11/15/01
Remarks: NA – Indicated Not Applicable		Ground Elevation: 13.17'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 45.00'
		Drilling Method: Geoprobe	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
0–4	NA	88	0.8 ppm		0.0–4.0: Brown to dark grey, FILL, fine sand, some silt, few bricks, few gravel, non–cohesive, loose, dry to moist. (FI)				None	10
4–8	NA	58	266 ppm		4.0–8.0: Brown to dark grey, FILL, fine sand, some silt, few bricks, few gravel, non–cohesive, loose, wet. Slight naphthalene/tar odor, light sheen at 8'. (FI)				Slight	
8–12	NA	58	1167 ppm	10	8.0–12.8: Brown to grey SILT and fine to very fine SAND, little medium to coarse sand, trace rootlets and peaty material, cohesive, soft, wet. Strong tar–like odor, tar NAPL in pore spaces, some sheen. (SM)				Strong	0
12–16	NA	45	457 ppm							

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-10

CEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/15/01	Date Completed: 11/15/01
Remarks: NA - Indicated Not Applicable		Ground Elevation: 13.17'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 45.00'
		Drilling Method: Geoprobe	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
16-20	NA	55			12.8-19.4: Fine to coarse SAND in varying colors, few fine gravel, wet. Strong tar-like odor, heavy tar NAPL coating on all grains, heavy sheen. (SW)					
			336 ppm			16-20 FT				
					19.4-20.0: Brown to red very fine SAND, SILT and CLAY, few medium to coarse sand, trace fine gravel, cohesive, dense, moist, native. Slight tar-like odor, tar (NAPL) on top, otherwise no visual contamination. (SC)					
20-24	NA	75		20					Slight	
			1662 ppm		20.0-24.0: Brown to red very fine SAND, SILT and CLAY, few medium to coarse sand, trace fine gravel, cohesive, dense, moist, native. Strong tar-like odor, 0.1' fine to medium sand lense saturated with NAPL at 21', no contamination elsewhere in sample. (SC)				Strong	
			234 ppm							-10
24-28	NA	80			24.0-28.0: Red-brown SILT, few fine gravel, little clay, trace medium to coarse sand, cohesive, firm, moist. Very slight tar-like odor. (ML)					
			113 ppm							
28-32	NA	63								

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-10

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/15/01	Date Completed: 11/15/01
Remarks: NA - Indicated Not Applicable		Ground Elevation: 13.17'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 45.00'
		Drilling Method: Geoprobe	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			154 ppm						Very slight	
32-36	NA	43			28.0-36.0: Red-brown SILT, few fine gravel, little clay, trace medium to coarse sand, very cohesive, firm, moist. Very slight tar-like odor. (ML)					-20
			156 ppm							
36-40	NA	65								
			163 ppm		36.0-40.0: Red-brown, SILT, few fine gravel, little clay, trace medium to coarse sand, very cohesive, dense, moist. (ML)				None	
40-45	NA	62		40						
			402 ppm		40.0-45.0: Red-brown, SILT, few fine gravel, little clay, trace medium to coarse sand, very cohesive, dense, moist. Very slight naphthalene/tar-like odor. (ML)	40-45 FT			Very Slight	-30
					45.0: End of boring					

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-11

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/15/01	Date Completed: 11/15/01
Remarks: NA - Indicates Not Applicable		Ground Elevation: 12.87'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 45.00'
		Drilling Method: Geoprobe	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
0-3	NA	100			0.0-3.0: Hand dug. FILL, rubble, clinker, brown fine to coarse sand, trace glass. (FI)				
3-8	NA	16	0.6 ppm		3.0-8.0: Medium brown fine SAND and SILT, trace fine gravel, trace brick fragments, slightly cohesive, moist. (FI)			None	10
8-12	NA	45	144 ppm						
			65 ppm	10	8.0-12.0: Brown to dark brown SILT, fine to coarse SAND and FILL, trace fine gravel, few timber fragments, slightly cohesive, wet. Slight naphthalene/tar odor mixed with fuel-like odors. (FI)				
12-16	NA	60	239 ppm		12.0-16.0: Brown to dark brown, fine to coarse sand and silt, FILL, trace fine gravel, trace timbers, slightly cohesive, wet. Slight naphthalene/tar-like odor, trace sheen. (FI)			Slight	0

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-11

GEI Consultants, Inc.

ient: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/15/01	Date Completed: 11/15/01
Remarks: NA - Indicates Not Applicable		Ground Elevation: 12.87'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 45.00'
		Drilling Method: Geoprobe	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
16-20	NA	75	535 ppm		16.0-17.3: Medium-coarse SAND and GRAVEL, non-cohesive, loose, wet. Strong tar-like odor, 50% tar, 50% water, moderate sheen. (GW)				Strong	
			550 ppm		17.3-20.0: Red-brown, SILT, very fine sand and clay, little medium to coarse sand, trace fine to coarse gravel, cohesive, dense, firm, moist. Slight to moderate tar-like odor, trace tar coating on gravel, trace tar stringers, 99% of sample. (ML)	16-20 FT			Moderate	
20-24	NA	70	215 ppm	20	20.0-24.0: Red-brown SILT and CLAY, few medium to coarse sand, trace fine to medium gravel, cohesive, firm, moist. Slight tar odor, 0.1' tar-coated gravel at approximately 24'. (ML)					-10
24-28	NA	63	196 ppm		24.0-28.0: Red-brown SILT and CLAY, few medium to coarse sand, trace fine to medium gravel, very cohesive, firm, moist. Very slight tar-like odor. (ML)				Slight	
28-32	NA	78			28.0-32.0: Red-brown SILT and CLAY, few medium to coarse sand, trace fine to medium gravel, very cohesive, firm, moist. Slight to moderate tar odor 0.6'				Moderate	

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-11

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/15/01	Date Completed: 11/15/01
Remarks: NA - Indicates Not Applicable		Ground Elevation: 12.87'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 45.00'
		Drilling Method: Geoprobe	
		Logged By: Andrew Brey	Certified By: Lynn Willey

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
			683 ppm		of trace tar blebs and tar-coated gravel at 30.5 to 32.0'. (ML)					
32-36	NA	83							Moderate	
					32.0-36.0: Red-brown SILT and CLAY, few medium to coarse sand, trace fine to medium gravel, very cohesive, firm, moist. Moderate tar-like odor, trace tar coating with associated tar stringers through mini-fractures. (ML)					-20
			484 ppm							
36-40	NA	55								
					36.0-40.0: Red-brown SILT and CLAY, few medium to coarse sand, few fine to coarse arkose gravel, very cohesive, dense, slightly moist. Slight tar odor, trace tar coating on few gravel, several dime-sized tar spots where fine-grained material is coated completely. (ML)					
			368 ppm							
40-45	NA	72		40					Slight	
					40.0-45.0: Red-brown SILT and CLAY, few medium to coarse sand, few fine to coarse arkose gravel, very cohesive, dense, firm, slightly moist, slight tar-like/MGP odor. (ML)	40-45 FT				-30
			95 ppm							
					45.0: End of boring					

Legend: Physical Observations — None, Sheen, Stain, Heavy

Site Id: GP-12

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/14/01	Date Completed: 11/14/01
Remarks: Sunny, warm, 60 F NA - Indicates Not Applicable		Ground Elevation: 12.54'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 45.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description: color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology / Physical Observations	Odors	Elevation (ft)
0-4	NA	63	0 ppm		0.0-6.0: Brown to red-brown SILT and fine to medium sand, trace gravel, non-cohesive, dry to moist. (SM)			None	10
4-8	NA	30	0 ppm		6.0-8.0: Red-brown SILT, trace fine sand, trace gravel, non-cohesive, wet. (ML)				
8-12	NA	63	25 ppm	10	8.0-12.0: Red-brown to grey silty SAND to sandy silt, trace little gravel, non-cohesive, loose, saturated with water. Petroleum-like sheen, blebs of tar. (SM)				
12-16	NA	65	59 ppm		12.0-12.9: Red-brown to grey silty, fine to medium SAND, trace silt, trace little gravel, non-cohesive. Petroleum odor, sheen, trace tar blebs. (SM) 12.9-16.0: Red-brown SILT, little sand, trace to little gravel, non-cohesive, dense, moist. Slight petroleum odor. (SM)				0

Legend: Physical Observations — None; Sheen; Stain; Heavy

Site Id: GP-12

GEI Consultants, Inc.

Client: Keyspan Energy			
Project Number: 98248-1007	Project Name: Clifton Former MGP	Date Started: 11/14/01	Date Completed: 11/14/01
Remarks: Sunny, warm, 60 F NA - Indicates Not Applicable		Ground Elevation: 12.54'	Datum: NAVD 88
		Contractor: Zebra Environmental	Total Depth: 45.00'
		Drilling Method: Geoprobe	
		Logged By: Lynn Willey	Certified By:

Split Spoon Sample Depth (ft.)	Blows Per 6 Inches	Recovery %	PID	Depth (ft.)	Soil Description color, density, SOIL, admixture, moisture, other notes, ORIGIN.	Analyzed Sample Interval	Lithology	Physical Observations	Odors	Elevation (ft)
16-20	NA	80	218 ppm		16.0-20.0: Red-brown SILT, trace to little fine gravel, trace to little sand, dense to soft. Slight naphthalene and tar odor, small vein of black, viscous tar. (ML)				Slight	
20-24	NA	65	86 ppm	20	20.0-24.0: Red-brown SILT, trace to little gravel, non-cohesive, dense, damp to moist. Trace naphthalene-like odor. (ML)	20-24 FT				-10
24-28	NA	63	1363 ppm		24.0-28.0: Red-brown SILT, trace to little fine to medium sand, trace to little gravel, non-cohesive, moderately soft to moderately dense. Slight to moderate naphthalene-like and tar odor, NAPL in veins, sheen. (ML)					
28-32	NA	43			28.0-32.0: Red-brown SILT, trace to little fine to medium sand, trace to little gravel, rock in tip of shoe, non-cohesive, moderately soft to moderately dense				Moderate	

Legend: Physical Observations — None, Sheen, Stain, Heavy

BORING/WELL LOG					Boring No. MW-1			
PROJECT - Clifton Station Facility, Brooklyn Union Gas					CONTRACTOR - FP&M		PAGE 1 OF 2	
PROJECT NO. 291-93-01					LOCATION - Staten Island, NY		DATE 4/1/93	
MP ELEVATION -					DATUM - Mean Sea Level		DRILLER: Aquifer Drilling and Testing, Inc.	
WATER LEVELS					DRILLING AND SAMPLING			
DATE	DW	DTW			CASING	SAMPLER	CORE	TUBE
4/5/93	-	1.45 feet		TYPE	SCH 40 PVC	Split Spoon	-	-
4/14/93	22.37 feet	1.87 feet		I.D.	-	2 inch	-	-
-	-	-	-	WT/Fall	-	-	-	-

Depth (ft)	Organic Vapors (ppm)	Sample Number	Blows per 6 in.	Recovery (inches)	SAMPLE DESCRIPTION, REMARKS, AND STRATUM CHANGES
0					
1					
2	5	1	4 2		(2-4 feet) Medium brown and black fill material with bricks and asphalt. Odor present.
3			7 3	4	
4	0.9	2	1 4		(4-6 feet) Medium brown fine to medium sand with lenses of dark green and gray silty clay. Slight odor.
5			5 5	8	
6	2	3	3 8		(6-8 feet) Gray fine sand and silty clay; some brown silty sand. Slight odor.
7			9 8	15	
8	1	4	3 6		(8-10 feet) Gray silty sand and gravel; some brown sand and clay and trace of white sand and green clay. No odor.
9			7 11	20	
10	0.3	5	4 13		(10-12 feet) Grayish brown fine sand with some brown and green gravel.
11			16 17	4	
12	0.2	6	14 23		(12-14 feet) Medium brown fine sand and silty clay; some gravel, very compact.

BORING/WELL LOG					Boring No. MW-1			
PROJECT - Clifton Station Facility, Brooklyn Union Gas					CONTRACTOR - FP&M		PAGE 2 OF 2	
PROJECT NO. 291-93-01					LOCATION - Staten Island, NY		DATE 4/1/93	
MP ELEVATION -					DATUM - Mean Sea Level		DRILLER: Aquifer Drilling and Testing, Inc.	
WATER LEVELS					DRILLING AND SAMPLING			
DATE	DW	DTW			CASING	SAMPLER	CORE	TUBE
4/5/93	-	1.45 feet		TYPE	SCH 40 PVC	Split Spoon	-	-
4/14/93	22.37 feet	1.87 feet		I.D.	-	2 inch	-	-
-	-	-	-	WT/Fall	-	-	-	-

Depth (ft)	Organic Vapors (ppm)	Sample Number	Blows per 6 in.	Recovery (inches)	SAMPLE DESCRIPTION, REMARKS, AND STRATUM CHANGES
13			14 13	6	
14	0.3	7	4 5		(14-16 feet) Reddish brown fine sand with silty clay; trace of white sand and gray clay. Compact.
15			6 8	16	
16	0	8	6 7		(16-18 feet) Reddish brown silty clay with some fine sand. Compact. Moderately saturated.
17			11 12	22	
18	0.1	9	5 6		(18-20 feet) Same as above.
19			7 5	14	
20	0	10	7 8		(20-22 feet) Same as above.
21			16 20	18	
22	0.2	11	20 24		(22-24 feet) Same as above.
23			24 23	3	
					Boring terminated and 4-inch ID, SCH 40 PVC well constructed. Screen from he top to bottom. Measuring point is top of PVC casing 0.45 feet below grade. All samples obtained with a 2" ID split spoon.

					BORING/WELL LOG			Boring No. MW-2
PROJECT - Clifton Station Facility, Brooklyn Union Gas					CONTRACTOR - FP&M			PAGE 1 OF 2
PROJECT NO. 291-93-01					LOCATION - Staten Island, NY			DATE 4/1/93
MP ELEVATION -					DATUM - Mean Sea Level			DRILLER: Aquifer Drilling and Testing, Inc.
WATER LEVELS					DRILLING AND SAMPLING			
DATE	DW	DTW			CASING	SAMPLER	CORE	TUBE
4/5/93	-	1.84 feet		TYPE	SCH 40 PVC	Split Spoon	-	-
4/14/93	23.66 feet	1.71 feet		I.D.	-	2 inch	-	-
-	-	-	-	WT/Fall	-	-	-	-

Depth (ft)	Organic Vapors (ppm)	Sample Number	Blows per 6 in.	Recovery (inches)	SAMPLE DESCRIPTION, REMARKS, AND STRATUM CHANGES
0					
1					
2					
3					
4					
5	0	1	8 5		(5-7 feet) Grayish brown medium sand with some silt. Trace of gravel.
6			4 3	3	
7					
8					
9					
10	0	2	6 7		(10-12 feet) Medium brown fine sand and silt with lenses of green clay. Some grayish brown silty sand with clay. Trace of white sand.
11			10 8	12	
12					
13					
14					
15	0	3	23 53		(15-17 feet) Medium brown sand with trace of gray clay.

					BORING/WELL LOG			Boring No. MW-2
PROJECT - Clifton Station Facility, Brooklyn Union Gas					CONTRACTOR - FP&M			PAGE 2 OF 2
PROJECT NO. 291-93-01					LOCATION - Staten Island, NY			DATE 4/1/93
MP ELEVATION -					DATUM - Mean Sea Level			DRILLER: Aquifer Drilling and Testing, Inc.
WATER LEVELS					DRILLING AND SAMPLING			
DATE	DW	DTW			CASING	SAMPLER	CORE	TUBE
4/5/93	-	1.84 feet		TYPE	SCH 40 PVC	Split Spoon	-	-
4/14/93	23.66 feet	1.71 feet		I.D.	-	2 inch	-	-
-	-	-	-	WT/Fall	-	-	-	-

Depth (ft)	Organic Vapors (ppm)	Sample Number	Blows per 6 in.	Recovery (inches)	SAMPLE DESCRIPTION, REMARKS, AND STRATUM CHANGES
16			22 10	2	
17		4	11 13		(17-19 feet) Reddish brown fine sand, some gray clay and green gravel.
18			11 10	3	
19					
20		5	16 22		(20-22 feet) Reddish brown fine sand, some silt and clay, very compact.
21			27 22	14	
22					
23					
24					
25		6	18 22		(25-27 feet) Same as above.
26			26 32	20	
27					
28					Boring terminated and 4-inch ID, SCH 40 PVC well constructed. Screen from the top to bottom. Measuring point is top of PVC casing 0.5 feet below grade. All samples obtained with a 2" ID split spoon.

BORING/WELL LOG					Boring No. MW-3
PROJECT - Clifton Station Facility, Brooklyn Union Gas				CONTRACTOR - FP&M	PAGE 1 OF 2
PROJECT NO. 291-93-01				LOCATION - Staten Island, NY	DATE 4/1/93
MP ELEVATION -				DATUM - Mean Sea Level	DRILLER: Aquifer Drilling and Testing, Inc.

WATER LEVELS				
DATE	DW	DTW		
4/14/93	20.05 feet	1.51 feet	-	TYPE
-	-	-	-	I.D.
-	-	-	-	WT/Fall

DRILLING AND SAMPLING			
CASING	SAMPLER	CORE	TUBE
SCH 40 PVC	Split Spoon	-	-
-	2 inch	-	-
-	-	-	-

Depth (ft)	Organic Vapors (ppm)	Sample Number	Blows per 6 in.	Recovery (inches)	SAMPLE DESCRIPTION, REMARKS, AND STRATUM CHANGES
0	20	1	6 11		(0-2 feet) Black petroleum coated material, strong petroleum odor.
1			7 13	14	
2	25	2			(2-4 feet) Medium brown medium sand with black petroleum product, petroleum odor.
3				3	
4	15	3	2 2		(4-6 feet) No recovery.
5			4 6	0	
6	2	4			(6-8 feet) Dark gray clay, some medium brown medium sand, petroleum odor.
7				16	
8					
9					
10	4	5	7 7		(10-12 feet) Medium brown clay with fine sand, petroleum odor.
11			9 9	20	
12					
13					
14					

BORING/WELL LOG								Boring No. MW-3
PROJECT - Clifton Station Facility, Brooklyn Union Gas					CONTRACTOR - FP&M			PAGE 2 OF 2
PROJECT NO. 291-93-01					LOCATION - Staten Island, NY			DATE 4/1/93
MP ELEVATION -					DATUM - Mean Sea Level			DRILLER: Aquifer Drilling and Testing, Inc.
WATER LEVELS					DRILLING AND SAMPLING			
DATE	DW	DTW			CASING	SAMPLER	CORE	TUBE
4/14/93	20.05 feet	1.51 feet		TYPE	SCH 40 PVC	Split Spoon	-	-
-	-	-		I.D.	-	2 inch	-	-
-	-	-	-	WT/Fall	-	-	-	-

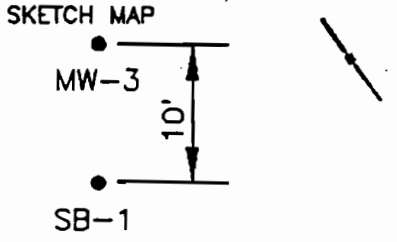
Depth (ft)	Organic Vapors (ppm)	Sample Number	Blows per 6 in.	Recovery (inches)	SAMPLE DESCRIPTION, REMARKS, AND STRATUM CHANGES
15	5	6	5 6		(15-17 feet) Same as above. Petroleum odor.
16			7 8	3	
17					
18					
19					
20	2	7	7 8		(20-22 feet) Reddish brown fine sand and clay. Compact. Very slight petroleum odor.
21			6 6	15	
22					Boring terminated and 4 inch ID, SCH 40 PCV well constructed. Screened from top to bottom. Measuring point is top of PVC casing, 0.3 feet below grade. All samples obtained with a 2" ID split spoon.

tac240

Fanning, Phillips & Molnar
Engineers
Ronkonkoma New York

PROJECT CLIFTON STATION OWNER BROOKLYN UNION
LOCATION 40 WILLOW AVE. W.O. No. 291-93-01
BORING No. SB-1 TOTAL DEPTH 6' DIAMETER —
SURFACE ELEV. — WATER LEVEL INITIAL ~4' 24-hrs —
SCREEN DIA. — LENGTH — SLOT SIZE —
CASING DIA. — LENGTH — TYPE —
DRILLING COMP. ADT, INC DRILLING METHOD HOLLOW STEM AUGER
DRILLER C.PUENTE LOG BY M.T. RAKOVAN DATE DRILLED 12/7/93

SKETCH MAP



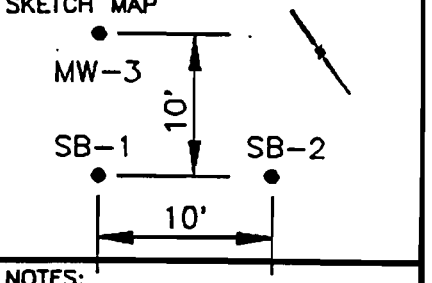
NOTES:

DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	GRAPHIC LOG	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
1	SPLIT SPOON			0-2' TOP: ASPHALT MATERIAL BOTTOM: REDDISH BROWN FINE SAND, SILT & CLAY BLOW COUNT: 8-16-14-10, 6" RECOVERY PID READING: 0 ppm
2				
3	SPLIT SPOON			2'-4' REDDISH BROWN FINE SAND, SILT & CLAY WITH GRAY MEDIUM SAND, WET AT THE BASE BLOW COUNT: 5-4-3-2, 8" RECOVERY PID READING: 0 ppm
4				
5	SPLIT SPOON			4'-6' BROWN GRAY FINE SAND, SILT & CLAY WET BLOW COUNT: 3-5-5-3, 3" RECOVERY PID READING: 0 ppm
6				

Fanning, Phillips & Molnar
Engineers
Ronkonkoma New York

PROJECT CLIFTON STATION OWNER BROOKLYN UNION
LOCATION 40 WILLOW AVE. W.O. No. 291-93-01
BORING No. SB-2 TOTAL DEPTH 6' DIAMETER
SURFACE ELEV. — WATER LEVEL INITIAL ~4' 24-hrs
SCREEN DIA. — LENGTH — SLOT SIZE —
CASING DIA. — LENGTH — TYPE —
DRILLING COMP. ADT, INC DRILLING METHOD HOLLOW STEM AUGER
DRILLER C.PUENTE LOG BY M.T. RAKOVAN DATE DRILLED 12/7/93

SKETCH MAP



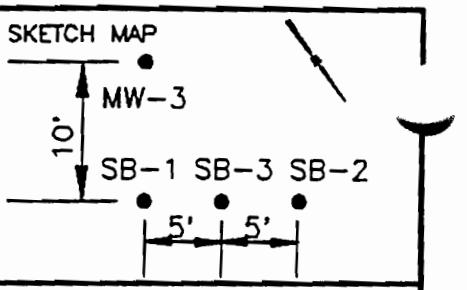
NOTES:

DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	GRAPHIC LOG	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
1	SPLIT SPOON			0-2' DARK BROWN FINE SAND, SILT & CLAY WITH GRAY SAND & LIGHT BROWN SAND BLOW COUNT: 5-10-12-10 6" RECOVERY PID READING: 0.6 ppm-TOP 1.2 ppm-BASE
2				
3	SPLIT SPOON			
4				
5	SPLIT SPOON			2'-4' REDDISH BROWN FINE SAND, SILT & CLAY WITH DARK BROWN FINE SAND. BLOW COUNT: 5-5-4-5, 10" RECOVERY PID READING: 3.2 ppm
6				4'-6' DARK BROWN TO REDDISH BROWN FINE TO MEDIUM SAND, SILT & CLAY WITH TRACE OF COARSE SAND & FILL MATERIAL BLOW COUNT: 4-6-7-8, 14" RECOVERY PID READING: 5.5 ppm

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PROJECT CLIFTON STATION OWNER BROOKLYN UNION
LOCATION 40 WILLOW AVE. W.O. No. 291-93-01
BORING No. SB-3 TOTAL DEPTH 6' DIAMETER —
SURFACE ELEV. — WATER LEVEL INITIAL ~3' 24-hrs —
SCREEN DIA. — LENGTH — SLOT SIZE —
CASING DIA. — LENGTH — TYPE —
DRILLING COMP. ADT, INC DRILLING METHOD HOLLOW STEM AUGER
DRILLER C.PUENTE LOG BY M.T. RAKOVAN DATE DRILLED 12/7/93

SKETCH MAP



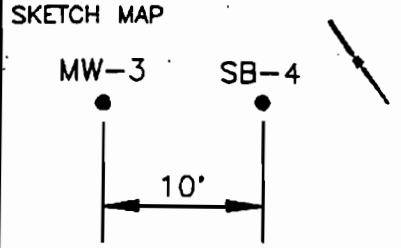
NOTES:

DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	GRAPHIC LOG	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
1	SPLIT SPOON			0-2' TOP: BROWN FINE SAND, SILT & CLAY WITH SOME FILL MATERIAL & SOME BLACK COARSE ASPHALT OR COAL MATERIAL SLIGHT PETROLEUM ODOR.
2				BOTTOM: REDDISH BROWN FINE SAND, SILT & CLAY
3	SPLIT SPOON			BLOW COUNT: 5-10-12-12, 8" RECOVERY
4				PID READING: .5-1 ppm
5	SPLIT SPOON			2'-4' DARK BROWN SILT & CLAY WITH TRACE OF FINE SAND. WET.
6				BLOW COUNT: 4-4-4-4, 6" RECOVERY
				PID READING: 2.6 ppm
				4'-6' DARK BROWN SILT & CLAY WITH TRACE OF FINE SAND. WET.
				BLOW COUNT: 4-5-6-6, 5" RECOVERY
				PID READING: 2.5 ppm

Fanning, Phillips & Molnar
Engineers
Ronkonkoma New York

PROJECT CLIFTON STATION OWNER BROOKLYN UNION
LOCATION 40 WILLOW AVE. W.O. No. 291-93-01
BORING No. SB-4 TOTAL DEPTH 8' DIAMETER —
SURFACE ELEV. — WATER LEVEL INITIAL ~6' 24-hrs —
SCREEN DIA. — LENGTH — SLOT SIZE —
CASING DIA. — LENGTH — TYPE —
DRILLING COMP. ADT, INC DRILLING METHOD HOLLOW STEM AUGER
DRILLER C.PUENTE LOG BY M.T. RAKOVAN DATE DRILLED 12/7/93

SKETCH MAP



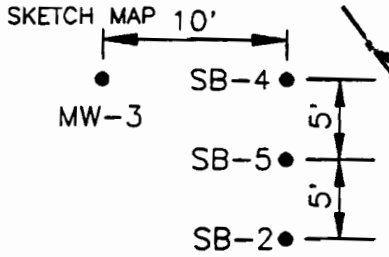
NOTES:

DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	GRAPHIC LOG	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
1	SPLIT SPOON			0-2' BROWN FINE SAND WITH VARIOUS SIZES OF FILL MATERIAL, BRICK, etc. SLIGHT HYDROCARBON ODOR. BLOW COUNT: 20-18-10-5, 7" RECOVERY PID READING: 0 ppm
2				
3	SPLIT SPOON			
4				
5	SPLIT SPOON			2'-4' REDDISH BROWN SILT & CLAY WITH TRACE OF FINE SAND BLOW COUNT: 3-3-4-4, 4" RECOVERY PID READING: 2.4 ppm
6				
7	SPLIT SPOON			4'-6' REDDISH BROWN SILT & CLAY WITH TRACE OF SAND & ORGANIC MATERIAL. ONE 1" BLACK SAND LAYER WITH PETROLEUM ODOR. BLOW COUNT: 4-4-6-7, 6" RECOVERY PID READING: 3.5 ppm 11.5 ppm AT THE BLACK LAYER
8				6'-8' GRAY TIGHT CLAY, ROOT MATERIAL AT THE BASE. SLIGHT PETROLEUM ODOR. WET. BLOW COUNT: 4-6-12-14, 12" RECOVERY PID READING: 1.7 ppm

Fanning, Phillips & Molnar
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Ronkonkoma New York

PROJECT CLIFTON STATION OWNER BROOKLYN UNION
LOCATION 40 WILLOW AVE. W.O. No. 291-93-01
BORING No. SB-5 TOTAL DEPTH 8' DIAMETER —
SURFACE ELEV. — WATER LEVEL INITIAL — 24-hrs —
SCREEN DIA. — LENGTH — SLOT SIZE —
CASING DIA. — LENGTH — TYPE —
DRILLING COMP. ADT, INC DRILLING METHOD HOLLOW STEM AUGER
DRILLER C.PUENTE LOG BY M.T. RAKOVAN DATE DRILLED 12/7/93

SKETCH MAP



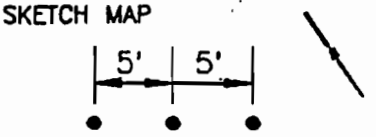
NOTES:

DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	GRAPHIC LOG	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
1	SPLIT SPOON		FILL	0-6" REMNANTS FROM SOIL CLEANUP OF THE DEEP WELL, PETROLEUM ODOR.
2				
3	SPLIT SPOON			6"-2' REDDISH BROWN SILT & CLAY WITH TRACE OF FINE SAND BLOW COUNT: 5-6-11-11, 3" RECOVERY PID READING: 0 ppm
4				
5	SPLIT SPOON			2'-4' BROWN SILT & CLAY WITH SOME FINE SAND & MEDIUM SAND BLOW COUNT: 12-10-7-7, 4" RECOVERY PID READING: 0.7 ppm
6				
7	SPLIT SPOON			4'-6' BROWN SILT & CLAY WITH TRACE OF FINE SAND & SCATTERED GREEN SAND. SATURATED. BLOW COUNT: 4-4-6-7, 8" RECOVERY PID READING: 2-4 ppm
8				6'-8' GRAY TIGHT CLAY. WET. BLOW COUNT: 5-10-10-12, 4" RECOVERY PID READING: 4.6 ppm

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Ronkonkoma New York

PROJECT CLIFTON STATION OWNER BROOKLYN UNION
LOCATION 40 WILLOW AVE. W.O. No. 291-93-01
BORING No. SB-6 TOTAL DEPTH 8' DIAMETER —
SURFACE ELEV. — WATER LEVEL INITIAL ~6' 24-hrs —
SCREEN DIA. — LENGTH — SLOT SIZE —
CASING DIA. — LENGTH — TYPE —
DRILLING COMP. ADT, INC DRILLING METHOD HOLLOW STEM AUGER
DRILLER C.PUENTE LOG BY M.T. RAKOVAN DATE DRILLED 12/7/93

SKETCH MAP



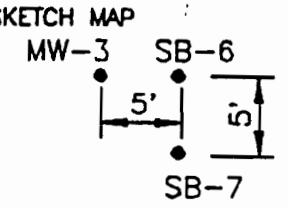
NOTES:

DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	GRAPHIC LOG	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
1	SPLIT SPOON		FILL	0-2' TOP: FILL MATERIAL BOTTOM: REDDISH BROWN SILT & CLAY WITH TRACE OF FINE SAND BLOW COUNT: 19-12-9-7, 6" RECOVERY OVA READING: 1 ppm
2				
3	SPLIT SPOON			
4				
5	SPLIT SPOON			2'-4' TOP: DARK BROWN SILT & CLAY WITH SOME FINE SAND BOTTOM: REDDISH BROWN SILT & CLAY WITH TRACE OF FINE SAND BLOW COUNT: 3-3-4-5, 14" RECOVERY OVA READING: 1 ppm
6				
7	SPLIT SPOON			4'-6' REDDISH BROWN SILT & CLAY WITH TRACE OF FINE SAND. WET. BLOW COUNT: 3-3-4-5, 12" RECOVERY OVA READING: 2 ppm
8				6'-8' TOP: REDDISH BROWN SILT & CLAY WITH SOME FINE SAND. WET. BOTTOM: GRAY TIGHT CLAY BLOW COUNT: 10-12-12-15, 10" RECOVERY OVA READING: 8 ppm

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Engineers
Ronkonkoma New York

PROJECT CLIFTON STATION OWNER BROOKLYN UNION
LOCATION 40 WILLOW AVE. W.O. No. 291-93-01
BORING No. SB-7 TOTAL DEPTH 6' DIAMETER —
SURFACE ELEV. — WATER LEVEL INITIAL — 24-hrs —
SCREEN DIA. — LENGTH — SLOT SIZE —
CASING DIA. — LENGTH — TYPE —
DRILLING COMP. ADT, INC DRILLING METHOD HOLLOW STEM AUGER
DRILLER C.PUENTE LOG BY M.T. RAKOVAN DATE DRILLED 12/7/93

SKETCH MAP



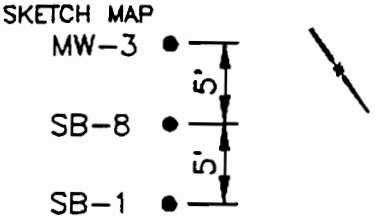
NOTES:

DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	GRAPHIC LOG	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
1				1'-3' TOP: FILL MATERIAL BOTTOM: REDDISH BROWN SILT & CLAY WITH FINE SAND. BLOW COUNT: 7-9-10-15, 8" RECOVERY OVA READING: 1 ppm
2	SPLIT SPOON			
3				
4	SPLIT SPOON			3'-5' REDDISH BROWN SILT & CLAY WITH FINE SAND. BLOW COUNT: 6-6-3-3, 6" RECOVERY OVA READING: 0.5-1 ppm
5				
6	SPLIT SPOON			5'-7' TOP: GRAY SILT & CLAY BOTTOM: REDDISH BROWN SILT & CLAY WITH TRACE OF SAND. BLOW COUNT: 4-5-6-7, 14" RECOVERY OVA: 4 ppm (TOP) 1.5 ppm (BOTTOM)
7				

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Engineers
Ronkonkoma New York

PROJECT CLIFTON STATION OWNER BROOKLYN UNION
LOCATION 40 WILLOW AVE. W.O. No. 291-93-01
BORING No. SB-8 TOTAL DEPTH 6' DIAMETER —
SURFACE ELEV. — WATER LEVEL INITIAL ~4' 24-hrs —
SCREEN DIA. — LENGTH — SLOT SIZE —
CASING DIA. — LENGTH — TYPE —
DRILLING COMP. ADT, INC DRILLING METHOD HOLLOW STEM AUGER
DRILLER C.PUENTE LOG BY M.T. RAKOVAN DATE DRILLED 12/7/93

SKETCH MAP



NOTES:

DEPTH (FEET)	SAMPLE NUMBER	WELL CONSTRUCTION	GRAPHIC LOG	DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES)
1	SPLIT SPOON			0-2' REDDISH BROWN SILT & CLAY WITH TRACE OF SAND BLOW COUNT: 3-5-6-8, 4" RECOVERY OVA READING: 0 ppm
2				
3	SPLIT SPOON			2'-4' REDDISH BROWN SILT & CLAY, & GRAY SILT & CLAY BLOW COUNT: 5-6-4-3, 6" RECOVERY OVA READING: 1-2 ppm
4				
5	SPLIT SPOON			4'-6' REDDISH BROWN SILT & CLAY & GRAY SILT & CLAY BLOW COUNT: 4-6-6-8, 5" RECOVERY OVA READING: <1 ppm
6				

Appendix C

Test Pit Logs and Test Pit Photographs

GEI Consultants, Inc.

ATLANTIC
ENVIRONMENTAL DIVISION

188 Norwich Avenue
P.O. Box 297
Colchester, CT 06415

Ph: (860) 537-0751
Fax: (860) 537-6347

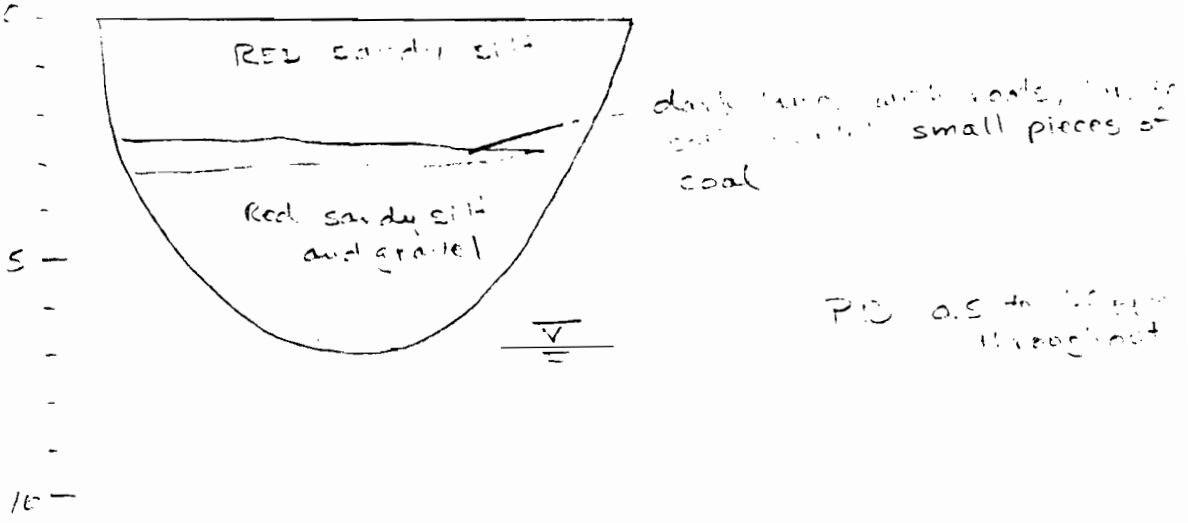
TEST PIT DESCRIPTION SHEET

PROJECT NUMBER: 98248-1007
TEST PIT NUMBER: TP-10
GENERAL LOCATION AND/OR PURPOSE: Gate Station on 40 Willow Avenue. - looking for relief holder No. 2
DATE: February 24, 1999
TIME OPENED: 1310 **TIME CLOSED:** 1345

CALL BEFORE YOU DIG CASE NO.: covered by FPM
OBSERVER: John Ripp
ASSISTANT: Jeff Willson
OTHERS: Steve Wallett
CONTRACTOR: PSC - Phillips Service
EQUIPMENT: John Deere 310D

IN THE SPACE PROVIDED BELOW, NOTE WHAT WAS FOUND IN THE TEST PIT AND SKETCH DIMENSIONS, SOIL TYPES, AND WASTE. NOTE ANY BURIED METAL OBJECTS.

SW ← 11' → NE



PID 0.5 ppm

VIDEO DOCUMENTED: YES X NO
PHOTOGRAPHED: YES X NO
PIEZOMETER NO. USED IN BACKFILL: No
DEPTH TO WATER: 6.5 FT

ANALYTICAL SAMPLES: TP-10 (3)
NAPL SEEPAGE: YES NO X
SAMPLES: YES NO X
QUANTITY:

GEI Consultants, Inc.

ATLANTIC
ENVIRONMENTAL DIVISION

188 Norwich Avenue
P.O. Box 297
Colchester, CT 06415

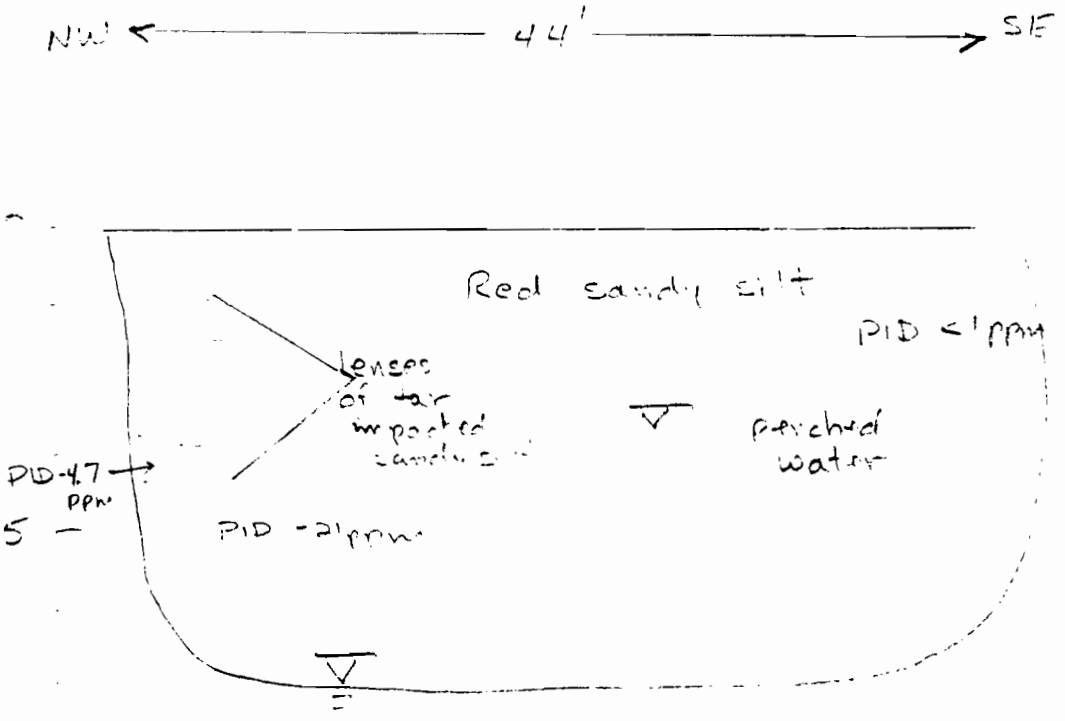
Ph: (860) 537-0751
Fax: (860) 537-6347

TEST PIT DESCRIPTION SHEET

PROJECT NUMBER: 98248-1007
TEST PIT NUMBER: TP-10A
GENERAL LOCATION AND/OR PURPOSE: Continuation of TP-10 - looking for relief holder No. 2
DATE: February 25, 1999
TIME OPENED: 1245 **TIME CLOSED:** 1415

CALL BEFORE YOU DIG CASE NO.: covered by FPM
OBSERVER: John Ripp
ASSISTANT: Jeff Willson
OTHERS: Steve Wallett
CONTRACTOR: PSC - Phillips Service
EQUIPMENT: John Deere 310D

IN THE SPACE PROVIDED BELOW, NOTE WHAT WAS FOUND IN THE TEST PIT AND SKETCH DIMENSIONS, SOIL TYPES, AND WASTE. NOTE ANY BURIED METAL OBJECTS.



Cross sectional view

VIDEO DOCUMENTED: YES X NO
PHOTOGRAPHED: YES X NO
PIEZOMETER NO. USED IN BACKFILL: No
DEPTH TO WATER: 3 (perched) FT

ANALYTICAL SAMPLES: TP-10A (3)
NAPL SEEPAGE: YES NO X
SAMPLES: YES NO X
QUANTITY:







KEYSPAN\CLIFTON\98248211007\OU-1\CL-TESTPIT.PPT

TEST PIT 10/10A

Appendix D

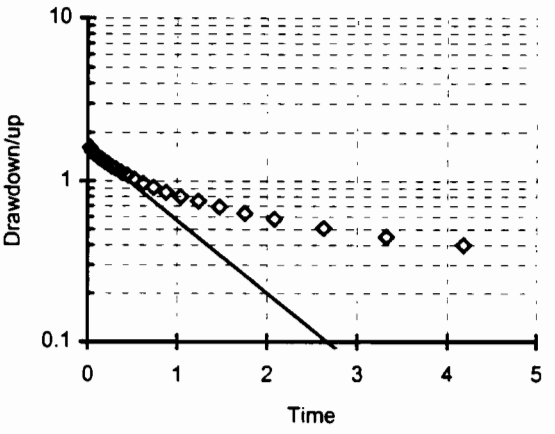
Hydraulic Conductivity Calculations

Slug Test Calculations

Bouwer & Rice Method for Calculating Hydraulic Conductivity

Project Name: Clifton Former MGP Site
Project No.: 98248
Client Name: Keyspan
Identification: RW-3
Analysis By: A. Brey
Run Date:

Riser Pipe Diameter:	0.1666	feet
Intake Diameter:	0.35	feet
Intake Length:	9.94	feet
Saturated Column Length:	9.94	feet
Water Table Depth:	1.85	feet
Aquifer Thickness:	40	feet
Line Fit Starting No.:	1	Min 1 to
Line Fit Ending No.:	10	Max 34
Specify Output Units:	3	1 to 9
Hyd. Cond., K(h):	1.40E+00	ft./day
Error of Fit:	0.002	



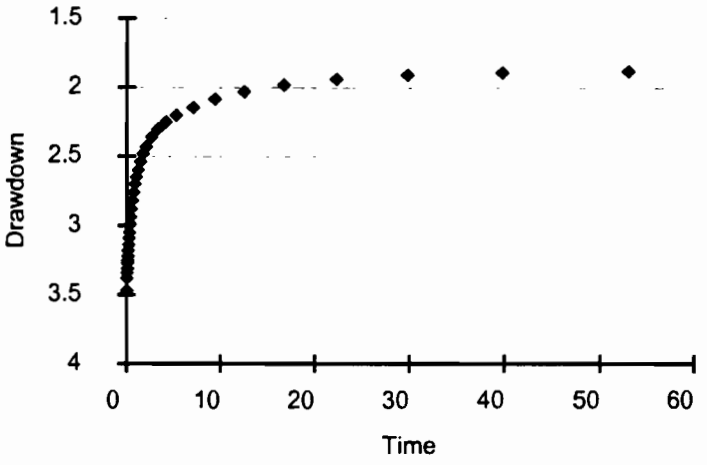
Meas. #	Time minutes	Field Meas. feet	Drawdown/up feet		Line Fit To LN(Yt)	Regression On LN(Yt)
1)	0.03	3.47	1.62		0.482	0.450
2)	0.05	3.38	1.53		0.425	0.429
3)	0.07	3.34	1.49		0.399	0.409
4)	0.09	3.31	1.46		0.378	0.388
5)	0.11	3.27	1.42		0.351	0.365
6)	0.13	3.25	1.40		0.336	0.343
7)	0.16	3.22	1.37		0.315	0.317
8)	0.19	3.18	1.33		0.285	0.286
9)	0.22	3.14	1.29		0.255	0.249
10)	0.26	3.09	1.24		0.215	0.205
11)	0.31	3.05	1.20		0.182	0.153
12)	0.37	2.99	1.14		0.131	0.091
13)	0.44	2.94	1.09		0.086	0.018
14)	0.52	2.88	1.03		0.030	-0.066
15)	0.62	2.82	0.97		-0.030	-0.166
16)	0.74	2.76	0.91		-0.094	-0.288
17)	0.88	2.70	0.85		-0.163	-0.432
18)	1.04	2.65	0.80		-0.223	-0.605
19)	1.24	2.60	0.75		-0.288	-0.810
20)	1.47	2.54	0.69		-0.371	-1.055
21)	1.75	2.48	0.63		-0.462	-1.347
22)	2.08	2.43	0.58		-0.545	-1.693
23)	2.63	2.36	0.51		-0.673	-2.261
24)	3.32	2.30	0.45		-0.799	-2.978

25)	4.18	2.25	0.40		-0.916	-3.880
26)	5.27	2.20	0.35		-1.050	-5.015
27)	7.03	2.14	0.29		-1.238	-6.856
28)	9.39	2.08	0.23		-1.470	-9.315
29)	12.53	2.03	0.18		-1.715	-12.594
30)	16.73	1.98	0.13		-2.040	-16.969
31)	22.32	1.94	0.09		-2.408	-22.806
32)	29.79	1.91	0.06		-2.813	-30.589
33)	39.74	1.89	0.04		-3.219	-40.971
34)	53.01	1.88	0.03		-3.507	-54.819

SLUG TEST DATA ENTRY FORM

Client Name: Keyspan | Well Number: RW-3 | Test Type: Slug Out
Project No.: 98248 | Topo. Elev.: 10.41' amsl | Weather: Sunny, warm
Project Name: Clifton Former MGP Site | Analysis By: A. Brey | Date Started: 4/1/99

BASIC TEST DATA	
Measurement Units (1-6):	2
Unconfined(1)/Confined(2):	1
Well Depth - TOC (feet):	11.79
Static W/L-Depth (ft.):	1.85
Riser Pipe Diameter (feet):	0.1666
Initial Test Depth Value (ft.):	3.63
TOC Elevation (feet):	9.95
Intake/Soil Col. Diam. (feet):	0.35
Depth to Top of Pack (feet):	1.5
Intake/Soil Col. Length (ft.):	9.94
Saturat. Col. Thickness (ft.):	9.94
Casing Soil Length (if appl.):	
Casing Stickup (feet):	
Slug Volume (ft^3):	0.0398
Thickness of Aquifer (feet):	



AQUIFER RECOVERY DATA

Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)
0.03	3.47						
0.05	3.38						
0.07	3.34						
0.09	3.31						
0.112	3.27						
0.1328	3.25						
0.1578	3.22						
0.1875	3.18						
0.2227	3.14						
0.2647	3.09						
0.3147	3.05						
0.3742	2.99						
0.4447	2.94						
0.5247	2.88						
0.6213	2.82						
0.738	2.76						
0.8763	2.7						
1.0413	2.65						
1.238	2.6						
1.473	2.54						
1.753	2.48						
2.0847	2.43						
2.6297	2.36						
3.3163	2.3						
4.1813	2.25						
5.2697	2.2						
7.0347	2.14						
9.3913	2.08						
12.5347	2.03						

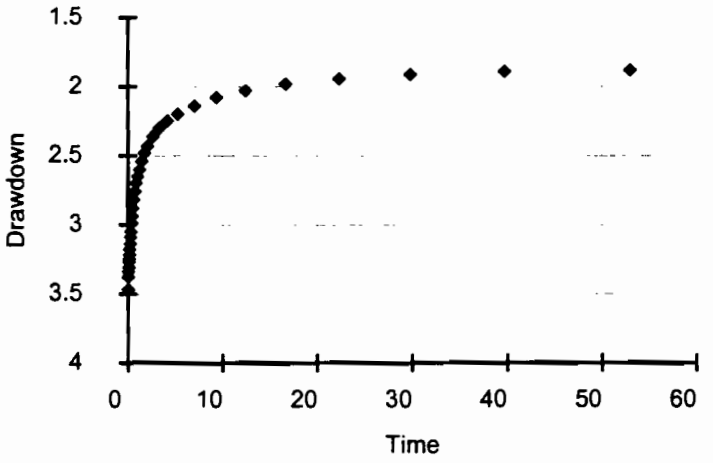
SLUG TEST DATA ENTRY FORM

Client Name: Keyspan | Well Number: RW-3 | Test Type: Slug Out

Project No.: 98248 | Topo. Elev.: 10.41' amsl | Weather: Sunny, warm

Project Name: Clifton Former MGP Site | Analysis By: A. Brey | Date Started: 4/1/99

BASIC TEST DATA	
Measurement Units (1-6):	2
Unconfined(1)/Confined(2):	1
Well Depth - TOC (feet):	11.79
Static W/L-Depth (ft.):	1.85
Riser Pipe Diameter (feet):	0.1666
Initial Test Depth Value (ft.):	3.63
TOC Elevation (feet):	9.95
Intake/Soil Col. Diam. (feet):	0.35
Depth to Top of Pack (feet):	1.5
Intake/Soil Col. Length (ft.):	9.94
Saturat. Col. Thickness (ft.):	9.94
Casing Soil Length (if appl.):	
Casing Stickup (feet):	
Slug Volume (ft^3):	0.0398
Thickness of Aquifer (feet):	



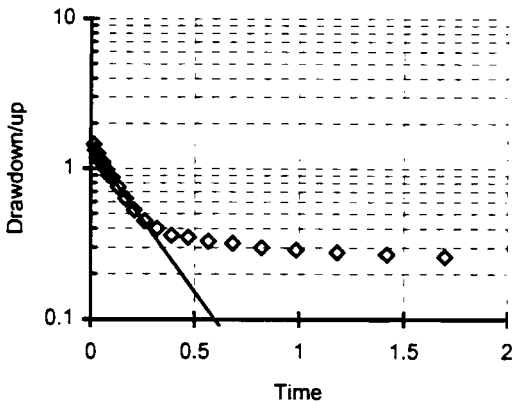
AQUIFER RECOVERY DATA

Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)
16.7297	1.98						
22.3247	1.94						
29.7863	1.91						
39.7397	1.89						
53.0147	1.88						

Bouwer & Rice Method for Calculating Hydraulic Conductivity

Project Name: Clifton Former MGP Site
Project No.: 98248
Client Name: Keyspan
Identification: RW-6
Analysis By: A. Brey
Run Date:

Riser Pipe Diameter:	0.1666	feet
Intake Diameter:	0.35	feet
Intake Length:	10.5	feet
Saturated Column Length:	9.52	feet
Water Table Depth:	2.57	feet
Aquifer Thickness:	40	feet
Line Fit Starting No.:	6	Min 1 to
Line Fit Ending No.:	14	Max 30
Specify Output Units:	3	1 to 9
Hyd. Cond., K(h):	5.52E+00	ft./day
Error of Fit:	0.004	



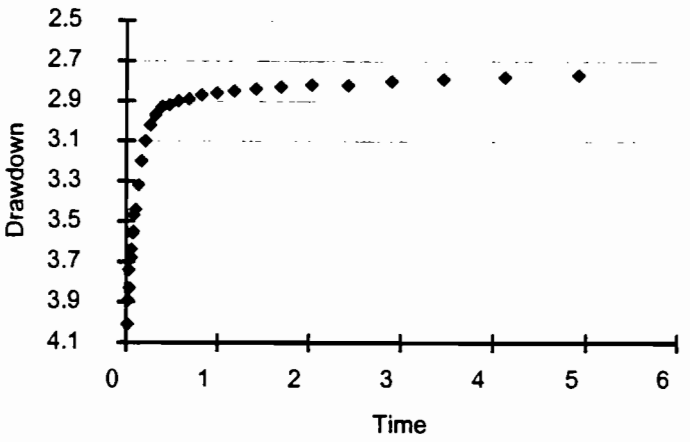
Meas. #	Time minutes	Field Meas. feet	Drawdown/up feet		Line Fit To LN(Yt)	Regression On LN(Yt)
1)	0.02	4.01	1.44		0.365	0.231
2)	0.02	3.89	1.32		0.278	0.209
3)	0.03	3.74	1.17		0.157	0.165
4)	0.04	3.83	1.26		0.231	0.144
5)	0.06	3.68	1.11		0.104	0.044
6)	0.06	3.64	1.07		0.068	0.048
7)	0.07	3.56	0.99		-0.010	-0.010
8)	0.08	3.55	0.98		-0.020	-0.042
9)	0.09	3.47	0.90		-0.105	-0.076
10)	0.10	3.44	0.87		-0.139	-0.151
11)	0.13	3.32	0.75		-0.288	-0.280
12)	0.17	3.20	0.63		-0.462	-0.432
13)	0.21	3.10	0.53		-0.635	-0.615
14)	0.26	3.02	0.45		-0.799	-0.832
15)	0.32	2.97	0.40		-0.916	-1.090
16)	0.39	2.93	0.36		-1.022	-1.396
17)	0.47	2.92	0.35		-1.050	-1.744
18)	0.57	2.90	0.33		-1.109	-2.163
19)	0.68	2.89	0.32		-1.139	-2.670
20)	0.82	2.87	0.30		-1.204	-3.271
21)	0.99	2.86	0.29		-1.238	-3.987
22)	1.18	2.85	0.28		-1.273	-4.841
23)	1.42	2.84	0.27		-1.309	-5.862
24)	1.70	2.83	0.26		-1.347	-7.078

25)	2.03	2.82	0.25		-1.386	-10.282
26)	2.43	2.82	0.25		-1.386	-12.366
27)	2.90	2.80	0.23		-1.470	-14.845
28)	3.46	2.79	0.22		-1.514	-17.797
29)	4.13	2.78	0.21		-1.561	-21.300
30)	4.92	2.77	0.20		-1.609	-25.461

SLUG TEST DATA ENTRY FORM

Client Name: Keyspan | Well Number: RW-6 | Test Type: Slug Out
Project No.: 98248 | Topo. Elev.: 11.72' amsl | Weather: Sunny, warm
Project Name: Clifton Former MGP Site | Analysis By: A. Brey | Date Started: 4/1/99

BASIC TEST DATA	
Measurement Units (1-6):	2
Unconfined(1)/Confined(2):	1
Well Depth - TOC (feet):	12.09
Static W/L-Depth (ft.):	2.57
Riser Pipe Diameter (feet):	0.1666
Initial Test Depth Value (ft.):	4.24
TOC Elevation (feet):	11.14
Intake/Soil Col. Diam. (feet):	0.35
Depth to Top of Pack (feet):	0.5
Intake/Soil Col. Length (ft.):	9.52
Saturat. Col. Thickness (ft.):	9.52
Casing Soil Length (if appl.):	
Casing Stickup (feet):	
Slug Volume (ft^3):	0.041
Thickness of Aquifer (feet):	40



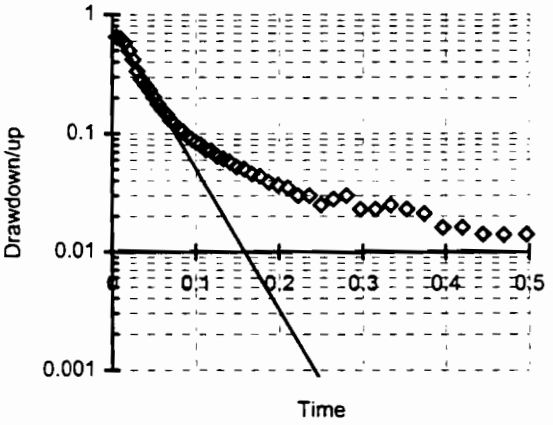
AQUIFER RECOVERY DATA

Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)
0.015	4.01						
0.02	3.89						
0.03	3.74						
0.035	3.83						
0.058	3.68						
0.057	3.64						
0.0705	3.56						
0.0778	3.55						
0.0857	3.47						
0.1028	3.44						
0.1325	3.32						
0.1677	3.2						
0.2097	3.1						
0.2597	3.02						
0.3192	2.97						
0.3897	2.93						
0.4697	2.92						
0.5663	2.9						
0.683	2.89						
0.8213	2.87						
0.9863	2.86						
1.183	2.85						
1.418	2.84						
1.698	2.83						
2.0297	2.82						
2.4263	2.82						
2.898	2.8						
3.4597	2.79						
4.1263	2.78						

Bouwer & Rice Method for Calculating Hydraulic Conductivity

Project Name: Clifton Former MGP Site
Project No.: 98248
Client Name: Keyspan
Identification: RW-08
Analysis By: A. Brey
Run Date: 10/5/99 First Run

Riser Pipe Diameter:	0.16666	feet
Intake Diameter:	0.35	feet
Intake Length:	17	feet
Saturated Column Length:	17	feet
Water Table Depth:	2.8	feet
Aquifer Thickness:	40	feet
Line Fit Starting No.:	1	Min 1 to
Line Fit Ending No.:	12	Max 77
Specify Output Units:	3	1 to 9
Hyd. Cond., K(h):	2.54E+01	ft./day
Error of Fit:	0.030	

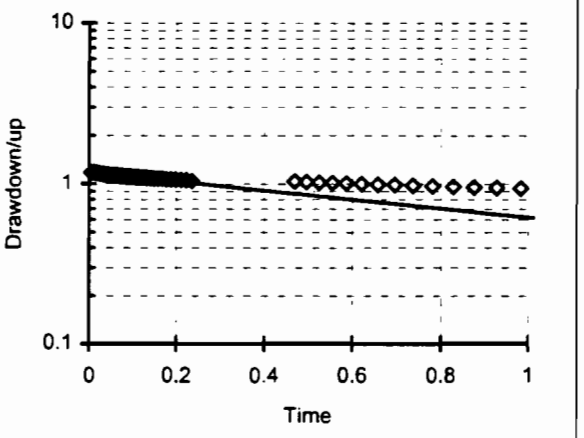


Meas. #	Time minutes	Field Meas. feet	Drawdown/up feet		Line Fit To LN(Yt)	Regression On LN(Yt)
1)	0.01	3.45	0.65		-0.437	-0.351
2)	0.01	3.43	0.63		-0.465	-0.490
3)	0.02	3.38	0.58		-0.546	-0.628
4)	0.02	3.30	0.50		-0.697	-0.766
5)	0.03	3.22	0.42		-0.872	-0.904
6)	0.03	3.14	0.34		-1.094	-1.043
7)	0.04	3.09	0.29		-1.252	-1.181
8)	0.04	3.06	0.26		-1.355	-1.319
9)	0.05	3.03	0.23		-1.465	-1.458
10)	0.05	3.00	0.20		-1.595	-1.596
11)	0.06	2.98	0.18		-1.726	-1.734
12)	0.06	2.96	0.16		-1.839	-1.873
13)	0.07	2.95	0.15		-1.931	-2.011
14)	0.07	2.93	0.13		-2.048	-2.149
15)	0.08	2.92	0.12		-2.120	-2.287
16)	0.08	2.91	0.11		-2.216	-2.426
17)	0.09	2.90	0.10		-2.263	-2.564
18)	0.09	2.90	0.10		-2.354	-2.702
19)	0.10	2.89	0.09		-2.408	-2.841
20)	0.10	2.89	0.09		-2.465	-2.979
21)	0.11	2.88	0.08		-2.513	-3.139
22)	0.11	2.87	0.07		-2.604	-3.311
23)	0.12	2.87	0.07		-2.631	-3.491
24)	0.13	2.87	0.07		-2.733	-3.684

Bouwer & Rice Method for Calculating Hydraulic Conductivity

Project Name: Clifton Former MGP Site
Project No.: 98248
Client Name: Keyspan
Identification: RW-12
Analysis By: A. Brey
Run Date:

Riser Pipe Diameter:	0.16666	feet
Intake Diameter:	0.35	feet
Intake Length:	13.5	feet
Saturated Column Length:	13.5	feet
Water Table Depth:	1.51	feet
Aquifer Thickness:	30	feet
Line Fit Starting No.:	5	Min 1 to
Line Fit Ending No.:	20	Max 100
Specify Output Units:	3	1 to 9
Hyd. Cond., K(h):	7.04E-01	ft./day
Error of Fit:	0.000	



Meas. #	Time minutes	Field Meas. feet	Drawdown/up feet		Line Fit To LN(Yt)	Regression On LN(Yt)
1)	0.01	2.69	1.18		0.164	0.160
2)	0.01	2.69	1.18		0.166	0.157
3)	0.02	2.69	1.18		0.161	0.154
4)	0.02	2.68	1.17		0.156	0.150
5)	0.03	2.67	1.16		0.150	0.147
6)	0.03	2.67	1.16		0.146	0.144
7)	0.04	2.66	1.15		0.141	0.141
8)	0.04	2.66	1.15		0.135	0.138
9)	0.05	2.65	1.14		0.134	0.134
10)	0.05	2.65	1.14		0.132	0.131
11)	0.06	2.64	1.13		0.126	0.128
12)	0.06	2.64	1.13		0.124	0.125
13)	0.07	2.64	1.13		0.120	0.122
14)	0.07	2.64	1.13		0.118	0.118
15)	0.08	2.63	1.12		0.115	0.115
16)	0.08	2.63	1.12		0.112	0.112
17)	0.09	2.63	1.12		0.109	0.109
18)	0.09	2.62	1.11		0.107	0.106
19)	0.10	2.62	1.11		0.103	0.102
20)	0.10	2.62	1.11		0.101	0.099
21)	0.11	2.61	1.10		0.099	0.096
22)	0.11	2.61	1.10		0.097	0.092
23)	0.12	2.61	1.10		0.094	0.087
24)	0.13	2.61	1.10		0.093	0.083

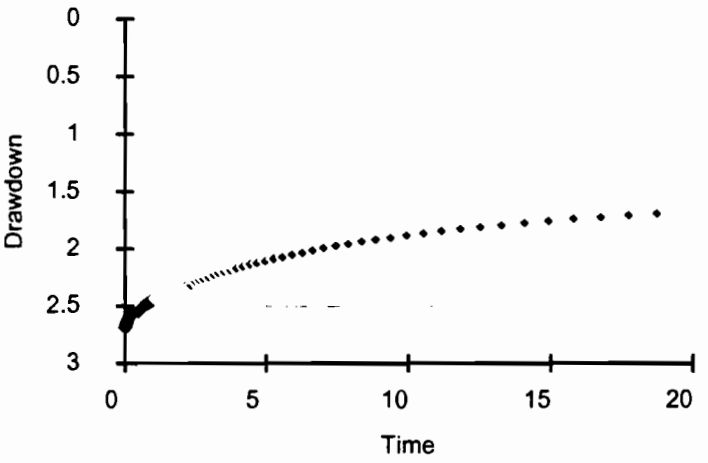
25)	0.13	2.60	1.09		0.088	0.078
26)	0.14	2.60	1.09		0.086	0.073
27)	0.15	2.59	1.08		0.078	0.068
28)	0.16	2.59	1.08		0.080	0.062
29)	0.17	2.59	1.08		0.078	0.056
30)	0.18	2.58	1.07		0.071	0.050
31)	0.19	2.58	1.07		0.067	0.043
32)	0.20	2.58	1.07		0.063	0.036
33)	0.21	2.57	1.06		0.058	0.029
34)	0.22	2.57	1.06		0.056	0.021
35)	0.24	2.55	1.04		0.043	0.012
36)	0.47	2.55	1.04		0.036	-0.137
37)	0.50	2.54	1.03		0.030	-0.154
38)	0.52	2.53	1.02		0.021	-0.173
39)	0.55	2.52	1.01		0.014	-0.192
40)	0.59	2.52	1.01		0.009	-0.212
41)	0.62	2.51	1.00		-0.002	-0.234
42)	0.66	2.50	0.99		-0.009	-0.258
43)	0.70	2.49	0.98		-0.016	-0.282
44)	0.74	2.49	0.98		-0.023	-0.309
45)	0.78	2.48	0.97		-0.033	-0.337
46)	0.83	2.47	0.96		-0.038	-0.367
47)	0.88	2.47	0.96		-0.045	-0.398
48)	0.93	2.46	0.95		-0.054	-0.431
49)	0.98	2.45	0.94		-0.064	-0.466
50)	1.04	2.44	0.93		-0.074	-0.503
51)	1.10	2.43	0.92		-0.081	-0.543
52)	1.17	2.42	0.91		-0.092	-0.584
53)	1.24	2.41	0.90		-0.102	-0.629
54)	1.31	2.40	0.89		-0.112	-0.676
55)	1.39	2.40	0.89		-0.122	-0.726
56)	1.47	2.39	0.88		-0.132	-0.780
57)	1.56	2.38	0.87		-0.144	-0.836
58)	1.65	2.37	0.86		-0.157	-0.896
59)	1.75	2.35	0.84		-0.171	-0.959
60)	1.86	2.34	0.83		-0.184	-1.026
61)	1.97	2.33	0.82		-0.198	-1.097
62)	2.08	2.32	0.81		-0.209	-1.171
63)	2.21	2.31	0.80		-0.221	-1.251
64)	2.34	2.32	0.81		-0.209	-1.336
65)	2.48	2.28	0.77		-0.256	-1.425

66)	2.63	2.27	0.76		-0.274	-1.520
67)	2.79	2.26	0.75		-0.286	-1.620
68)	2.95	2.24	0.73		-0.311	-1.727
69)	3.13	2.23	0.72		-0.334	-1.840
70)	3.32	2.21	0.70		-0.357	-1.960
71)	3.51	2.20	0.69		-0.370	-2.087
72)	3.72	2.19	0.68		-0.390	-2.221
73)	3.95	2.17	0.66		-0.414	-2.363
74)	4.18	2.16	0.65		-0.439	-2.514
75)	4.43	2.14	0.63		-0.468	-2.673
76)	4.69	2.12	0.61		-0.489	-2.841
77)	4.97	2.11	0.60		-0.518	-3.020
78)	5.27	2.09	0.58		-0.548	-3.210
79)	5.58	2.07	0.56		-0.580	-3.411
80)	5.91	2.05	0.54		-0.614	-3.623
81)	6.27	2.03	0.52		-0.648	-3.848
82)	6.64	2.01	0.50		-0.685	-4.087
83)	7.03	1.99	0.48		-0.728	-4.340
84)	7.45	1.98	0.47		-0.766	-4.608
85)	7.90	1.96	0.45		-0.801	-4.892
86)	8.37	1.94	0.43		-0.849	-5.193
87)	8.86	1.92	0.41		-0.887	-5.512
88)	9.39	1.90	0.39		-0.934	-5.849
89)	9.95	1.88	0.37		-0.986	-6.206
90)	10.54	1.86	0.35		-1.038	-6.585
91)	11.17	1.85	0.34		-1.091	-6.986
92)	11.83	1.83	0.32		-1.155	-7.411
93)	12.53	1.81	0.30		-1.207	-7.861
94)	13.28	1.79	0.28		-1.273	-8.338
95)	14.07	1.77	0.26		-1.339	-8.844
96)	14.91	1.75	0.24		-1.411	-9.379
97)	15.79	1.74	0.23		-1.492	-9.946
98)	16.73	1.72	0.21		-1.556	-10.547
99)	17.72	1.71	0.20		-1.635	-11.183
100)	18.72	1.69	0.18		-1.720	-11.823

SLUG TEST DATA ENTRY FORM

Client Name: Keyspan | Well Number: RW-12 | Test Type: Slug Out
Project No.: 98248 | Topo. Elev.: 10.56 | Weather:
Project Name: Clifton Former MGP Site | Analysis By: A. Brey | Date Started: 10/8/99

BASIC TEST DATA	
Measurement Units (1-6):	2
Unconfined(1)/Confined(2):	1
Well Depth - TOC (feet):	
Static W/L-Depth (ft.):	1.51
Riser Pipe Diameter (feet):	0.16666
Initial Test Depth Value (ft.):	2.78
TOC Elevation (feet):	10.4
Intake/Soil Col. Diam. (feet):	0.35
Depth to Top of Pack (feet):	4.34
Intake/Soil Col. Length (ft.):	13.5
Saturat. Col. Thickness (ft.):	13.5
Casing Soil Length (if appl.):	
Casing Stickup (feet):	
Slug Volume (ft^3):	
Thickness of Aquifer (feet):	40



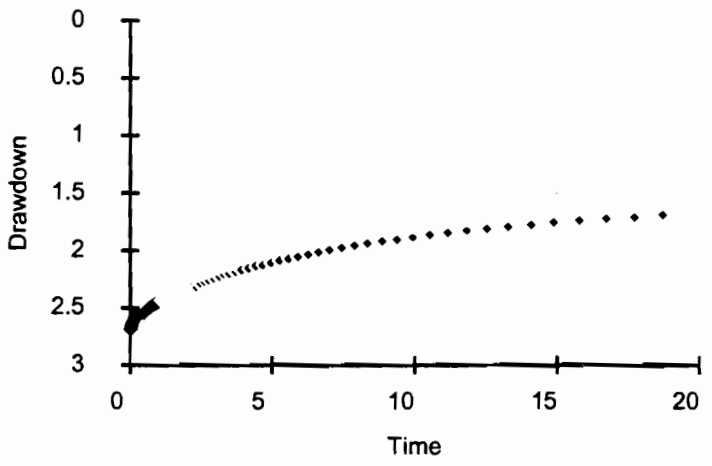
AQUIFER RECOVERY DATA

Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)
0.005	2.688	1.103	2.432				
0.01	2.69	1.168	2.422				
0.015	2.685	1.238	2.413				
0.02	2.679	1.3113	2.404				
0.025	2.672	1.3897	2.395				
0.03	2.667	1.473	2.386				
0.035	2.662	1.5613	2.376				
0.04	2.655	1.6547	2.365				
0.045	2.653	1.753	2.353				
0.05	2.651	1.858	2.342				
0.055	2.644	1.968	2.33				
0.06	2.642	2.0847	2.321				
0.065	2.637	2.2097	2.312				
0.07	2.635	2.3413	2.321				
0.075	2.632	2.4813	2.284				
0.08	2.628	2.6297	2.27				
0.085	2.625	2.7863	2.261				
0.09	2.623	2.953	2.243				
0.095	2.619	3.1297	2.226				
0.1	2.616	3.3163	2.21				
0.1058	2.614	3.5147	2.201				
0.112	2.612	3.7247	2.187				
0.1185	2.609	3.9463	2.171				
0.1255	2.607	4.1813	2.155				
0.1328	2.602	4.4297	2.136				
0.1407	2.6	4.693	2.123				
0.149	2.591	4.973	2.106				
0.1578	2.593	5.2697	2.088				
0.1672	2.591	5.583	2.07				

SLUG TEST DATA ENTRY FORM

Client Name: Keyspan | Well Number: RW-12 | Test Type: Slug Out
Project No.: 98248 | Topo. Elev.: 10.56 | Weather:
Project Name: Clifton Former MGP Site | Analysis By: A. Brey | Date Started: 10/8/99

BASIC TEST DATA	
Measurement Units (1-6):	2
Unconfined(1)/Confined(2):	1
Well Depth - TOC (feet):	
Static W/L-Depth (ft.):	1.51
Riser Pipe Diameter (feet):	0.16666
Initial Test Depth Value (ft.):	2.78
TOC Elevation (feet):	10.4
Intake/Soil Col. Diam. (feet):	0.35
Depth to Top of Pack (feet):	4.34
Intake/Soil Col. Length (ft.):	13.5
Saturat. Col. Thickness (ft.):	13.5
Casing Soil Length (if appl.):	
Casing Stickup (feet):	
Slug Volume (ft^3):	
Thickness of Aquifer (feet):	40



AQUIFER RECOVERY DATA

Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)	Time (min)	Depth (ft.)
0.177	2.584	5.9147	2.051				
0.1875	2.579	6.2663	2.033				
0.1985	2.575	6.6397	2.014				
0.2102	2.57	7.0347	1.993				
0.2227	2.568	7.453	1.975				
0.2358	2.554	7.8963	1.959				
0.4697	2.547	8.3663	1.938				
0.4963	2.54	8.8647	1.922				
0.5247	2.531	9.3913	1.903				
0.5547	2.524	9.9497	1.883				
0.5863	2.519	10.5413	1.864				
0.6213	2.508	11.168	1.846				
0.658	2.501	11.8313	1.825				
0.6963	2.494	12.5347	1.809				
0.738	2.487	13.2797	1.79				
0.7813	2.478	14.0697	1.772				
0.828	2.473	14.9063	1.754				
0.8763	2.466	15.7913	1.735				
0.928	2.457	16.7297	1.721				
0.983	2.448	17.723	1.705				
1.0413	2.439	18.723	1.689				

Single Well Pump Test Calculations

RW-4 Pump Test Calculations

Theis Recovery: $T = 2.3Q_{avg} / 4\pi\Delta S$

where: T = transmissivity (ft^2/day)
Q_{avg} = pumping rate (ft^3/day)
ΔS = change in residual drawdown (ft)

Semi-Logarithmic Plot of Residual Drawdown Versus t/t'

where: t = pumping time + recovery time
t' = recovery time

draw straight line through points and calculate change in residual drawdown

Pumping time = 3.3 min
Q_{avg} = 143 mL/sec = 0.303 ft^3/min

t_1 = t/ t' = 20 (t' = 12 min)
t_2 = t/ t' = 60 (t' = 3.8 min)
s_1 = 0.39 ft
s_2 = 1.0 ft
ΔS = $s_2 - s_1$ = (1.0 – 0.39)ft = 0.61 ft

$T = (2.3Q_{avg} / 4\pi\Delta S) \times (\log t_2 / t_1)$

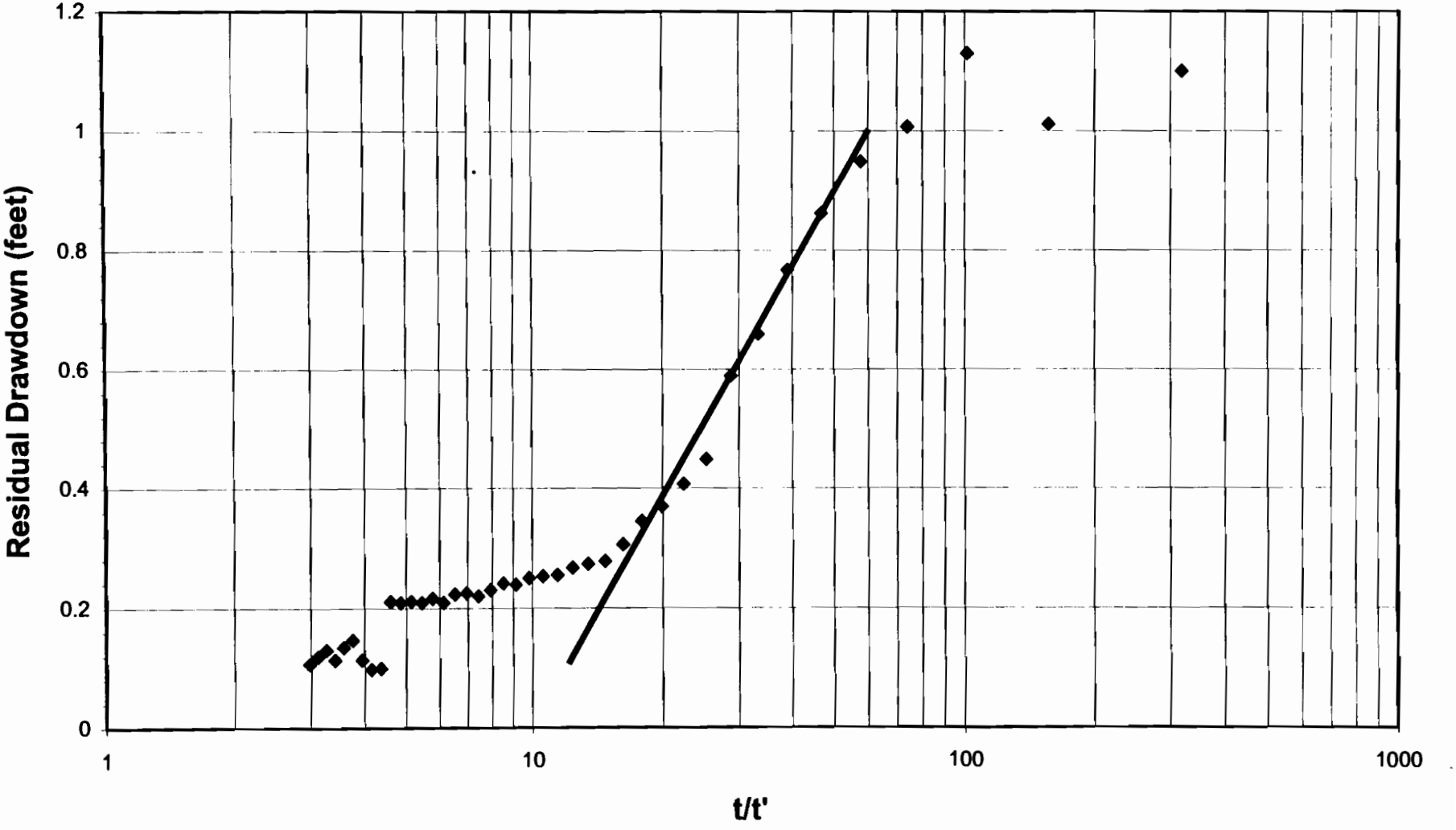
$= [(2.3)(0.303\ ft^3/min)/(4\pi(0.61))] \times 0.477$

$= 4.3 \times 10^{-02}\ ft^2/min$

$T = Km$
assume m = 25 ft = aquifer thickness

$K = 1.7 \times 10^{-03}$ ft/min = 8.7×10^{-04} cm/sec

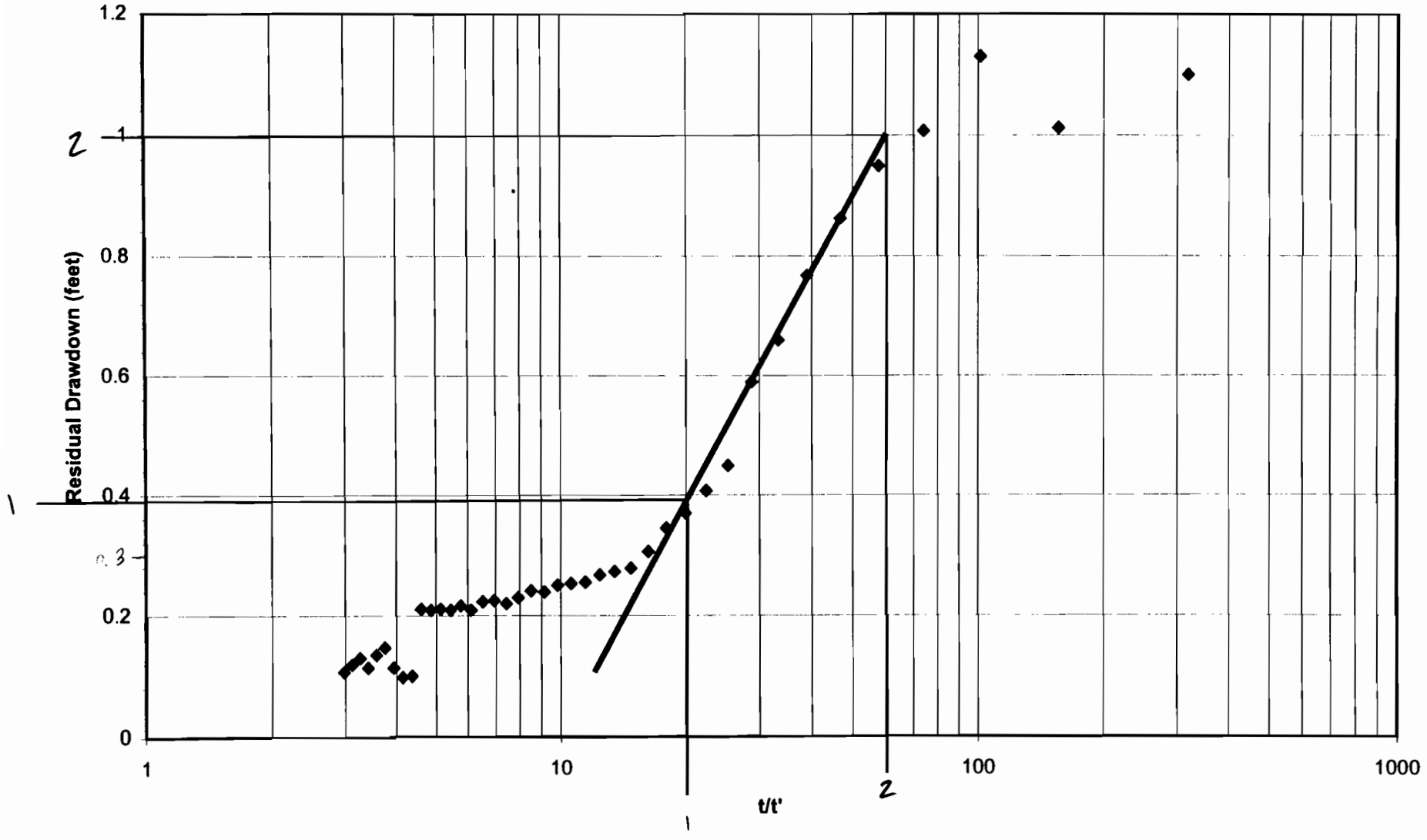
RW-4 Recovery Data



$Q = 143 \text{ mL/sec}$
$= 8580 \text{ mL/min}$
$= 0.303 \text{ ft}^3/\text{min}$

Pump t = 3.3 min

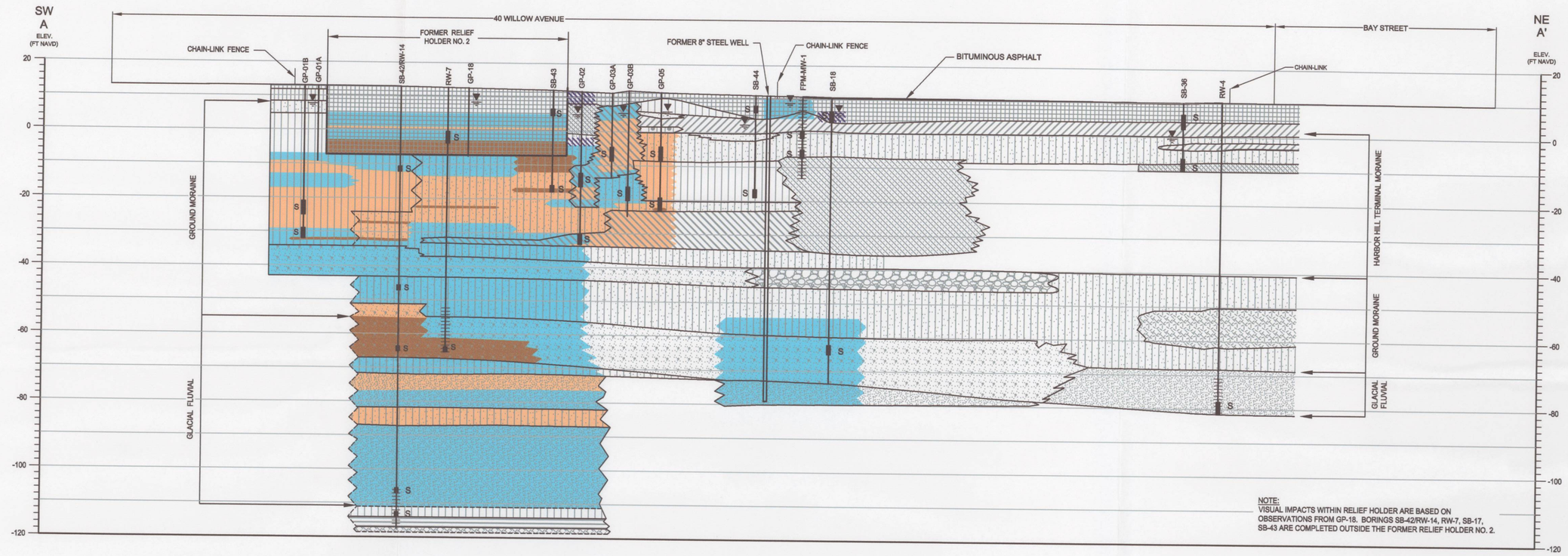
RW-4 Recovery Data

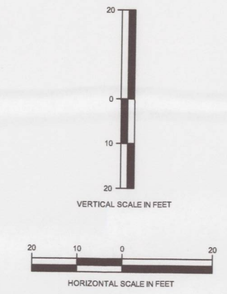


$t_1 = t/t' = 20 \quad (t' = 0.19 \text{ min})$

$t_2 = t/t' = 60 \quad (t' = 0.05 \text{ min})$


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S
NEW YORK STATE COORDINATE SYSTEM EAST ZONE
OPERABLE UNIT-2 AREA
OPERABLE UNIT-1 AREA
GREENFIELD AVENUE
FOREST STREET
WILLOW AVENUE
DITSON STREET
PLACE
LANGERE
LYNHURST AVENUE
EDGEWATER STREET
BAY STREET
RAILROAD EMBANKMENT - STATEN ISLAND RAPID TRANSIT RAILWAY CO.
RAILROAD EMBANKMENT - ACTIVE COMMUTER TRAIN
RAILROAD EMBANKMENT - ABANDONED SPUR LINE
USC&GS VERTICAL BENCHMARK AT RAILROAD BRIDGE RETAINING WALL
STORM SEWER DRAINS TO OUTFALL ON BULKHEAD
STORM SEWER FLOW DIRECTION
FORMER GAS COMPANY BUILDING (1 STORY)
COMMERCIAL BUILDING (2 STORY)
66 WILLOW AVENUE
40 WILLOW AVENUE
PAVED PARKING LOT
UNPAVED LOT
GRASSED LOT
APPROXIMATE BOUNDARY OF UST EXCAVATION
550 GAL USED OIL TANK
UNDERGROUND VAULT
5 550-GAL USTs
CONCRETE COAL STORAGE BIN
GENERATOR HOUSE
RETORT HOUSE
GASOMETER
RELIEF HOLDER NO. 1
RELIEF HOLDER NO. 2
ACTUAL RELIEF HOLDER WALL
FUEL OIL TANK
TAR TANKS
NAPHTHA TANK
STORAGE TANKS
OIL TANK
GARAGE
STABLE
REPAIR SHOP
PIPE SHOP
BLACKSMITH SHOP & SHED
AMMONIA PLANT
DISTRIBUTING SHOP
200 GALLON UNDERGROUND GASOLINE TANK
PURIFIER TANKS
PURIFIER TANK
METER REPAIR SHOP
STOREROOM
BOILER ROOM
ENGINE ROOM
COAL SHED
CANOPY
LOADING DOCK
OVERHEAD
TAR WELL
WATER GAS GENERATOR HOUSE
TAR SEPARATOR
ELECTRIC PRECIPITATORS
BRICK BUILDINGS
CONCRETE VAULT
COOLING TOWER
FORMER 8" STEEL WELL
BRICK BUILDING
CONCRETE
SIDEWALK
GRASS
FLAGSTONE
GATE
CHIMNEY
BRICK HOLDER WALL CROSSING
UTILITY CROSSING
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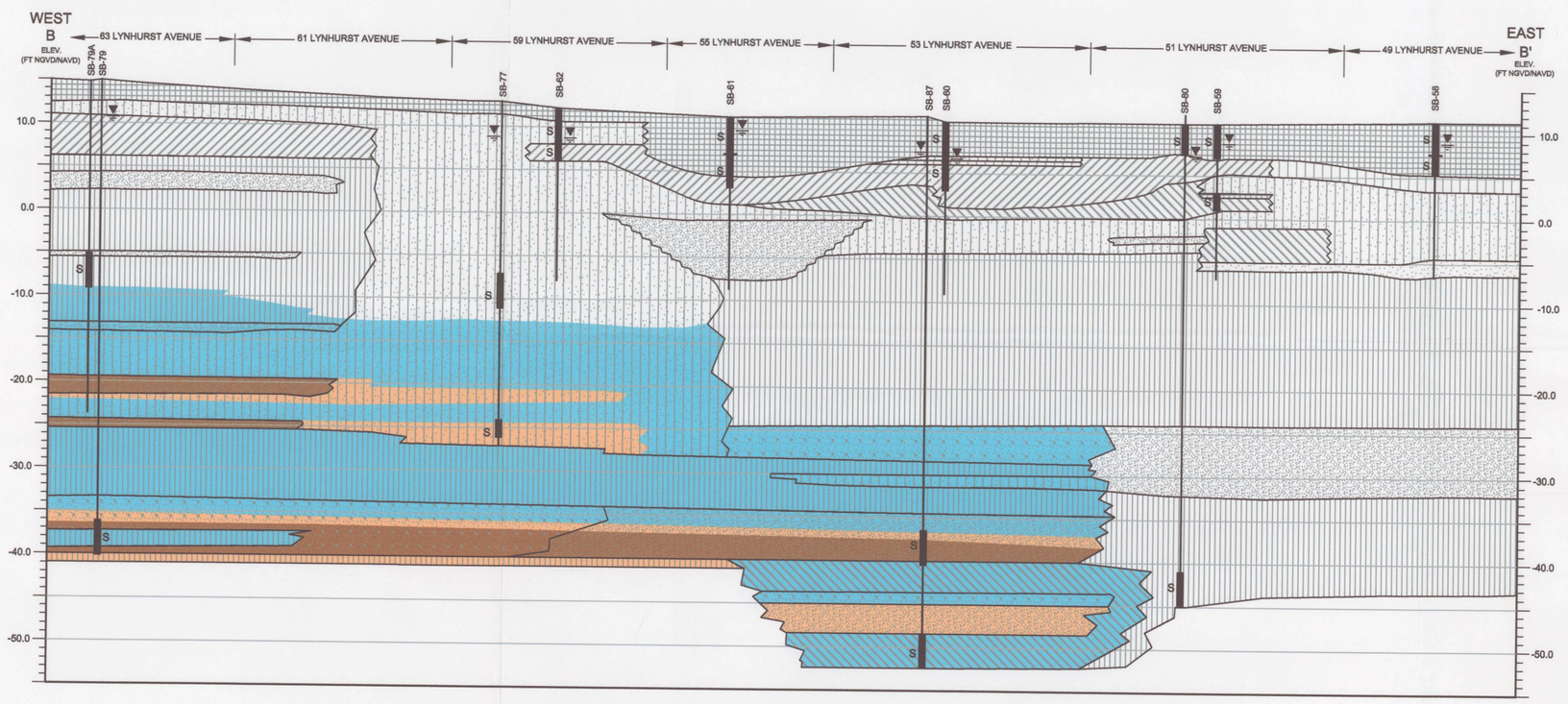
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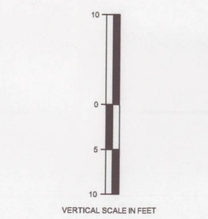
ALLUVIAL/MARSH DEPOSITS
- GRAVELLY-SAND
- SAND (shallow)
- SILT (shallow)
- SILT-CLAY
- GRAVELLY SILT
- PEAT

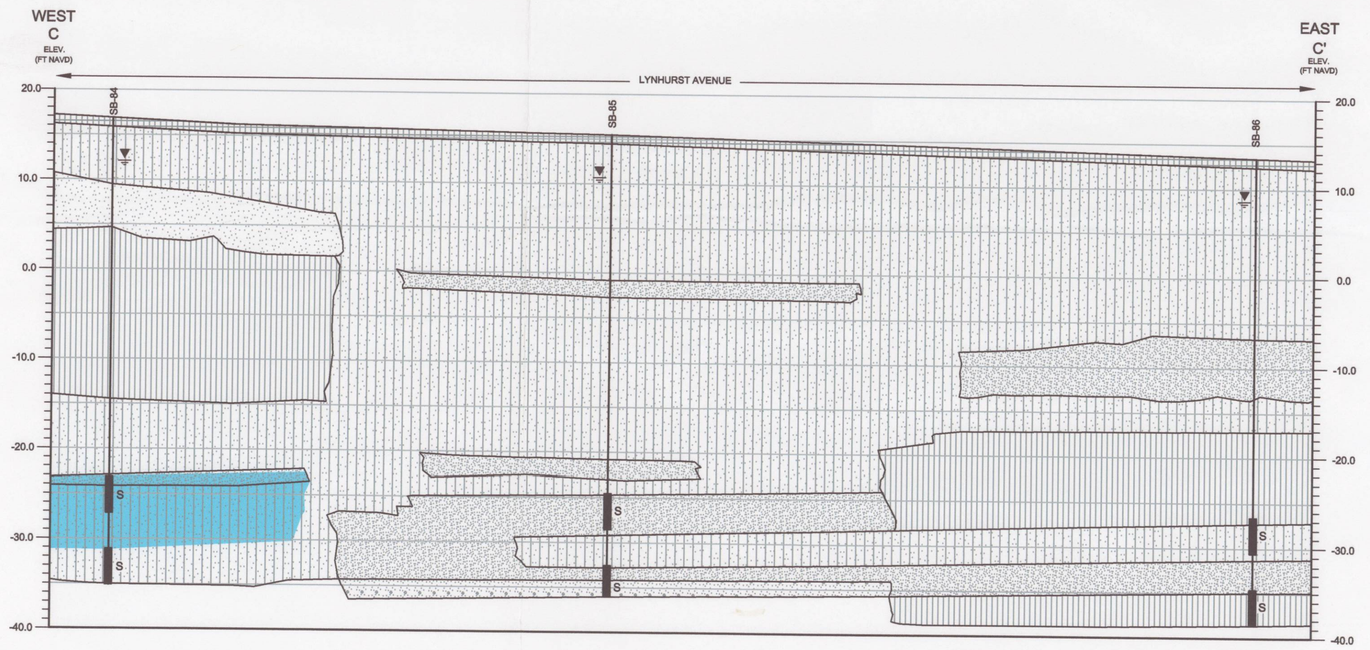
GLACIAL DEPOSITS
- SILT (deep)
- SILT-SAND
- SAND, SILT, CLAY
- SILT-CLAY
- SAND (deep)
- GRAVELLY-SAND
- COBBLE ZONE

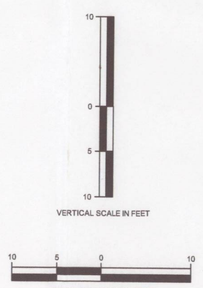
WEATHERED BEDROCK
- SAPROLITE (weathered bedrock)
- MICACEOUS SAND
- MICACEOUS SILT

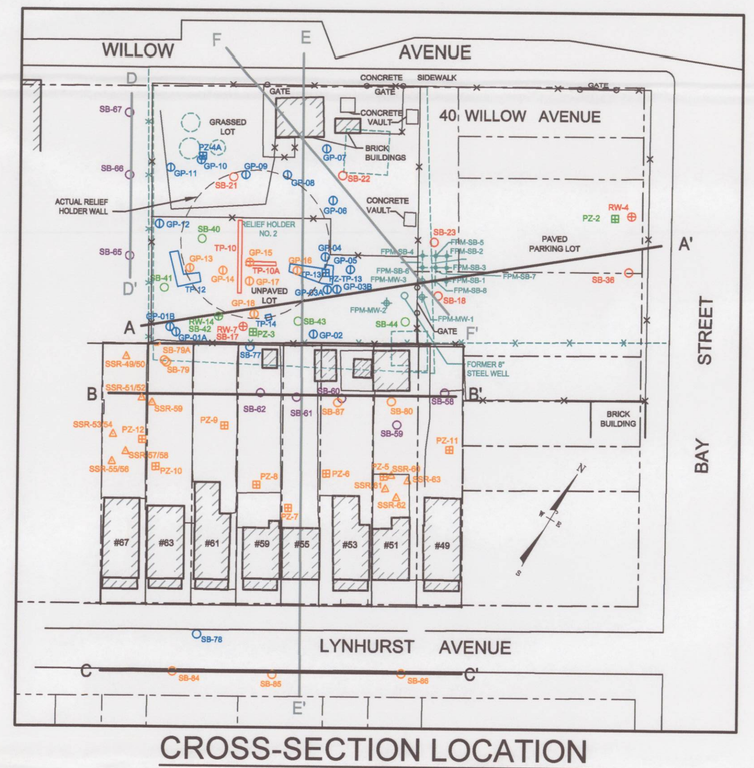
FILL
- FILL
- INFERRED CONTACT
- CONTACT
- OBSERVED APPARENT GROUNDWATER TABLE BASED UPON BORING INFORMATION
- BOUNDARY IS APPROXIMATED
- SB-55/RW-15 — SOIL BORING/ MONITORING WELL IDENTIFICATION
- S — ANALYTICAL SOIL SAMPLE INTERVAL
- WELL SCREEN INTERVAL
- SHEEN AND TAR/ NAPHTHA ODORS
- TAR STAINING, TAR BLEBS/SHEEN AND TAR/NAPHTHA ODORS
- TAR SATURATED, SOIL MATRIX, TAR/NAPHTHA ODORS
- PETROLEUM STAINING, SHEENS AND ODORS











CROSS-SECTION LOCATION

1" = 50'

SOURCES:

1. "FOLLOW-UP SOIL AND GROUNDWATER INVESTIGATION AT THE BROOKLYN UNION GAS COMPANY CLIFTON STATION FACILITY, 40 WILLOW AVENUE, STATEN ISLAND, NY" BY FANNING, PHILLIPS & MOLNAR, AUGUST 26, 1994.
2. "MAP OF PROPERTY, EXIST. BLDG & YARD CONNECTIONS, NEW YORK AND RICHMOND GAS COMPANY - 1925", BY FANNING, PHILLIPS & MOLNAR ENGINEERS, RONKONKOMA, NEW YORK. SCALE 1"=30'. DATED 2/9/94 - REVISED TO 2/13/98.
3. "TOPOGRAPHY AND SAMPLE LOCATIONS, #49 - #67 LYNHURST AVENUE" BY GEI CONSULTANTS, INC., COLCHESTER, CONNECTICUT FOR KEYSPAN ENERGY. SCALE 1"=10'. DATED 7/8/02.

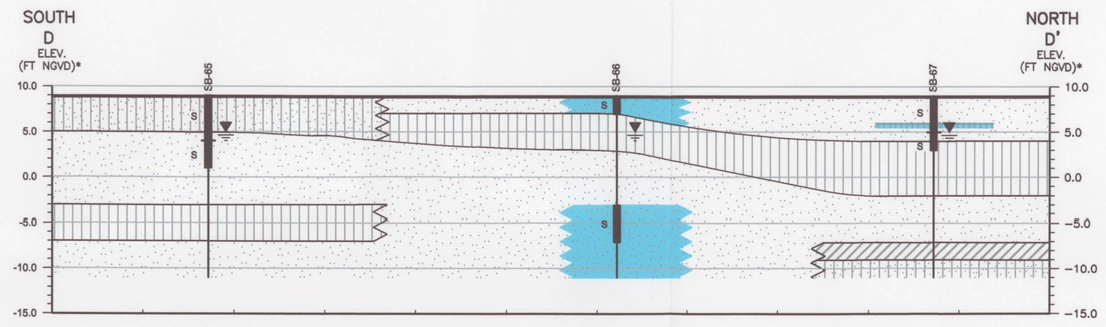
GEI Consultants, Inc.

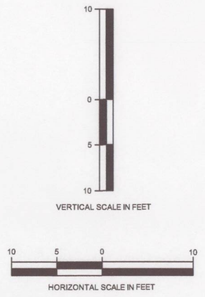
PLAN PREPARED FOR
KEYSPAN CORPORATION
CLIFTON FORMER MGP SITE
STATEN ISLAND, NEW YORK

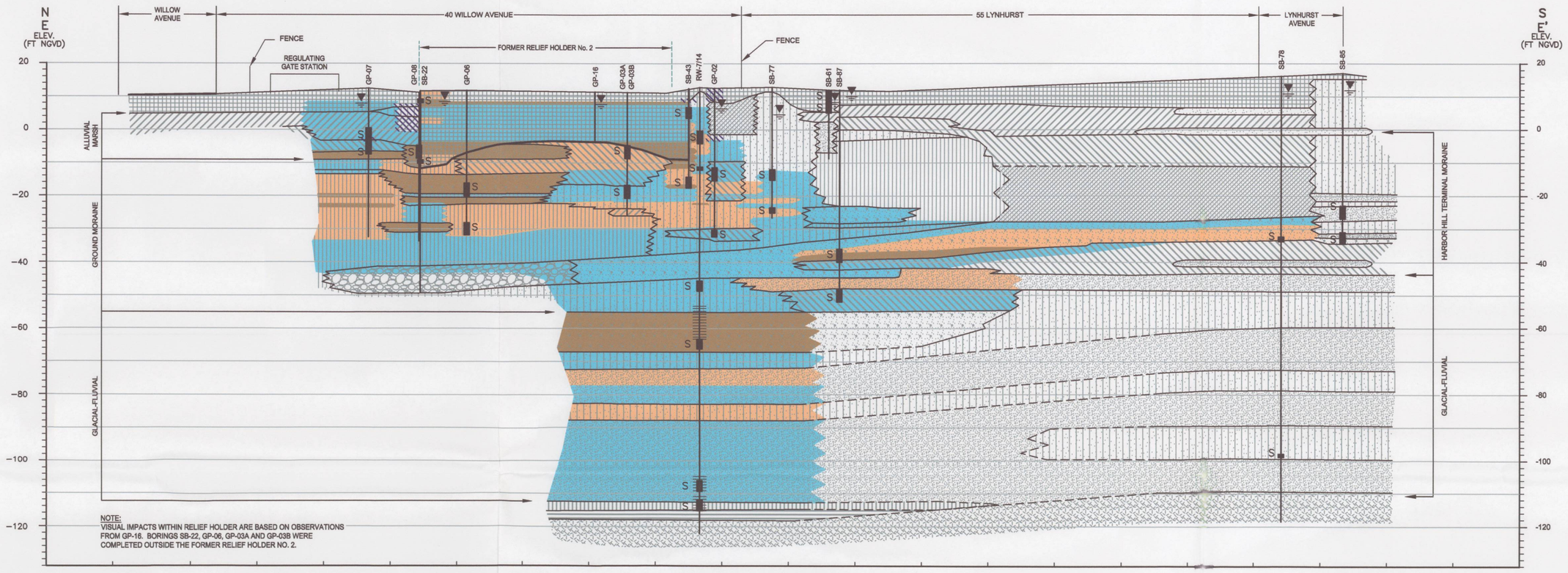
GEOLOGIC CROSS SECTIONS A-A', B-B', AND C-C'

SCALE: AS NOTED	DRN BY: SCG	**PLATE 2**
DATE: SEP 2002	982482-1-1007	

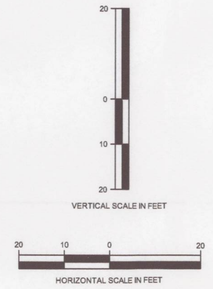
KEYSPAN\CLIFTON\982482\1007\CLF-XS-ABC

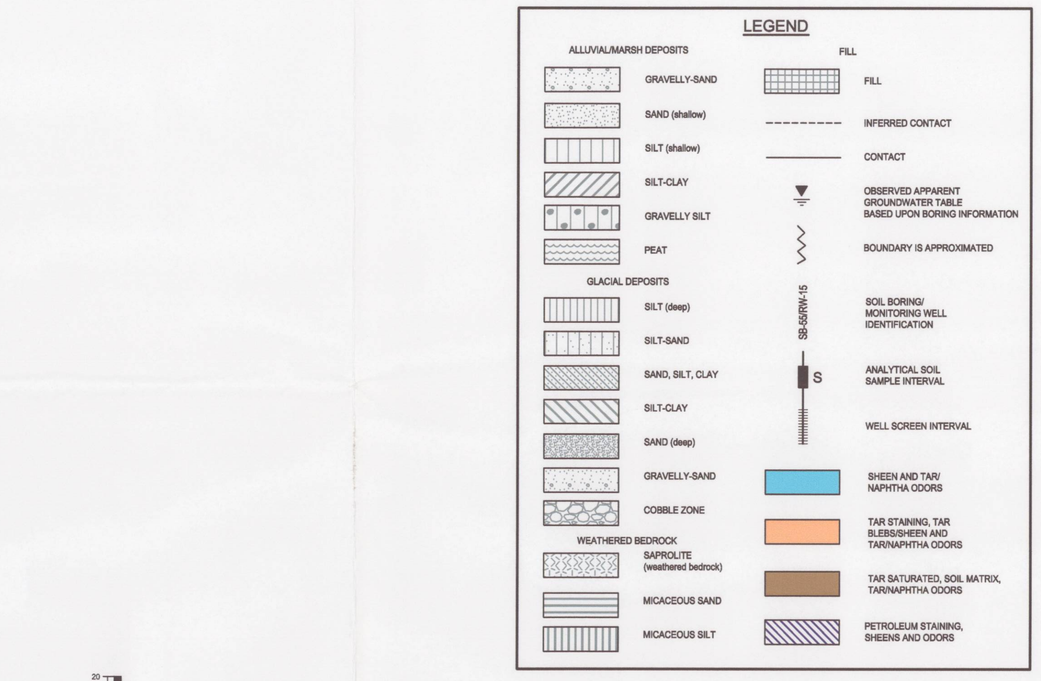


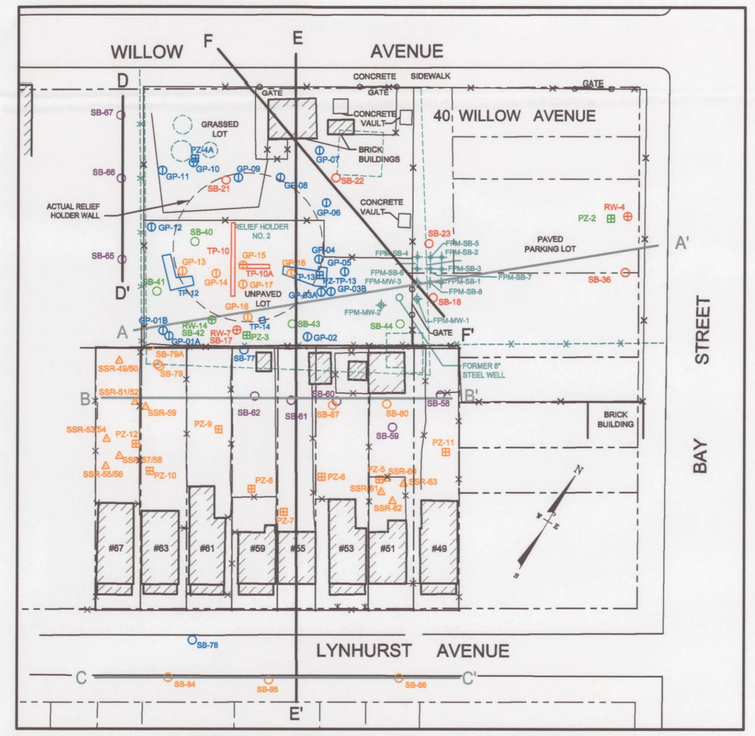




NOTE:
VISUAL IMPACTS WITHIN RELIEF HOLDER ARE BASED ON OBSERVATIONS FROM GP-16, BORINGS SB-22, GP-06, GP-03A AND GP-03B WERE COMPLETED OUTSIDE THE FORMER RELIEF HOLDER NO. 2.

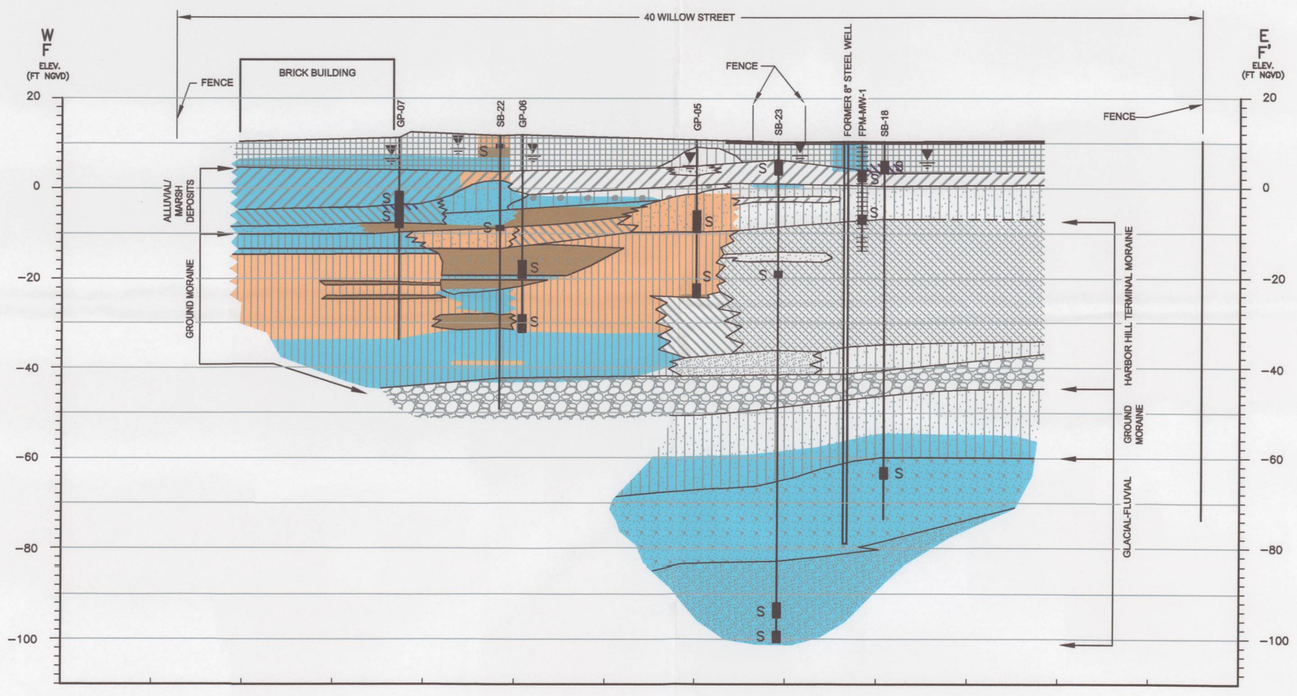


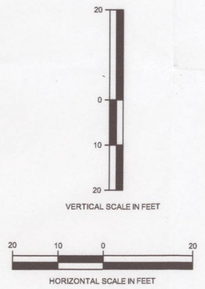




CROSS-SECTION LOCATION

1" = 50'





SOURCES:

1. "UST CLOSURE SUMMARY REPORT, CLIFTON SERVICE CENTER, 25 WILLOW AVENUE, STATEN ISLAND, NEW YORK" BY LEXICON ENVIRONMENTAL ASSOCIATES, INC., OCTOBER 15, 1993.
2. "FOLLOW-UP SOIL AND GROUNDWATER INVESTIGATION AT THE BROOKLYN UNION GAS COMPANY CLIFTON STATION FACILITY, 40 WILLOW AVENUE, STATEN ISLAND, NY" BY FANNING, PHILLIPS & MOLNAR, AUGUST 29, 1994.
3. "MAP OF PROPERTY, EXIST. BLDG & YARD CONNECTIONS, NEW YORK AND RICHMOND GAS COMPANY - 1921", BY FANNING, PHILLIPS & MOLNAR ENGINEERS, RONKONKOMA, NEW YORK. SCALE 1"=30'. DATED 2/6/94 - REVISED TO 2/13/98.
4. STORM AND SANITARY SEWERS IN WILLOW AVENUE (BETWEEN TOMKINS AVENUE AND EDGEWATER STREET), BOROUGH OF STATEN ISLAND. CITY OF NEW YORK DEPARTMENT OF DESIGN CONSTRUCTION DIVISION OF TECHNICAL SUPPORT. RECORD OF BORINGS B-2, SHEET 2 OF 3. JULY 14, 1997.
5. "TOPOGRAPHY AND SAMPLE LOCATIONS, #49 - #67 LYNHURST AVENUE" BY GEI CONSULTANTS, INC., COLCHESTER, CONNECTICUT FOR KEYSPAN ENERGY. SCALE 1"=10'. DATED 7/8/02.

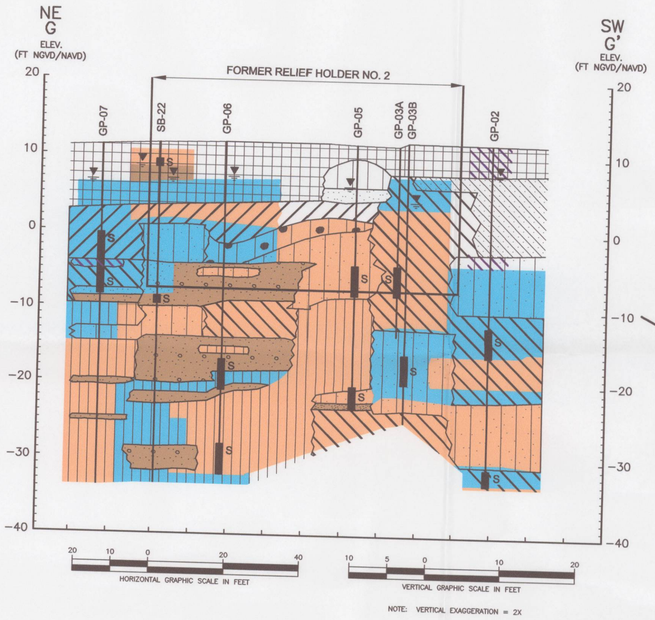
GEI Consultants, Inc.

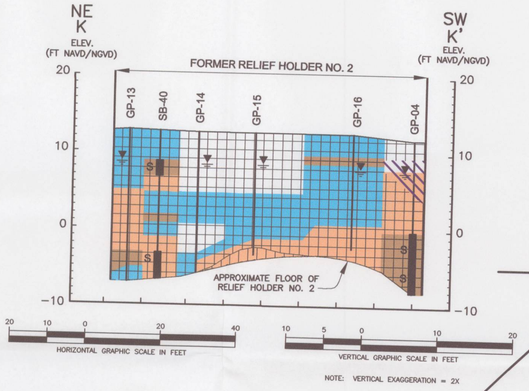
PLAN PREPARED FOR
KEYSPAN CORPORATION
CLIFTON FORMER MGP SITE
STATEN ISLAND, NEW YORK

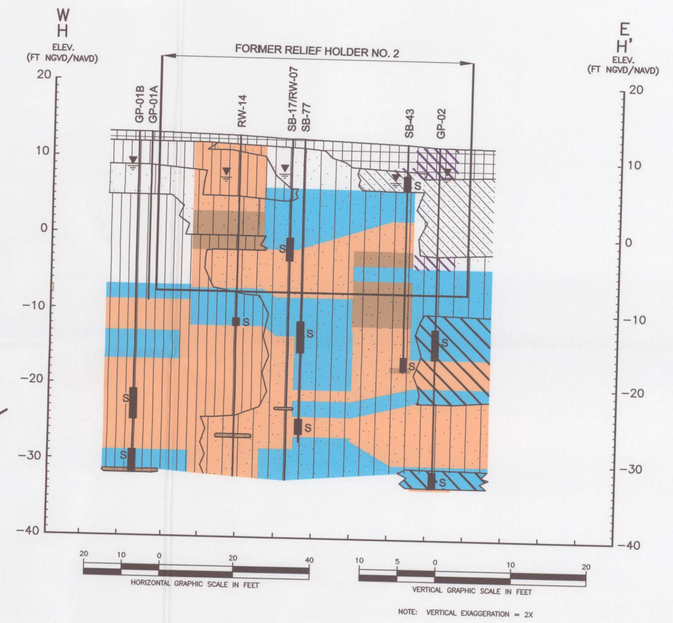
GEOLOGIC CROSS SECTIONS D-D', E-E', AND F-F'

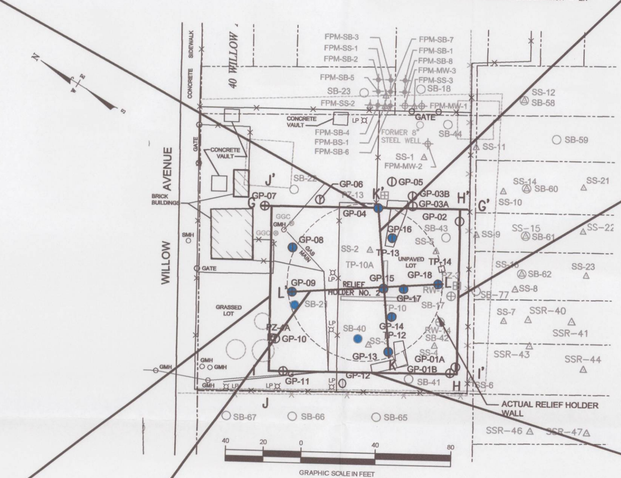
SCALE: AS NOTED	DRN BY: SCG	**PLATE 3**
DATE: SEP 2002	982482-1-1007	

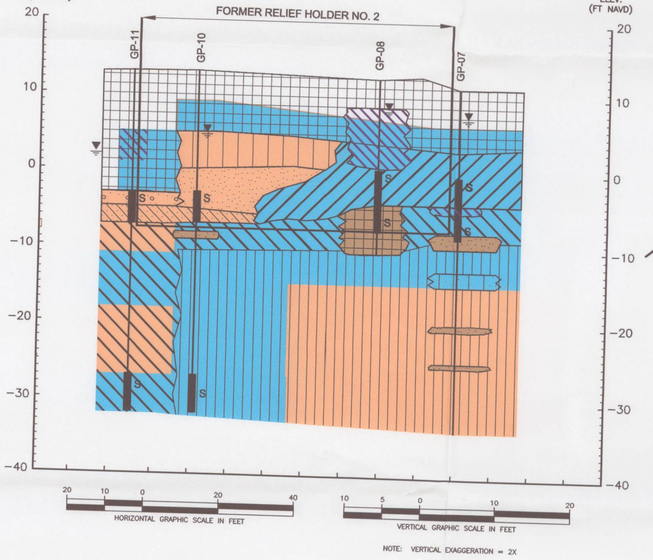
KEYSPAN\CLIFTON\982482\1007\CLF-XS-DEF

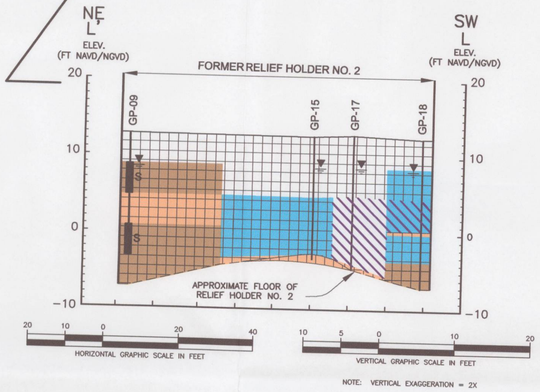


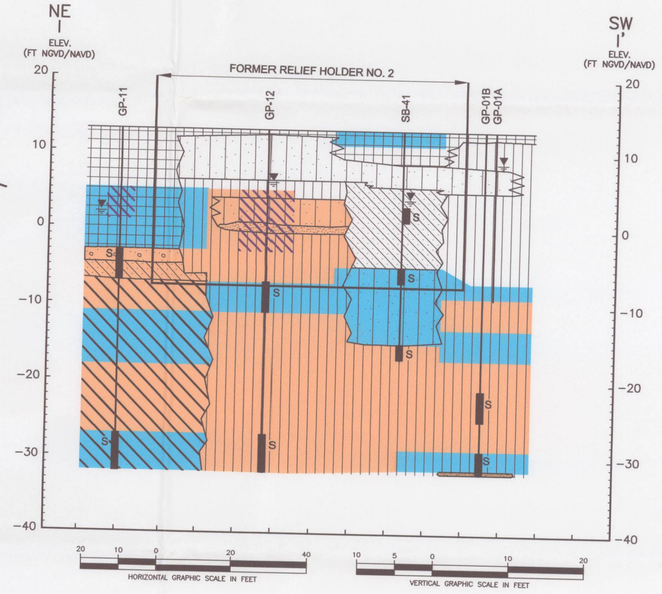


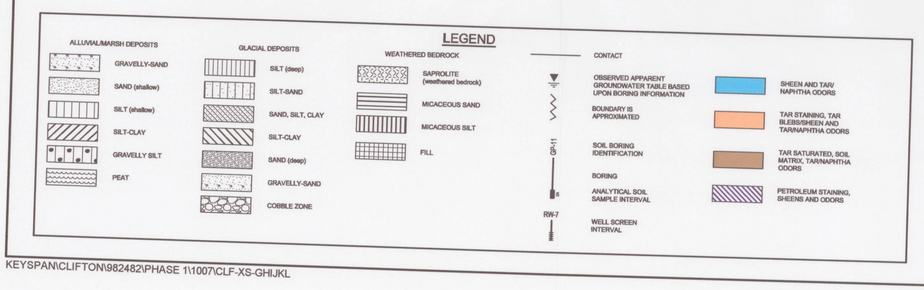


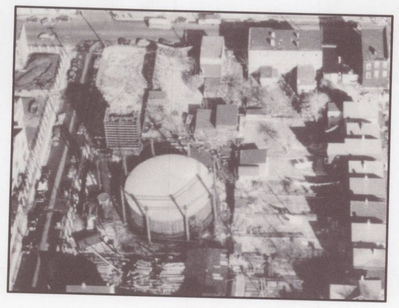




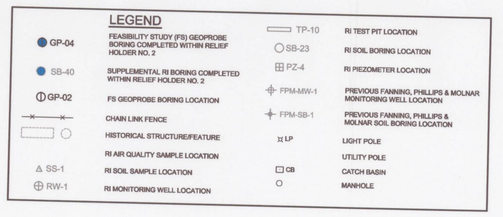








NOT TO SCALE



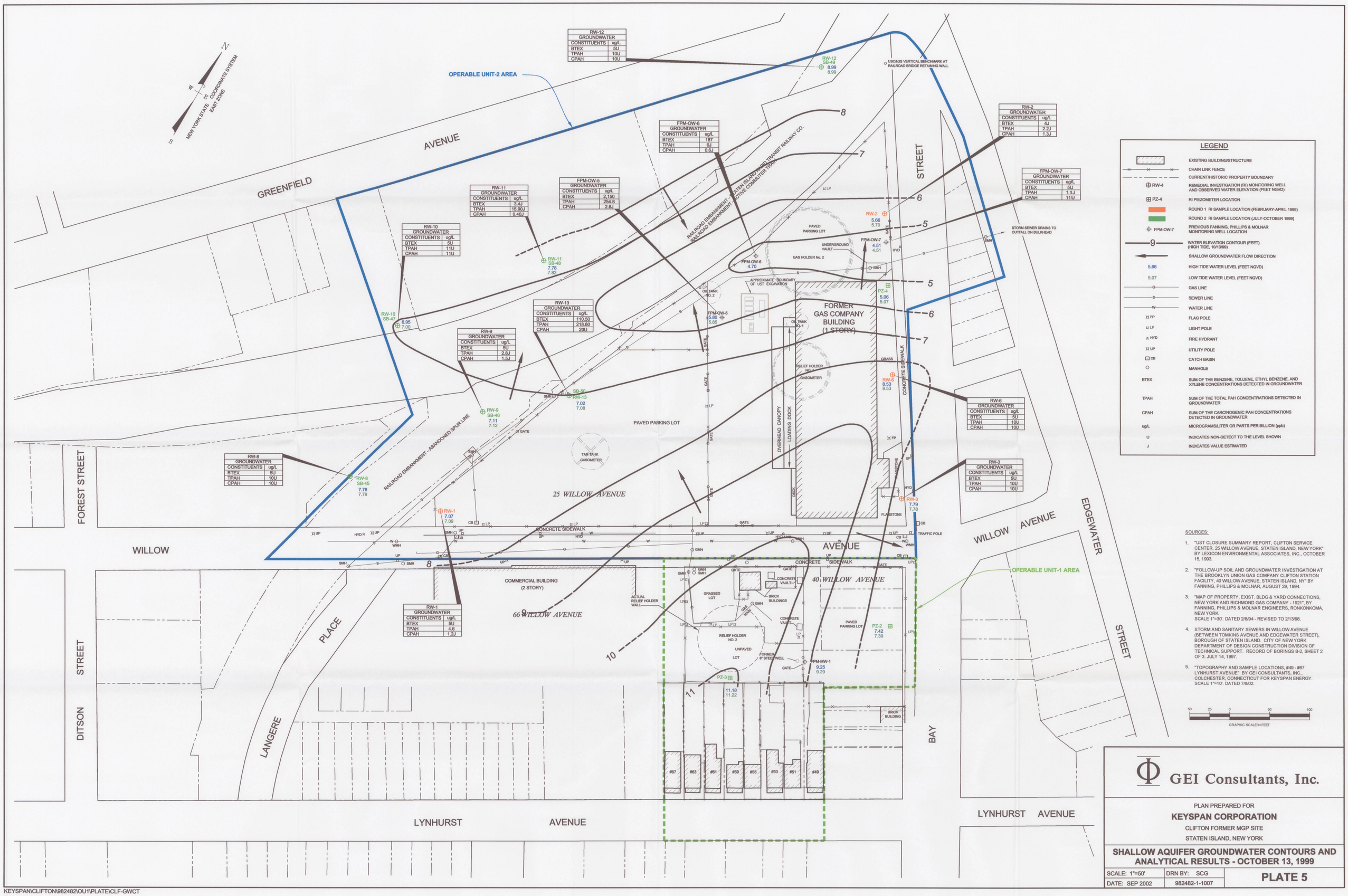
GEI Consultants, Inc.

PLAN PREPARED FOR
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CLIFTON FORMER MGP SITE
STATEN ISLAND, NEW YORK

GEOLOGIC CROSS SECTIONS G-G', H-H', I-I', J-J', K-K', AND L-L'

SCALE: AS NOTED	DRN BY: SCG	**PLATE 4**
DATE: SEP 2002	982482-1-1007	

KEYSPAN\CLIFTON\982482\PHASE 1\1007\CLF-XS-GHIJKL



GEI Consultants, Inc.

PLAN PREPARED FOR
KEYSPAN CORPORATION
CLIFTON FORMER MGP SITE
STATEN ISLAND, NEW YORK

SHALLOW AQUIFER GROUNDWATER CONTOURS AND ANALYTICAL RESULTS - OCTOBER 13, 1999

SCALE: 1"=50'	DRN BY: SCG	**PLATE 5**
DATE: SEP 2002	982482-1-1007	

KEYSPAN\CLIFTON\982482\OU1\PLATE\CLF-GWCT

N

NEW YORK STATE COORDINATE SYSTEM EAST ZONE

OPERABLE UNIT-2 AREA

GREENFIELD AVENUE

RAILROAD EMBANKMENT - STATEN ISLAND RAPID TRANSIT RAILWAY CO.
RAILROAD EMBANKMENT - ACTIVE COMMUTER TRAIN

USC&GS VERTICAL BENCHMARK AT RAILROAD BRIDGE RETAINING WALL

STORM SEWER DRAINS TO OUTFALL ON BULKHEAD

RW-16 GROUNDWATER	
CONSTITUENTS	ug/L
BTEX	0.6J
TPAH	10U
CPAH	10U

RW-15 GROUNDWATER	
CONSTITUENTS	ug/L
BTEX	0.7J
TPAH	11U
CPAH	11U

RW-14 GROUNDWATER	
CONSTITUENTS	ug/L
BTEX	3590
TPAH	2850
CPAH	500U

RW-4 GROUNDWATER	
CONSTITUENTS	ug/L
BTEX	0.2J
TPAH	0.2J
CPAH	10U

PAVED PARKING LOT
UNDERGROUND VAULT
GAS HOLDER No. 2
APPROXIMATE BOUNDARY OF UST EXCAVATION
OIL TANK NO. 2
OIL TANK NO. 1
FORMER GAS COMPANY BUILDING (1 STORY)
RELIEF HOLDER NO. 1
GASOMETER
OVERHEAD CANOPY
LOADING DOCK
GRASS
CONCRETE SIDEWALK
FLAGSTONE
RW-16 SB-56 13.88
RW-15 SB-55A 12.75 12.61
TAR TANK GASOMETER
PAVED PARKING LOT
25 WILLOW AVENUE
40 WILLOW AVENUE
66 WILLOW AVENUE
COMMERCIAL BUILDING (2 STORY)
ACTUAL RELIEF HOLDER WALL
GRASSED LOT
CONCRETE VAULT
BRICK BUILDING
RELIEF HOLDER NO. 2
UNPAVED LOT
FORMER 8" STEEL WELL
RW-14 SB-42 13.52 12.88
RW-7 SB-17 13.50 13.24
RW-4 13.13 12.54
BRICK BUILDING
#67 #63 #61 #59 #55 #53 #51 #49
13.7 13.5 13.3 13.1 12.9 13.3 13.5 13.7

FOREST STREET
WILLOW AVENUE
DITSON STREET
PLACE
LANGERE
LYNHURST AVENUE
BAY
STREET
EDGEWATER STREET
OPERABLE UNIT-1 AREA

LEGEND

- EXISTING BUILDING/STRUCTURE
- CHAIN LINK FENCE
- CURRENT/HISTORIC PROPERTY BOUNDARY
- RW-4 13.13 — REMEDIAL INVESTIGATION (RI) MONITORING WELL AND OBSERVED WATER ELEVATION (FEET NGVD)
- ROUND 1 RI SAMPLE LOCATION (FEBRUARY-APRIL 1999)
- ROUND 2 RI SAMPLE LOCATION (JULY-OCTOBER 1999)
- 13.3 — WATER ELEVATION CONTOUR (FEET) (HIGH TIDE, 10/13/99)
- INFERRED DEEP GROUNDWATER FLOW DIRECTION
- 12.75 — HIGH TIDE WATER ELEVATION (FEET NGVD)
- 12.61 — LOW TIDE WATER ELEVATION (FEET NGVD)
- G — GAS LINE
- S — SEWER LINE
- W — WATER LINE
- FP — FLAG POLE
- LP — LIGHT POLE
- HYD — FIRE HYDRANT
- UP — UTILITY POLE
- CB — CATCH BASIN
- MANHOLE
- BTEX — SUM OF THE BENZENE, TOLUENE, ETHYL BENZENE, AND XYLENE CONCENTRATIONS DETECTED IN GROUNDWATER
- TPAH — SUM OF THE TOTAL PAH CONCENTRATIONS DETECTED IN GROUNDWATER
- CPAH — SUM OF THE CARCINOGENIC PAH CONCENTRATIONS DETECTED IN GROUNDWATER
- ug/L — MICROGRAMS/LITER OR PARTS PER BILLION (ppb)
- U — INDICATES NON-DETECT TO THE LEVEL SHOWN
- J — INDICATES ESTIMATED

* NOTE: RW-14 WAS PUMPED AT THE TIME OF LOW TIDE MEASUREMENT

SOURCES:

1. "UST CLOSURE SUMMARY REPORT, CLIFTON SERVICE CENTER, 25 WILLOW AVENUE, STATEN ISLAND, NEW YORK" BY LEXICON ENVIRONMENTAL ASSOCIATES, INC., OCTOBER 15, 1993.
2. "FOLLOW-UP SOIL AND GROUNDWATER INVESTIGATION AT THE BROOKLYN UNION GAS COMPANY CLIFTON STATION FACILITY, 40 WILLOW AVENUE, STATEN ISLAND, NY" BY FANNING, PHILLIPS & MOLNAR, AUGUST 29, 1994.
3. "MAP OF PROPERTY, EXIST. BLDG & YARD CONNECTIONS, NEW YORK AND RICHMOND GAS COMPANY - 1921", BY FANNING, PHILLIPS & MOLNAR ENGINEERS, RONKONKOMA, NEW YORK. SCALE 1"=30'. DATED 2/8/94 - REVISED TO 2/13/98.
4. STORM AND SANITARY SEWERS IN WILLOW AVENUE (BETWEEN TOMKINS AVENUE AND EDGEWATER STREET), BOROUGH OF STATEN ISLAND. CITY OF NEW YORK DEPARTMENT OF DESIGN CONSTRUCTION DIVISION OF TECHNICAL SUPPORT. RECORD OF BORINGS B-2, SHEET 2 OF 3. JULY 14, 1997.
5. "TOPOGRAPHY AND SAMPLE LOCATIONS, #49 - #67 LYNHURST AVENUE" BY GEI CONSULTANTS, INC., COLCHESTER, CONNECTICUT FOR KEYSPAN ENERGY. SCALE 1"=10'. DATED 7/8/02.

50 25 0 50 100
GRAPHIC SCALE IN FEET

GEI Consultants, Inc.

PLAN PREPARED FOR
KEYSPAN CORPORATION
CLIFTON FORMER MGP SITE
STATEN ISLAND, NEW YORK

DEEP AQUIFER GROUNDWATER CONTOURS AND ANALYTICAL RESULTS - OCTOBER 13, 1999

SCALE: 1"=50'	DRN BY: SCG	**PLATE 6**
DATE: SEP 2002	982482-1-1007	

KEYSPAN\CLIFTON\982482\OU1\PLATE\CLF-GWCT



LEGEND

- EXISTING BUILDING/STRUCTURE
- HISTORICAL STRUCTURE/FEATURE
- CHAIN LINK FENCE
- CURRENT/HISTORIC PROPERTY BOUNDARY
- RW-2 / 5.54 — REMEDIAL INVESTIGATION (RI) MONITORING WELL AND OBSERVED WATER ELEVATION (FEET NGVD)
- FPM-OW-7 — PREVIOUS FANNING, PHILLIPS & MOLNAR MONITORING WELL LOCATION
- PZ-4 — RI PIEZOMETER LOCATION
- ROUND 1 RI SAMPLE LOCATION (FEBRUARY-APRIL 1999)
- ROUND 2 RI SAMPLE LOCATION (JULY-OCTOBER 1999)
- ROUND 4 RI SAMPLE LOCATION (NOVEMBER 2001-JANUARY 2002)
- 9 — WATER ELEVATION CONTOUR (FEET NGVD/NAVD) (JANUARY 17, 2002)
- INFERRED SHALLOW GROUNDWATER FLOW DIRECTION
- G — GAS LINE
- S — SEWER LINE
- W — WATER LINE
- FP — FLAG POLE
- LP — LIGHT POLE
- HYD — FIRE HYDRANT
- UP — UTILITY POLE
- CB — CATCH BASIN
- MANHOLE
- BTEX — THE SUM OF THE BENZENE, TOLUENE, ETHYL BENZENE, AND XYLENE CONCENTRATIONS DETECTED IN GROUNDWATER
- TPAH — THE SUM OF THE TOTAL PAH CONCENTRATIONS DETECTED IN GROUNDWATER
- CPAH — THE SUM OF THE CARCINOGENIC PAH CONCENTRATIONS DETECTED IN GROUNDWATER
- ug/L — MICROGRAMS/LITER OR PARTS PER BILLION (ppb)
- U — INDICATES NON-DETECT TO THE LEVEL SHOWN
- J — INDICATES VALUE ESTIMATED

NOTE:

1. GROUNDWATER ELEVATION INFORMATION FROM MONITORING WELL RW-13 WAS NOT USED FOR THE CONSTRUCTION OF THIS MAP.
2. ANALYTICAL SAMPLES WERE COLLECTED FROM RW-17 AND RW-18 DURING THE ROUND FOUR SAMPLING EVENT. THE REMAINDER OF THE WELLS PRESENTED WERE GAUGED FOR WATER LEVELS ONLY.
3. GROUNDWATER ELEVATIONS FROM MONITORING WELL RW-17 AND RW-18 WERE NOT UTILIZED IN THE CONSTRUCTION OF THIS MAP BECAUSE THE WELLS ARE LOCATED WITHIN A WATER BEARING ZONE OF THE CONFINING UNIT.

SOURCES:

1. "UST CLOSURE SUMMARY REPORT, CLIFTON SERVICE CENTER, 25 WILLOW AVENUE, STATEN ISLAND, NEW YORK" BY LEXICON ENVIRONMENTAL ASSOCIATES, INC., OCTOBER 15, 1993.
2. "FOLLOW-UP SOIL AND GROUNDWATER INVESTIGATION AT THE BROOKLYN UNION GAS COMPANY CLIFTON STATION FACILITY, 40 WILLOW AVENUE, STATEN ISLAND, NY" BY FANNING, PHILLIPS & MOLNAR, AUGUST 29, 1994.
3. "MAP OF PROPERTY, EXIST. BLDG & YARD CONNECTIONS, NEW YORK AND RICHMOND GAS COMPANY - 1921", BY FANNING, PHILLIPS & MOLNAR ENGINEERS, RONKONKOMA, NEW YORK. SCALE 1"=30'. DATED 2/8/94 - REVISED TO 2/13/96.
4. STORM AND SANITARY SEWERS IN WILLOW AVENUE (BETWEEN TOMKINS AVENUE AND EDGEWATER STREET), BOROUGH OF STATEN ISLAND. CITY OF NEW YORK DEPARTMENT OF DESIGN CONSTRUCTION DIVISION OF TECHNICAL SUPPORT. RECORD OF BORINGS B-2, SHEET 2 OF 3. JULY 14, 1997.
5. "TOPOGRAPHY AND SAMPLE LOCATIONS, #49 - #67 LYNHURST AVENUE" BY GEI CONSULTANTS, INC., COLCHESTER, CONNECTICUT FOR KEYSPAN ENERGY. SCALE 1"=10'. DATED 7/8/02.

50 25 0 50 100
GRAPHIC SCALE IN FEET

GEI Consultants, Inc.

PLAN PREPARED FOR
KEYSPAN CORPORATION
CLIFTON FORMER MGP SITE OU-1
STATEN ISLAND, NEW YORK

SHALLOW AQUIFER GROUNDWATER CONTOURS OU-1 AND OU-2 JANUARY 17, 2002

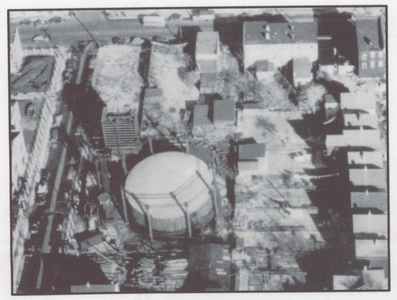
SCALE: 1"=50'	DRN BY: SCG	**PLATE 7**
DATE: FEB 2003	982482-1-1007	

KEYSPAN\CLIFTON\982482\1007\OU-1\PLATES\CLF-GWCT 1-17



Photograph 1

Photograph depicts the eastern wall of Relief Holder No. 2 in test pit 13 (TP-13). The holder wall is a brick masonry construction with a concrete-like coating. The top of Relief Holder No. 2 is approximately 1.5 to 2 feet below ground surface. Rubble present on the inside of the holder wall included brick, steel cable, concrete and transite fragments. A steel reinforcement bar is present in the foreground which is likely associated with a former super structure support tower.



NOT TO SCALE



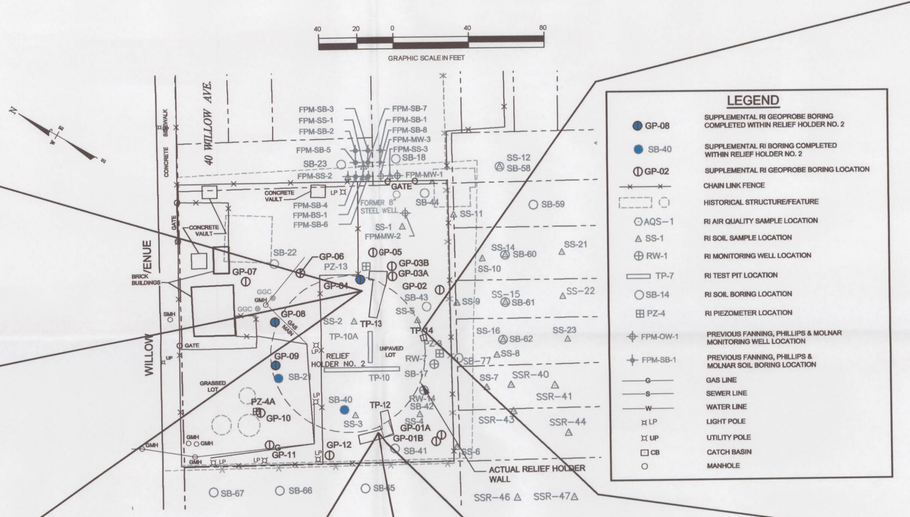
Photograph 7

Photograph depicts the top of the Relief Holder No. 2 wall encountered in test pit 14 (TP-14) adjacent to the residential parcels.



Photograph 2

Photograph depicts the brick construction of the eastern wall of Relief Holder No. 2 in test pit 13 (TP-13). The interior of the holder is in the foreground (bottom) of the photograph.





Photograph 8

Photograph depicts the top of the Relief Holder No. 2 wall encountered in test pit 14 (TP-14) adjacent to the residential parcels.

LEGEND

GP-08	SUPPLEMENTAL RI GEOPROBE BORING COMPLETED WITHIN RELIEF HOLDER NO. 2
SB-40	SUPPLEMENTAL RI BORING COMPLETED WITHIN RELIEF HOLDER NO. 2
GP-02	SUPPLEMENTAL RI GEOPROBE BORING LOCATION
	CHAIN LINK FENCE
	HISTORICAL STRUCTURE/FEATURE
AQS-1	RI AIR QUALITY SAMPLE LOCATION
SS-1	RI SOIL SAMPLE LOCATION
RW-1	RI MONITORING WELL LOCATION
TP-7	RI TEST PIT LOCATION
SB-14	RI SOIL BORING LOCATION
PZ-4	RI PIEZOMETER LOCATION
FPM-OW-1	PREVIOUS FANNING, PHILLIPS & MOLNAR MONITORING WELL LOCATION
FPM-SB-1	PREVIOUS FANNING, PHILLIPS & MOLNAR SOIL BORING LOCATION
G	GAS LINE
S	SEWER LINE
W	WATER LINE
LP	LIGHT POLE
UP	UTILITY POLE
CB	CATCH BASIN
	MANHOLE



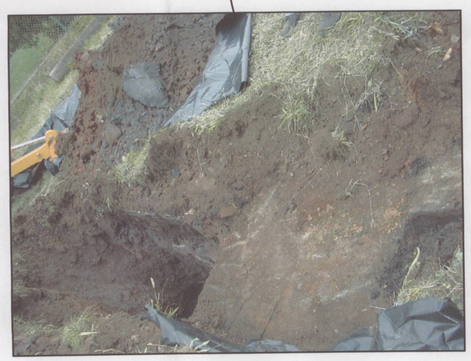
Photograph 3

Photograph depicts the outer wall of Relief Holder No. 2. Note the concrete skim coat of concrete and the brick construction of the top of the holder wall. Note the impacted soils in the upper portion of the photograph in test pit 13 (TP-13).



Photograph 4

Photograph depicts a close up view of the holder wall construction from a portion of the holder wall encountered during the excavation of test pit 12 (TP-12). Note the brick and masonry construction of the holder wall.



Photograph 5

Photograph depicts the outer western wall of Relief Holder No. 2, and a concrete slab for the former tower support structure located near the western boundary of the 40 Willow Avenue parcel in test pit 12 (TP-12). The concrete slab contained four steel bolts that were formerly connected to the steel super structure depicted in the historic aerial photograph.



Photograph 6

Photograph depicts the outer wall (western side) of Relief Holder No.2. and the edge of the concrete slab in test pit 12 (TP-12). The wall construction is brick with a concrete skim coating.

GEI Consultants, Inc.

PLAN PREPARED FOR

KEYSPAN CORPORATION

CLIFTON FORMER MGP SITE

STATEN ISLAND, NEW YORK

TEST PIT INVESTIGATION OF RELIEF HOLDER NO. 2
40 WILLOW AVENUE

SCALE: AS NOTED	DRN BY: SCG	**APPENDIX C**
DATE: SEP 2002	982482-1007	

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