Department of Environmental Conservation

Division of Environmental Remediation

Environmental Restoration
Record of Decision
Barretto Point Site
New York (C) Bronx County, New York
Site Number B-00032-2

December 2003

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor* ERIN M. CROTTY, *Commissioner*

DECLARATION STATEMENT
ENVIRONMENTAL RESTORATION RECORD OF DECISION

Barretto Point Environmental Restoration Site
New York (C), Bronx County, New York
Site No. B-00032-2

Statement of Purpose and Basis

The Record of Decision (ROD) presents the selected remedy for the Barretto Point site, an environmental restoration site. The selected remedial program was chosen in accordance with the New York State Environmental Conservation Law and is not inconsistent with the National Oil and Hazardous Substances Pollution Contingency Plan of March 8, 1990 (40CFR300), as amended.

This decision is based on the Administrative Record of the New York State Department of Environmental Conservation (NYSDEC) for the Barretto Point environmental restoration site, and the public's input to the Proposed Remedial Action Plan (PRAP) presented by the NYSDEC. A listing of the documents included as a part of the Administrative Record is included in Appendix B of the ROD.

Assessment of the Site

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, presents a current or potential significant threat to public health and/or the environment.

Description of Selected Remedy

Based on the results of the Site Investigation/Remedial Alternatives Report (SI/RAR) for the Barretto Point site and the criteria identified for evaluation of alternatives, the NYSDEC has selected excavation and off-site disposal of soils contaminated with volatile organic compounds, and a soil cover. The components of the remedy are as follows:

- For the 5-acre Planned Park Area and 7.3-acre Remaining Site Area (see Figure 2), grading and placement of two feet of clean soil cover to limit potential exposure to contaminated soil;

- For the 0.7-acre Former Paint and Varnish Manufacturing Facility Area (see Figure 2), excavation and removal of contaminated soil (approximately 14,100 cubic yards), and extraction and treatment of groundwater as part of the dewatering process during excavation of VOC-contaminated soil. Extracted groundwater will be treated to meet the requirements for discharge to a NYSDEC approved treatment/disposal facility.

- Covering the excavated area with clean soil and/or the construction of the treatment plant digesters which have been proposed as part of the upgrade of the Hunts Point Water Pollution Control Plant (HPWPCP).

- A soils management plan will be developed to address proper handling of residually contaminated soils that may be excavated from the site during future redevelopment.

- Institutional controls will be imposed in the form of an environmental easement, in such form as the NYSDEC may approve, that would require compliance with an approved soils management plan. The environmental easement will also limit use of groundwater from the affected area as a source of potable or process water without the necessary water quality treatment as determined by the New York City Department of Environmental Protection (NYCDEP) and the NYSDEC.

- A long term maintenance program will be instituted.

- The property owner will certify annually to the NYSDEC that the institutional and engineering controls put in place, pursuant to the ROD, are still in place, have not been altered, and are still effective.

New York State Department of Health Acceptance

The New York State Department of Health (NYSDOH) concurs that the remedy selected for this site is protective of human health.

Declaration

The selected remedy is protective of human health and the environment, complies with State and Federal requirements that are legally applicable or relevant and appropriate to the remedial action to the extent practicable, and is cost effective.

_____ _____

Date

Dale A. Desnoyers, Director
Division of Environmental Remediation

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Environmental Restoration
RECORD OF DECISION

Barretto Point Site
New York (C), Bronx County, New York
Site No. B-00032-2
December 2003

SECTION 1: SUMMARY OF THE RECORD OF DECISION

The New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Department of Health (NYSDOH), has selected a remedy for the Barretto Point Brownfield Site. The presence of hazardous substances has created threats to human health and/or the environment that are addressed by this remedy.

The 1996 Clean Water/ Clean Air Bond Act provides funding to municipalities for the investigation and cleanup of brownfields. Under the Environmental Restoration (Brownfields) Program, the state provides grants to municipalities to reimburse up to 90 percent of eligible costs for site investigation and remediation activities. Once remediated the property can then be reused.

As more fully described in Sections 3 and 5 of this document, historic industrial operations at the site have resulted in the disposal of hazardous substances, including volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs) and metals. These hazardous substances have contaminated the surface soil, subsurface soil and groundwater at the site, and have resulted in:

- a threat to human health and the environment associated with current and potential exposure to impacted surface and subsurface soil and groundwater.

- an environmental threat associated with the impacts of contaminants (VOCs) to groundwater and subsurface soil in the northeastern portion of the site where a paint and varnish manufacturing facility was previously located.

To eliminate or mitigate these threats, the NYSDEC has selected the following remedy to allow for recreational and industrial use of the site:

- For the 5-acre Planned Park Area and 7.3-acre Remaining Site Area (see Figure 2), grading and placement of two feet of clean soil cover to limit potential exposure to contaminated soil;

- For the 0.7-acre Former Paint and Varnish Manufacturing Facility Area (see Figure 2), excavation and removal of contaminated soil (approximately 14,100 cubic yards), and

extraction and treatment of groundwater as part of the dewatering process during excavation of VOC-contaminated soil. Extracted groundwater will be treated to meet the requirements for discharge to a NYSDEC approved treatment/disposal facility.

- Covering the excavated area with clean soil and/or the construction of the treatment plant digesters which have been proposed as part of the upgrade of the HPWPCP.

- A soils management plan will be developed to address proper handling of residually contaminated soils that may be excavated from the site during future redevelopment.

- Institutional controls will be imposed in the form of an environmental easement, in such form as the NYSDEC may approve, that would require compliance with an approved soils management plan. The environmental easement will also limit use of groundwater from the affected area as a source of potable or process water without the necessary water quality treatment as determined by the New York City Department of Environmental Protection (NYCDEP) and the NYSDEC.

- A long term maintenance program will be instituted.

- The property owner will certify annually to the NYSDEC that the institutional and engineering controls put in place, pursuant to the ROD, are still in place, have not been altered, and are still effective.

The selected remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform with officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, criteria and guidance are hereafter called SCGs.

SECTION 2: SITE LOCATION AND DESCRIPTION

The Barretto Point Site is located in the Hunts Point section of Bronx County, New York. The site is approximately 13 acres in size and is bounded by Viele Avenue to the north, the East River to the south and west, and Manida Street and the Hunts Point Water Pollution Control Plant (HPWPCP) to the east. The site location is shown on Figure 1 and the site layout is shown on Figure 2.

The Barretto Point Site is currently owned by the City of New York and is mostly vacant. The area surrounding the site is primarily industrial/commercial in nature, including waste transfer stations, warehouses and the HPWPCP. The nearest residences are located approximately 1,500 feet north of the site.

Planned use of the Barretto Point Site includes a 5-acre park in the western portion of the site (see Figure 2 for location) with the remainder of the site reserved for upgrading of the Hunts Point Water Pollution Control Plant.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

By 1950, much of the site had been developed for industrial purposes. These uses included a sand and gravel operation in the northwestern portion of the site (including a transformer house along Barretto Street), an asphalt plant at the southwest corner of Barretto Street and Ryawa Avenue, and coal pockets to the west along the East River. Industries in the northeastern portion of the site included a paint and varnish manufacturing facility. The locations of these facilities are shown on Figure 3.

An aerial photograph from 1962 showed that the coal pockets (two large rectangular structures likely used for the storage of coal) have been removed from the site. In addition, the aerial photograph showed that the southern and northwestern portions of the site have been expanded into the East River, apparently as a result of filling operations.

By 1978, only the buildings associated with the asphalt plant were still present at the site, although the plant is reported as not being operational (these buildings were demolished by 1991). The northwestern portion of the site has been further expanded into the East River.

As many as eight squatter dwellings were constructed on the west side of Barretto Street between 1992 and 1999. These structures were removed in October 1999 and their occupants were relocated by the City of New York.

3.2: Remedial History

No information regarding previous environmental investigations that may have been conducted at the site is available, although a groundwater monitoring well constructed prior to this investigation was identified in the northeastern area of the site.

SECTION 4: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past owners and operators, waste generators, and haulers.

Since no viable PRPs have been identified, there are currently no ongoing enforcement actions. However, legal action may be initiated at a future date by the state to recover state response costs should PRPs be identified. The City of New York will assist the state in its efforts by providing all

information to the state which identifies PRPs. The City of New York will also not enter into any agreement regarding response costs without the approval of the NYSDEC.

SECTION 5: SITE CONTAMINATION

The City of New York has recently completed a site investigation/remedial alternatives report (SI/RAR) to determine the nature and extent of any contamination by hazardous substances at this environmental restoration site.

5.1: Summary of the Site Investigation

The purpose of the SI was to define the nature and extent of any contamination resulting from previous activities at the site. The SI was conducted between September 1999 and May 2000**.** The field activities and findings of the investigation are described in the SI report.

The Site Investigation was conducted in two phases. The first phase was conducted between September 1999 and December 1999, and the second phase was conducted between March 2000 and May 2000. A supplemental soil investigation was conducted in August and October of 2002. The following activities were conducted during the SI:

- Site reconnaissance survey to evaluate site conditions prior to the initiation of field work, including site access, and health and safety considerations. The site reconnaissance survey identified one existing groundwater monitoring well, several open boreholes, an area of stressed vegetation and a surface discharge at the site. During the Site Investigation, the boreholes were abandoned, and samples were collected from the area of stressed vegetation, the monitoring well and the surface discharge;

- Site clearing and establishment of the investigation grid network that was utilized for the geophysical survey and soil vapor survey;

- Geophysical survey to evaluate possible subsurface features of potential environmental concern, such as drums, tanks or drywells;

- Radiological survey to evaluate whether radioactive material was present at the site;

- Soil vapor/groundwater screening survey to define areas of VOC contaminated soils and groundwater, and possible vapor exposure pathways. Fifty soil vapor samples and six groundwater samples were collected using the direct push technique;

- Collection of eleven surface soil samples (including one background sample) to assess the presence and nature of surface soil contamination at the site;

- Excavation of eight test pits and four test trenches to geologically and chemically characterize fill material across the site;

- Installation of five soil borings and five monitoring wells for analysis of soils and groundwater, as well as physical properties of soil and hydrogeologic conditions;

- Excavation of 46 test pits and construction of 33 soil borings to delineate the extent of soil contamination in the vicinity of the former paint and varnish manufacturing facility in the northeastern portion of the site;

- Measurement of groundwater elevations in the six new and existing monitoring wells to evaluate groundwater flow direction during high tide and low tide conditions;

- Tidal study to evaluate tidal influences on groundwater at the site;

- Sampling of six new and existing monitoring wells;

- Collection of one discrete groundwater sample using the direct push technique and four groundwater samples from temporary wells to evaluate groundwater quality in the area of contaminated soil in the vicinity of the former paint and varnish manufacturing facility in the northeastern portion of the site; and

- Collection of one sample from the surface discharge identified during the site reconnaissance survey.

To determine whether the surface soil, subsurface soil, surface discharge and groundwater contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater and surface discharge SCGs are based on NYSDEC "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.

- Surface and subsurface soil SCGs are based on the NYSDEC "Technical and Administrative Guidance Memorandum (TAGM) 4046; "Determination of Soil Cleanup Objectives and Cleanup Levels".

Based on the SI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized below. More complete information can be found in the SI report.

5.1.1: Site Geology and Hydrogeology

The site is underlain by fill material, native till deposits and weathered bedrock.

Fill material was encountered in all soil borings and test pits at thicknesses ranging from one foot to more than 15 feet. The fill material generally is comprised of a mixture of sand, silt, gravel and cobbles with varying amounts of construction and demolition debris (including concrete, bricks, asphalt, wood, scrap metal, tires, plastic, cloth, paper, glass, cinders and/or ash).

Beneath the fill, the site is generally underlain by poorly sorted to moderately sorted compacted till which ranges in thickness from approximately six to 20 feet. The till consists of fine to medium sand, silt and fine to coarse gravel with trace amounts of clay. Varying amounts of cobbles, boulders and weathered rock fragments are also part of the till. The till was not observed above weathered bedrock in the western portion of the site. Since the site was historically extended into the East River, the till may be absent in this area.

Weathered bedrock was encountered below the fill or till at depths ranging from approximately 14 feet to 24 feet below ground surface. The weathered rock was identified as a black-gray mica schist.

The depth to groundwater at the site ranges from 8 feet to 18 feet below ground surface. The groundwater flow direction is predominantly to the southwest toward the East River.

5.1.2: Nature of Contamination

As described in the SI report, many soil vapor, surface soil, subsurface soil, groundwater and surface discharge samples were collected to characterize the nature and extent of contamination. As summarized in Table 1, the main categories of contaminants that exceed their SCGs are VOCs (in the vicinity of the former paint and varnish manufacturing facility), semivolatile organic compounds (SVOCs), in particular PAHs, and inorganics (metals).

The primary VOCs that were detected at concentrations exceeding SCGs are ethylbenzene and xylenes. In addition, significant concentrations of non-targeted, tentatively identified compounds (TICs) were detected in many of the soil samples, resulting in the SCG for total VOCs being exceeded. VOCs (including TICs) were predominantly detected in the area of the former paint and varnish manufacturing facility. The total VOC concentration was identified as an indicator of contamination for the area of the former paint and varnish manufacturing facility.

The primary SVOCs that were detected at concentrations exceeding SCGs are phenol, 2-methylphenol, fluoranthene, pyrene, and the PAHs benzo(a) anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno (1,2,3-cd)pyrene and dibenzo(a,h)anthracene. These PAHs have been identified by the USEPA as probable human carcinogens and will be hereafter discussed as a group with the total carcinogenic PAH (cPAH) concentration presented. PAHs are products of incomplete combustion and are common in soils in urban areas. The total cPAH concentration and the concentrations of benzo(a)pyrene were identified as indicators of contamination for the site.

Inorganics that were detected at concentrations exceeding SCGs are barium, beryllium, copper, iron, lead, mercury, nickel and zinc. It should be noted that the SCGs for each of these parameters, except

lead, were developed based on New York State or eastern United States background concentrations rather than health-based potential impacts. Since the SCG developed for lead is based on potential health impacts, lead was identified as an indicator of contamination for the site.

5.1.3: Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated.

Chemical concentrations are reported in parts per billion (ppb) for the groundwater and surface discharge samples, in parts per million (ppm) for surface soil and subsurface soil samples, and in milligrams per cubic meter (mg/m^3) for soil vapor samples. For comparison purposes, where applicable, SCGs are provided for each medium.

Table 1 summarizes the degree of contamination for the contaminants of concern in surface soil, subsurface soil, groundwater and surface discharge samples, and compares the data with the SCGs for the site. The following are the media which were investigated and a summary of the findings of the investigation.

Soil Vapor

The soil vapor survey was conducted during the initial phase of the site investigation to determine areas of the site where subsurface contamination could be present. Fifty (50) soil vapor samples were collected from a depth of approximately 3 feet below ground surface. Each sample was analyzed for VOCs by an on-site laboratory. Five samples were also submitted to a New York State Department of Health approved laboratory for confirmatory analysis. Elevated concentrations of VOCs, predominantly ethylbenzene (up to 620 mg/m^3), toluene (up to 38 mg/m^3)and xylenes (up to 2,460 mg/m^3) were detected in soil vapor in the area of the former paint and varnish manufacturing facility in the northeastern portion of the site (see Figure 4).

Surface Soil

Surface soil samples were collected at ten on-site locations to assess the presence and nature of surface soil contamination. One off-site surface soil sample was collected to establish background surface soil quality. Sample locations and the detected concentrations for the indicators of contamination in each sample are shown on Figure 5. Samples were collected from 0 to 2 inches below ground surface except for the samples to be analyzed for VOCs which were collected from 4 to 6 inches below ground surface. The surface soil samples were analyzed for VOCs, SVOCs and inorganics. Samples SS-03 and SS-04, collected from the area of the former transformer house, were also analyzed for PCBs.

The concentrations of total or individual VOCs did not exceed SCGs in any surface soil sample. Concentrations of total cPAHs in the samples ranged from approximately 3 ppm to 44 ppm, with the exception of sample SS-09 which contained total cPAHs at approximately 166 ppm. PCBs were detected

at concentrations below SCGs in both samples from around the former transformer house (SS-03 and SS-04).

Most of the surface soil samples contained metals, such as barium, beryllium, copper, iron, nickel and zinc, at concentrations in excess of their respective TAGM 4046 soil cleanup objectives, including surface soil samples SS-03 and SS-04 collected near the location of the former transformer house, which contained zinc at 1,700 and 1,000 ppm, respectively. The NYSDEC TAGM 4046 soil cleanup objective for zinc is 20 ppm.

The levels of contaminants detected in the background surface soil sample (SS-11) were within established guidelines.

Based on the sample results, surface soil throughout the site has been impacted by cPAHs and metals at levels exceeding SCGs.

Subsurface Soil

The original scope of work for the Site Investigation included the excavation of eight test pits (TP-01 through TP-08) and four test trenches (TT-01 through TT-04), and construction of five soil borings (B-01 through B-05) to characterize the fill material and to allow for collection of subsurface soil samples for laboratory analysis. Soil samples collected from these test pits, test trenches and soil borings were analyzed for VOCs, SVOCs and inorganics. The locations of these test pits, test trenches and soil borings, and the detected concentrations for the indicators of contamination in the samples collected, are shown on Figure 6.

The test pits and test trenches were completed to groundwater, the maximum reach of the backhoe (approximately 15 feet) or refusal, whichever came first. One or two samples were collected from each pit and from test trench TT-04 for laboratory analysis of VOCs, SVOCs and inorganics. Elevated organic vapors were not detected by field instrumentation, nor were visual or olfactory signs of contamination apparent in the other test trenches, so no samples were collected.

The soil borings were constructed to allow for the installation of permanent monitoring wells to assess groundwater quality and flow direction at the site. One or two soil samples were collected from the unsaturated zone in each boring for laboratory analysis of VOCs, SVOCs and inorganics to evaluate subsurface soil quality.

The analytical results from the samples collected within the planned park area (SB-02, TP-03, TP-04 and TP-05) contained individual cPAHs and metals at concentrations exceeding SCGs. In the northeastern portion of the site (the area of the former paint and varnish manufacturing facility), the sample from test pit TP-02 contained the VOCs ethylbenzene at 110 ppm and xylenes at 510 ppm, well above the SCGs of 5.5 ppm and 1.2 ppm, respectively, and the sample from test pit TP-01 contained the cPAH

benzo(a)pyrene at a concentration slightly above the SCG. Each of these test pits also showed metals at concentrations exceeding SCGs. Test pits TP-06, TP-07 and TP-08, and test trench TT-04 all contained individual cPAHs and metals at concentrations exceeding SCGs.

Due to the elevated organic vapors detected by field instrumentation and chemical odors encountered during the excavation of test pits TP-01 and TP-02, an additional 34 test pits (TP-09 through TP-42) and eleven soil borings (GP-01S, GP-02S, GP-03S and SB-06 through SB-13) were excavated in the area of the former paint and varnish manufacturing facility during the site investigation to delineate the soil contamination in this area. The test pits were initially excavated to identify the presence of contamination and were excavated until visual staining, odors, or elevated field instrument readings were detected. The horizontal and vertical extent of the contamination was established by those test pits in which no staining or odors were apparent above groundwater, and screening with field instruments indicated minor or no detections of organic contamination. Confirmatory soil samples were collected for VOC analysis from selected test pits with no odors or staining. The soil borings were constructed to determine the vertical limits of the soil contamination. Confirmatory soil samples were collected for VOC analysis from below the identified contamination.

As part of a supplemental soil investigation to further delineate and characterize soil contamination in the area of the former paint and varnish manufacturing facility, an additional 22 soil borings (SB-14 through SB-23, SB-25 through SB-29, SB-31 through SB-34 and SB-36 through SB-38) were constructed and twelve test pits (TP-02A, TP-10A, TP-11A, TP-14A, TP-18A, TP-19A, TP-20A, TP-23A, TP-30A, TP-32A, TP-33A and TP-SB10A) were excavated. The supplemental test pits were excavated adjacent to previous test pits where contamination had been detected by field instrumentation and observations. Samples of the contaminated soil were collected for VOC analysis to chemically characterize the limits of contamination that had been previously based on odors and staining. The locations of the delineation soil borings and test pits in the area of the former paint and varnish manufacturing facility, and the concentrations of total VOCs and total TICs detected in the samples collected from each test pit, are shown on Figure 7.

As shown on Figure 7, the concentrations of total VOCs (including TICs) in most of the supplemental test pit samples were above the TAGM 4046 soil cleanup objective of 10 ppm and were detected up to 5,247 ppm.

Based on the soil vapor survey and the analytical results from the soil boring and test pit soil samples, significant subsurface soil contamination was identified in the area surrounding the former paint and varnish manufacturing facility in the northeastern portion of the site. The estimated limits of soil requiring remediation in this area are shown on Figure 8.

Groundwater

As described above, five permanent wells (MW-01 through MW-05) were constructed during the Site Investigation. The locations of these wells and the previously existing well identified during the site reconnaissance are shown on Figure 10. The depth to groundwater beneath the site was found to range

from 8 feet to 18 feet below ground surface. Groundwater flow across the site is generally toward the East River.

Analysis of groundwater samples from temporary wells in the area of the former paint and varnish manufacturing facility showed levels of VOCs above groundwater standards (see Figure 10). Ethylbenzene was detected at concentrations ranging from 12 ppb to 4,200 ppb, total xylenes were detected at concentrations ranging from 33 ppb to 12,000 ppb, 1,3,5-trimethylbenzene was detected at a concentration of 180 ppb and 1,2,4-trimethylbenzene was detected at concentrations ranging from 13 ppb to 750 ppb. The standard for each of these four compounds is 5 ppb. In addition, benzene was detected at concentrations up to 66 ppb (the standard for benzene is 1 ppb).

Permanent monitoring wells constructed downgradient of the impacted area in the northeastern portion of the site (MW-02 through MW-05) were only minimally impacted by VOCs (below groundwater standards). Several cPAHs were detected in unfiltered samples from the permanent monitoring wells, including benzo(a) anthracene (1 ppb), chrysene (1 ppb), benzo(b) fluoranthene (2 ppb) and benzo(a)pyrene (1 ppb). The groundwater standard is 0.002 ppb for each of these compounds with the exception of benzo(a)pyrene for which the groundwater standard is nondetect. Filtered samples were not collected for organic analysis

Dissolved iron, magnesium, manganese and sodium were also detected at concentrations above groundwater standards in most of the downgradient wells. Due to high turbidity, both filtered and unfiltered samples were collected for metals analysis. The unfiltered samples from all downgradient wells contained concentrations of metals exceeding standards. However, the metals concentrations in the filtered samples were either non-detectable or within the groundwater standards, with the exception of magnesium and manganese which were detected at similar concentrations in the filtered and unfiltered samples. The elevated levels of cPAHs and metals in the unfiltered samples are likely due to the suspended particulates in these samples.

Surface Discharge

The surface discharge sample contained chloroform and antimony at concentrations slightly above groundwater standards.

5.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the SI/RAR. There were no IRMs performed at this site during the SI/RAR program.

5.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 6.0 of the SI report.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population. The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

Current potential exposure pathways include:

- Trespassers may be exposed through direct contact with, or incidental ingestion of surface soil at the site that may be contaminated with polycyclic aromatic hydrocarbons (PAHs) up to levels that could be a public health concern.

Future potential exposure pathways include:

- During site re-development, on-site workers may be exposed through direct contact with, or incidental ingestion of surface soil that is contaminated with PAHs, subsurface soil that is contaminated with PAHs and VOCs and/or groundwater that is contaminated with VOCs up to levels that might present a public health concern.

- If the northern portion of the site is re-developed without remediation, recreational users of the planned park may be exposed through direct contact with, or incidental ingestion of PAH-contaminated surface soil.

- During re-development of the former-varnish area without prior remediation and/or without proper engineering controls, on-site construction workers and employees of nearby facilities may inhale vapors if VOC-contaminated soil is disturbed.

- If VOC-contaminated subsurface soil remain in the former paint and varnish area, people may inhale soil gases that infiltrate into buildings that are constructed on the site.

Ingestion of groundwater is not expected since the area is served with public water that is from a distance source.

5.4: Summary of Environmental Impacts

This section summarizes the existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

The Baseline Risk Assessment, which is included in the SI report, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors. The following environmental exposure pathways and/or ecological risks have been identified: impact to the groundwater resource above standards.

The shoreline along the East River was inspected to identify any potential environmental impacts due to releases of contaminants from the site. No apparent environmental impacts such as leachate seeps or sheens on the water surface were noted.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS AND THE PROPOSED USE OF THE SITE

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375-1.10. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous substances disposed at the site through the proper application of scientific and engineering principles.

The proposed future uses for the Barretto Point Site are recreational (5-acre planned park area) and industrial (upgrading of the Hunts Point Water Pollution Control Plant).

The remediation goals for this site are to eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to the VOCs, cPAHs and metals detected at concentrations exceeding SCGs in surface soil and subsurface soil throughout the site;
- environmental exposures of flora or fauna to the VOCs, cPAHs and metals detected at concentrations exceeding SCGs in surface soil and subsurface soil throughout the site;
- the release of contaminants from soil into groundwater that may create exceedances of groundwater quality standards;
- environmental impacts from contaminated groundwater discharging to surface waters;
- the threat to surface waters by eliminating any future contaminated surface run-off from the site.

Further, the remediation goals for the site include attaining to the extent practicable:

- ambient groundwater quality standards at the limits of the site; and
- SCGs for VOC-contaminated soil in the northeastern portion of the site.

SECTION 7: SUMMARY OF THE EVALUATION OF ALTERNATIVES

The selected remedy must be protective of human health and the environment, be cost-effective, comply with other statutory requirements. Potential remedial alternatives for the Barretto Point Site were identified, screened and evaluated in the RA report.

A summary of the remedial alternatives that were considered for this site are discussed below. The present worth represents the amount of money invested in the current year that would be sufficient to cover all present and future costs associated with the alternative. This enables the costs of remedial alternatives to be compared on a common basis. As a convention, a time frame of 30 years is used to evaluate present worth costs for alternatives with an indefinite duration. This does not imply that operation, maintenance, or monitoring would cease after 30 years if remediation goals are not achieved.

7.1: Description of Remedial Alternatives

The following potential remedies were considered to address the contaminated surface soil, subsurface soil and groundwater at the site.

Alternative 1: No Action and Institutional Controls

Present Worth: *$123,000*
Capital Cost: *$0*
Annual OM&M:
(Years 1-30): *$8,000*

The No Action Alternative is evaluated as a procedural requirement and as a basis for comparison. It requires continued monitoring only, allowing the site to remain in an unremediated state. This alternative would leave the site in its present condition and would not provide any additional protection to human health or the environment.

Based on the levels of contaminants in surface soil and groundwater, institutional controls would be imposed on the property in the form of an environmental easement that would limit the use of the groundwater underlying the site. In addition, the institutional controls would include a requirement that the NYSDEC and NYCDEP be notified prior to the performance of any ground-intrusive activities at the site to ensure proper handling and disposal of contaminated soil in accordance with an approved soil management plan. Engineering controls would also be implemented in the form of fencing around the site that would inhibit

access. The existing fence would be maintained to minimize access to the site by trespassers. Implementation of Alternative 1 would take less than 6 months.

Alternative 2: Placement of 2 Feet of Clean Soil Cover and Institutional Controls in the Planned Park Area and the Remaining Site Area; and Excavation and Removal of Contaminated Soil, and Extraction and Treatment of Groundwater as Part of Soil Remediation, Emission Controls in the Former Paint and Varnish Manufacturing Area

Present Worth: *$6,169,000*
Capital Cost: *$5,723,000*
Annual OM&M:
(Years 1-30): *$29,000*

This alternative includes placement of a 24-inch soil cover over the 5-acre Planned Park Area and the 7.3-acre Remaining Site Area. The soil cover would consist of 18 inches of clean general fill and 6 inches of a vegetative medium comprising topsoil and grass over the surface of the fill to mitigate contact with contaminated soil. A subsurface demarcation layer would be placed to identify the base of the cover and the top of the contaminated fill. Some regrading of the site would be required in order to place the clean soil cover and tie into existing grades surrounding the site. Bank stabilization would also be required along the East River shoreline. Maintenance would include site inspections and repair, if necessary, to ensure the integrity and effectiveness of the soil cover. Institutional controls, as described for Alternative 1, are also included as part of this alternative to control use of and activities at the site, and provide information to future construction and maintenance workers with regard to the potential for contact with contaminated subsurface soil.

Due to the presence of significant concentrations of TICs for which individual soil cleanup levels do not exist, within the 0.7-acre Former Paint and Varnish Manufacturing Area, soils contaminated with total VOCs (including TICs) above 10 ppm would be excavated and disposed off-site. In general, the upper 2 feet of soil in this area is not significantly impacted. Regarding the shaded area shown on Figure 8, the upper 2 to 8 feet would not require remediation. During the remediation, the upper, less impacted soils would be returned to the excavation following the removal of the deeper, more impacted soils. Sheet piling would be used to reduce the volume of soil requiring excavation and minimize potential impacts to the surrounding area, including Manida Street. Since the contaminated soil extends to depths greater than 18 feet below ground surface in some areas, and the water table is approximately 16 to18 feet below ground surface, a portion of the excavation would be in groundwater. As a result, dewatering would be required. Prior to construction, a pump test would be conducted to determine the hydraulic characteristics of the overburden and bedrock to design an effective dewatering system, including the number of wells, well spacing, pumping rates and contaminant levels. The extracted groundwater would be treated for removal of iron, manganese and VOCs prior to a NYSDEC-approved treatment/disposal facility.

Significantly elevated levels of VOCs vapors and odors may be encountered during soil remediation in the Former Paint and Varnish Manufacturing Area. As a result, emission and dust controls will be implemented to ensure health and safety of on-site workers and the surrounding community.

Soil remediation in the Former Paint and Varnish Manufacturing Area could be conducted in conjunction with construction of the digesters planned as part of the HPWPCP upgrade. However, the upgrade digesters will not cover the entire excavation, so some backfill would be required for this alternative. In addition, since all of the contaminated soil would be removed from this area of the site, no institutional controls would need to be placed on this area and long-term maintenance would not be required. Design and construction of Alternative 2 would take approximately 18 months.

Alternative 3: Placement of 2 Feet of Clean Soil Cover and Institutional Controls in the Planned Park Area and Remaining Site Area; and Excavation and Removal of Contaminated Shallow Soil, and Placement of a Geomembrane Cap with In-situ Treatment of Groundwater in the Former Paint and Varnish Manufacturing Area

Present Worth: $3,362,000
Capital Cost: $2,817,000
Annual OM&M:
(Years 1-5): $71,000
(Years 6-30): $33,000

This alternative includes placement of a 24-inch soil cover over the 5-acre Planned Park Area and the 7.3-acre Remaining Site Area. The soil cover would be the same as that described for Alternative 2. Institutional controls, as described for Alternative 1, are also included as part of this alternative to control use of and activities at the site, and provide information to future construction and maintenance workers with regard to the potential for contact with contaminated subsurface soil.

Within the 0.7-acre Former Paint and Varnish Manufacturing Area, the upper three feet of soil would be excavated and disposed off-site. Prior to placement of the geomembrane cap, the area would be graded to achieve desired slopes for drainage off the cap. A subsurface drainage system surrounding the cap would likely be required to collect and divert run-off to other areas of the site or to the East River. From bottom to top, the geomembrane cap would comprise:

- 6-inch soil cover/geomembrane cushion
- 60-mil high density polyethylene liner
- geocomposite drainage layer
- barrier protection layer (minimum 24 inches)
- 6-inch topsoil/vegetative growth medium

The geomembrane cap would mitigate contact with contaminated soil, migration of precipitation through contaminated soil and waste, and impacts to groundwater. Temporary vapor and dust control measures would be necessary during construction to mitigate the potential for off-site release of contaminated vapors and dust. During construction, site monitoring for organic vapors and dust would be conducted in accordance with NYSDEC and NYSDOH requirements. Institutional controls would be necessary to maintain the integrity of the cap while controlling the potential for contact with contaminated soil beneath the cap.

In-situ treatment of groundwater in the Former Paint and Varnish Manufacturing Area would be conducted using oxygen release compounds (ORC®), a patented process that produces a slow and sustained release of molecular oxygen in contact with soil moisture or groundwater. In the presence of ORC, microbial degradation of the contaminants occurs. A pilot study would be performed in the area of the highest groundwater contamination to evaluate the effectiveness of the process in reducing contaminant levels. The pilot study would include installation of six temporary well points and groundwater monitoring for a period of approximately eight months to determine the effectiveness of the process. If the process is determined to be effective, full-scale application would be performed. The conceptual design of the full-scale application includes construction of approximately 130 temporary well points in an area of approximately 200 feet by 200 feet and one or two applications of ORC. Groundwater monitoring would be conducted to evaluate the effectiveness of the remediation process, including construction of four additional permanent monitoring wells, quarterly groundwater sampling for three years and semiannual groundwater sampling for two years. Treatment time for the process is estimated to be five years, including the pilot study, ORC applications and groundwater monitoring. Design and construction of Alternative 3 would take approximately 12 months.

Alternative 4: Excavation and Removal of All Fill Material and Replacement with Clean Soil in the Planned Park Area, Remaining Site Area and Former Paint and Varnish Manufacturing Area and Emission Controls; and Extraction and Treatment of Groundwater as Part of Soil Remediation in the Former Paint and Varnish Manufacturing Area

Present Worth: *$27,383,000*
Capital Cost: *$27,383,000*
Annual OM&M:
(Years 1-30): *$0*

This alternative includes excavation and removal of all fill material to the water table, native till material or bedrock, whichever is encountered first, and replacement with clean soil in the 5-acre Planned Park Area, the 7.3-acre Remaining Site Area and the 0.7-acre Former Paint and Varnish Manufacturing Area. During construction, site monitoring for organic vapors and dust would be conducted in accordance with NYSDEC and NYSDOH requirements. Temporary vapor and dust control measures would be necessary during excavation in the Former Paint and Varnish Manufacturing Area to mitigate the potential for off-site release of contaminated vapors and dust. Since the contaminated soil would be fully remediated and the potential for contact with contaminated soil would no longer exist, institutional controls and long-term maintenance would not be required.

Since contaminated groundwater has been identified in the Former Paint and Varnish Manufacturing Area, groundwater extraction and treatment would be conducted. A pump test would be performed to determine the hydraulic characteristics of the overburden and bedrock to design an effective extraction system, including the number of wells, well spacing, pumping rates and contaminant levels. Extracted groundwater would be treated for removal of iron, manganese and VOCs prior to disposal into the New York City sewer system. Design and construction of Alternative 3 would take approximately 36 months.

7.2 Evaluation of Remedial Alternatives

The criteria to which potential remedial alternatives are compared are defined in 6 NYCRR Part 375, which governs the remediation of environmental restoration projects in New York State. A detailed discussion of the evaluation criteria and comparative analysis is included in the RA report.

The first two evaluation criteria are termed "threshold criteria" and must be satisfied in order for an alternative to be considered for selection.

1. Protection of Human Health and the Environment. This criterion is an overall evaluation of each alternative's ability to protect public health and the environment.

2. Compliance with New York State Standards, Criteria, and Guidance (SCGs). Compliance with SCGs addresses whether a remedy will meet environmental laws, regulations, and other standards and criteria. In addition, this criterion includes the consideration of guidance which the NYSDEC has determined to be applicable on a case-specific basis.

The next five "primary balancing criteria" are used to compare the positive and negative aspects of each of the remedial strategies.

3. Short-term Effectiveness. The potential short-term adverse impacts of the remedial action upon the community, the workers, and the environment during the construction and/or implementation are evaluated. The length of time needed to achieve the remedial objectives is also estimated and compared against the other alternatives.

4. Long-term Effectiveness and Permanence. This criterion evaluates the long-term effectiveness of the remedial alternatives after implementation. If wastes or treated residuals remain on-site after the selected remedy has been implemented, the following items are evaluated: 1) the magnitude of the remaining risks, 2) the adequacy of the engineering and/or institutional controls intended to limit the risk, and 3) the reliability of these controls.

5. Reduction of Toxicity, Mobility or Volume. Preference is given to alternatives that permanently and significantly reduce the toxicity, mobility or volume of the wastes at the site.

6. Implementability. The technical and administrative feasibility of implementing each alternative are evaluated. Technical feasibility includes the difficulties associated with the construction of the remedy and the ability to monitor its effectiveness. For administrative feasibility, the availability of the necessary personnel and materials is evaluated along with potential difficulties in obtaining specific operating approvals, access for construction, institutional controls, and so forth.

7. Cost-Effectivness. Capital costs and operation, maintenance, and monitoring costs are estimated for each alternative and compared on a present worth basis. Although cost-effectiveness is the last balancing

criterion evaluated, where two or more alternatives have met the requirements of the other criteria, it can be used as the basis for the final decision. The costs for each alternative are presented in Table 2.

This final criterion is considered a "modifying criterion" and is taken into account after evaluating those above. It is evaluated after public comments on the Proposed Remedial Action Plan have been received.

8. Community Acceptance - Concerns of the community regarding the SI/RA reports and the PRAP have been evaluated. The responsiveness summary (Appendix A) presents the public comments received and the manner in which the NYSDEC addressed the concerns raised. In general, the public comments received were supportive of the selected remedy. The NYCDEP in its comments on the selected remedy (which calls for the covering of the excavated areas with the construction of the upgrade digesters), requested that an option be included to allow for the backfilling of the entire excavated area with clean soil, since the construction and design of the digesters is still at an early stage and installation will not take place until at least 48 months from now.

SECTION 8: SUMMARY OF THE SELECTED REMEDY

Based on the Administrative Record (Appendix B) and the discussion presented below, the NYSDEC has selected Alternative 2, (Placement of 2 Feet of Clean Soil Cover and Institutional Controls in the Planned Park Area and Remaining Site Area; and Excavation and Removal of Contaminated Soil, and Extraction and Treatment of Groundwater as Part of Soil Remediation, Emission Controls in the Former Paint and Varnish Manufacturing Area) as the remedy for this site. The elements of this remedy are described at the end of this section.

The selected remedy is based on the results of the SI and the evaluation of alternatives presented in the RA report.

Alternative 2 is being selected because, as described below, it satisfies the threshold criteria and provides the best balance of the primary balancing criteria described in Section 7.2. It will achieve the remediation goals for the site by mitigating contact with contaminated soil in the Planned Park Area and Remaining Site Area through placement of 2 feet of clean soil cover and removal of the highly contaminated soils and groundwater in the Former Paint and Varnish Manufacturing Area. Alternatives 3 and 4 would also comply with the threshold selection criteria, but to a lesser degree (Alternative 3) or at a significantly greater cost (Alternative 4). Alternative 1 is not protective of human health or the environment due to the potential for contact with contaminated soil that would remain on-site.

Because Alternatives 2, 3 and 4 satisfy the threshold criteria, the five balancing criteria are particularly important in selecting a final remedy for the site.

Alternatives 2, 3 and 4 all have short-term impacts. Due to the requirement for significant vapor control during soil excavation in the Former Paint and Varnish Manufacturing Area, the short-term impacts for Alternatives 2 and 4 are more significant than those for Alternative 3. In addition, Alternative 4 would have the greatest short-term impact due to the amount of truck traffic needed to remove and replace 285,000

cubic yards of material. The time needed to achieve the remediation goals would be slightly less for Alternative 3 compared to Alternative 2. Alternative 4 would require the longest time to achieve the remediation goals.

Achieving long-term effectiveness is best accomplished by excavation and removal of the contaminated soils (Alternative 4). Alternative 2 is favorable because it would result in the removal of the most highly contaminated soil (in the Former Paint and Varnish Manufacturing Area) and minimize the potential for contact with contaminated soil in the remainder of the site. Alternative 3 is less favorable due to the continued presence of heavily contaminated soil in the Former Paint and Varnish Manufacturing Area and the required maintenance of the geomembrane cap. In addition, although groundwater remediation would be performed through the use of ORC, the long-term effectiveness of this technology is uncertain, since groundwater would remain in contact with contaminated soil below the water table.

Alternatives 2 and 3 are readily implementable. Alternative 4, while implementable with conventional technologies, would take approximately 3 years to implement. Alternatives 2 and 4 are also very amenable to planned use of the site, since they would allow for construction of a park and upgrading of the Hunts Point Water Pollution Control Plant. Alternative 3, which includes placement of a geomembrane cover in the Former Paint and Varnish Manufacturing Area, may restrict development of this area of the site and is not consistent with the planned use of the site.

Alternative 4 would reduce the toxicity, mobility, and volume of waste relative to the site. Approximately 285,000 cubic yards of material would be removed with implementation of Alternative 4. Alternative 4 would remove a significant portion of the on-site contaminated soil, including all fill material down to the water table. Alternative 2 would require the excavation and removal of approximately 14,000 cubic yards of the most contaminated soil. Although residual contamination would remain, the mobility would be mitigated through placement and maintenance of a clean soil cover, demarcation layer and institutional controls and removal and treatment of contaminated groundwater during site dewatering.

Alternative 3 would reduce the mobility, and to a lesser degree, the toxicity and volume of contaminated soil through the removal of 3,500 cubic yards of contaminated soil. Treatment of the groundwater using ORC would reduce the toxicity, mobility and volume of contaminated groundwater, although not as effectively as groundwater extraction and treatment as part of Alternatives 2 and 4.

The cost of the alternatives varies significantly. Alternative 4, which includes removal of all fill and contaminated material off-site, is the most costly remedy. Alternative 2 is more costly than Alternative 3, however, Alternative 2 would provide for greater protection of human health and the environment, and permanence as compared to Alternative 3, and would allow for planned use of the site for a park and upgrading of the Hunts Point Water Pollution Control Plant.

The estimated present worth cost to implement the selected remedy is $6,169,000. The cost to construct the remedy is estimated to be $5,723,000 and the estimated average annual operation, maintenance, and monitoring costs for 30 years is $29,000.

The elements of the selected remedy are as follows:

1. Placement of 2 feet of soil cover over the Planned Park Area and the Remaining Site Area as shown on Figure 2. The cover will consist of 18 inches of clean soil and 6 inches of a vegetative medium consisting of topsoil and grass. Clean soil is considered to be material with no analytes in exceedance of NYSDEC TAGM 4046 soil cleanup objectives or local site background as determined by the procedure in Section 3.6.1.3 of DER 10 ("Tech Guide"). A demarcation layer will be placed between the remaining fill and the soil cover in the Planned Park Area and Remaining Site Area, to identify the base of the cover and the top of the contaminated fill.

2. Contaminated soil in the Former Paint and Varnish Manufacturing Area will be excavated and disposed off-site (see Figure 2). During excavation, vapor and dust controls will be implemented to ensure the health and safety of on-site workers and the surrounding community.

3. Extraction of groundwater will be implemented as part of the dewatering process during excavation of contaminated soil in the Former Paint and Varnish Manufacturing Area. Extracted groundwater will be treated to meet the requirements for discharge to a NYSDEC approved treatment/disposal facility.

4. A soils management plan will be developed to address residual contaminated soils that may be excavated from the site during future redevelopment. The plan will require soil characterization and, where applicable, disposal/reuse in accordance with NYSDEC regulations.

5. Institutional controls will be imposed in the form of an environmental easement, in such form as the NYSDEC may approve, that will require compliance with an approved soils management plan. The environmental easement will also limit use of groundwater from the affected area as a source of potable or process water without the necessary water quality treatment as determined by the New York City Department of Environmental Protection (NYCDEP) and the NYSDEC.
6. The property owner will complete and submit to the NYSDEC an annual certification until the NYSDEC notifies the property owner in writing that this certification is no longer needed. This submittal will contain certification that the institutional controls and engineering controls put in place, pursuant to the Record of Decision, are still in place, have not been altered, and are still effective.

7. Since the remedy results in untreated hazardous substances remaining at the site, a long term maintenance program will be instituted. Maintenance of this alternative will include site inspections and repair, if necessary, to ensure the integrity and effectiveness of the clean soil cover. This program will allow the effectiveness of the cover to be monitored and will be a component of the operation, maintenance, and monitoring for the site.

SECTION 9: HIGHLIGHTS OF COMMUNITY PARTICIPATION

TABLE 1
Nature and Extent of Contamination
December 1999 to October 2002

As part of the Barretto Point environmental restoration process, a number of Citizen Participation activities were undertaken to inform and educate the public about conditions at the site and the potential remedial alternatives. The following public participation activities were conducted for this site:

- Repositories for documents pertaining to the site were established.
- A public contact list, which included nearby property owners, elected officials, and local media and other interested parties, was established, and fact sheets sent to those on the site mailing list.
- A public meeting was held on November 18, 1999 to discuss the proposed environmental investigation.
- A public meeting was held on September 18, 2003 to present and receive comments on the PRAP.
- In December 2003, a responsiveness summary (Appendix A) was prepared and made available to the public to address comments received during the public comment period for the PRAP.

SURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)		ND		

TABLE 1
Nature and Extent of Contamination
December 1999 to October 2002

SURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Semivolatile Organic Compounds (SVOCs)	2- Methylphenol	ND to 0.22	0.1	1 of 10
	Fluoranthene	1.1 to 66	50	1 of 10
	Pyrene	1 to 53	50	1 of 10
	Benzo(a)anthracene	0.56 to 27	0.224	10 of 10
	Chrysene	0.59 to 28	0.4	10 of 10
	Benzo(b)fluoranthene	0.73 to 39	1.1	8 of 10
	Benzo(k)fluoranthene	0.22 to 14	1.1	7 of 10
	Benzo(a)pyrene	0.52 to 29	0.061	10 of 10
	Indeno(1,2,3-cd)pyrene	0.41 to 23	3.2	4 of 10
	Dibenzo(a,h)anthracene	ND to 5.9	0.014	7 of 10
	Total carcinogenic PAHs	3 to 165.9	10	7 of 10
PCB/Pesticides		ND		
Inorganic Compounds	Barium	136 to 1,520	300	6 of 10
	Beryllium	0.2 to 1.3	0.16	10 of 10
	Copper	15.7 to 332	25	9 of 10
	Iron	6,470 to 29,200	2,000	10 of 10
Inorganic	Lead	94.3 to 463	400	1 of 10

TABLE 1
Nature and Extent of Contamination
December 1999 to October 2002

SURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Compounds	Mercury	0.11 to 0.39	0.1	10 of 10
	Nickel	9.2 to 46.6	13	6 of 10
	Zinc	133 to 1,700	20	10 of 10

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	4-Methyl-2-pentanone	ND to 2.8	1	1 of 81
	Ethylbenzene	ND to 110	5.5	7 of 81
	Xylene	ND to 590	1.2	10 of 81
	Total TICs	ND to 5,247	NA	NA
	Total VOCs and TICs	5 to 6,086	10	17 of 46
Semivolatile Organic Compounds (SVOCs)	Phenol	ND to 0.051	0.03	1 of 23
	Dibenzofuran	ND to 20	6.2	1 of 23
	Phenanthrene	ND to 73	50	1 of 23
	Benzo(a)anthracene	ND to 9.7	0.224	14 of 23
	Chrysene	ND to 10	0.4	10 of 23
	Benzo(b)fluoranthene	ND to 14	1.1	8 of 23
	Benzo(k)fluoranthene	ND to 4.5	1.1	6 of 23

TABLE 1
Nature and Extent of Contamination
December 1999 to October 2002

SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)[a]	SCG[b] (ppm)[a]	Frequency of Exceeding SCG
Semivolatile Organic Compounds (SVOCs)	Benzo(a)pyrene	ND to 11	0.061	16 of 23
	Indeno(1,2,3-cd)pyrene	ND to 9.4	3.2	1 of 23
	Dibenzo(a,h)anthracene	ND to 2.4	0.014	9 of 23
Inorganic Compounds	Arsenic	ND to 12.1	7.5	1 of 23
	Barium	47 to 841	300	3 of 23
	Beryllium	0.29 to 1.7	0.16	22 of 23
	Copper	3.6 to 169	25	18 of 23
	Iron	8,580 to 77,400	2,000	23 of 23
SUBSURFACE SOIL	**Contaminants of Concern**	**Concentration Range Detected (ppm)[a]**	**SCG[b] (ppm)[a]**	**Frequency of Exceeding SCG**
Inorganic Compounds	Lead	1.8 to 659	400	3 of 23
	Mercury	ND to 1.3	0.1	14 of 23
	Nickel	10.9 to 71.6	13	19 of 23
	Selenium	ND to 5.5	2	1 0f 23
	Zinc	18.3 to 1,200	20	22 to 23

TABLE 1
Nature and Extent of Contamination
December 1999 to October 2002

SURFACE DISCHARGE	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Chloroform	49	7	1 of 1
Inorganic Compounds	Antimony	3.1	3	1 of 1

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	1,1-Dichloroethene	ND to 100	5	1 of 11
	1,2-Dichloroethane	ND to 2	0.6	1 of 11
	Benzene	ND to 66	1	4 of 11
	Toluene	ND to 68	5	2 of 11
	Ethylbenzene	ND to 4,200	5	6 of 11
	Xylene	ND to 12,000	5	5 of 11
	Styrene	ND to 84	5	1 of 11
	Isopropylbenzene	ND to 97	5	4 of 11
	n-Propylbenzene	ND to 120	5	5 of 11
Volatile Organic Compounds (VOCs)	1,3,5-Trimethylbenzene	ND to 180	5	4 of 11
	1,2,4-Trimethylbenzene	ND to 750	5	6 of 11
	sec-Butylbenzene	ND to 26	5	3 of 11
	4-Isopropyltoluene	ND to 26	5	3 of 11

TABLE 1
Nature and Extent of Contamination
December 1999 to October 2002

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
	n-Butylbenzene	ND to 22	5	1 of 11
Volatile Organic Compounds (VOCs)	Naphthalene	ND to 120	10	4 of 11
Semivolatile Organic Compounds (SVOCs)	Phenol	ND to 33	1	1 of 6
	2-Methylphenol	ND to 11	1	1 of 6
	4-Methylphenol	ND to 24	1	1 of 6
	Naphthalene	ND to 55	10	1 of 6
	Benzo(a)anthracene	ND to 1	0.002	1 of 6
	Chrysene	ND to 1	0.002	2 of 6
	Benzo(b)fluoranthene	ND to 2	0.002	1 of 6
	Benzo(a)pyrene	ND to 1	ND	1 of 6
PCB/Pesticides		ND		
Inorganic Compounds	Antimony	ND to 5.5	3	1 of 6
	Iron	ND to 92,700	300	3 of 6
	Lead	ND to 81.5	25	1 of 6
	Mangnesium	75,300 to 481,000	35,000	6 of 6

TABLE 1
Nature and Extent of Contamination
December 1999 to October 2002

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)[a]	SCG[b] (ppb)[a]	Frequency of Exceeding SCG
	Manganese	111 to 29,200	300	5 of 6
	Selenium	ND to 32.1	10	2 of 6
Inorganic Compounds	Sodium	143,000 to 5,960,000	20,000	6 of 6
	Thallium	ND to 60.5	0.5	2 of 6

SOIL GAS	Contaminants of Concern	Concentration Range Detected (mg/m^3)[a]	SCG[b] (mg/m^3)[a]	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	Toluene	ND to 38	NA	NA
	Tetrachloroethene	ND to 0.2	NA	NA
	Ethybenzene	ND to 620	NA	NA
	m&p-Xylenes	ND to 2,100	NA	NA
	o-Xylene	ND to 360	NA	NA

[a] ppb = parts per billion, which is equivalent to micrograms per liter, ug/L, in water;
ppm = parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
ug/m^3 = micrograms per cubic meter

[b] SCG = standards, criteria, and guidance values; developed from NYSDEC Technical and Administrative Guidance Memorandum (TAGM) No. 4046, Determination of Soil Cleanup Objectives and Cleanup Levels (1994) for surface and subsurface soil; and NYSDEC Technical and Operation Guidance Series (TOGS) (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (1998) for groundwater and surface discharge.

ND = Not detected

TICs = Tentatively identified compounds

NA = Not Applicable

Table 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost	Annual OM&M	Total Present Worth
Alternative 1: No Action	$0	$8,000	$123,000
Alternative 2: 2-Foot Soil Cover in Planned Park Area and Remaining Site Area/Excavation and Removal of Contaminated Soil/Extraction and Treatment of Groundwater/Emission Controls in Former Paint and Varnish Manufacturing Area	$5,723,000	$29,000	$6,169,000
Alternative 3: 2-Foot Soil Cover/Excavation and Removal of Shallow Contaminated Soil/Geomembrane Cap with In-Situ Treatment of Groundwater in the Former Paint and Varnish Manufacturing Area	$2,817,000	$71,000 (Years 1-5) $33,000 (Years 6-30)	$3,362,000
Alternative 4: Excavation and Removal of All Fill Material and Replacement With Clean Soil/Extraction and Treatment of Groundwater in Former Paint and Varnish Manufacturing Area	$27,383,000	$0	$27,383,000

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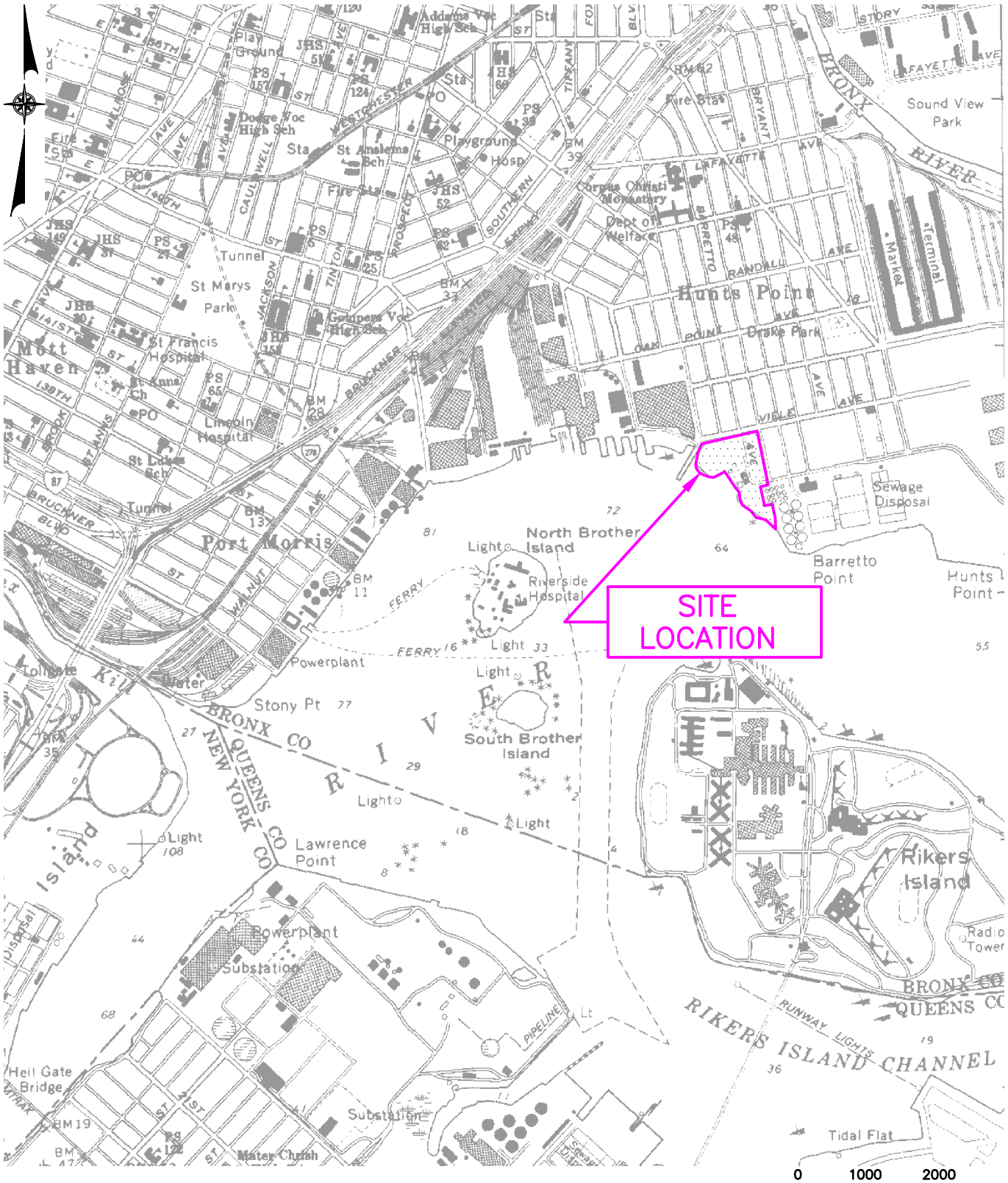


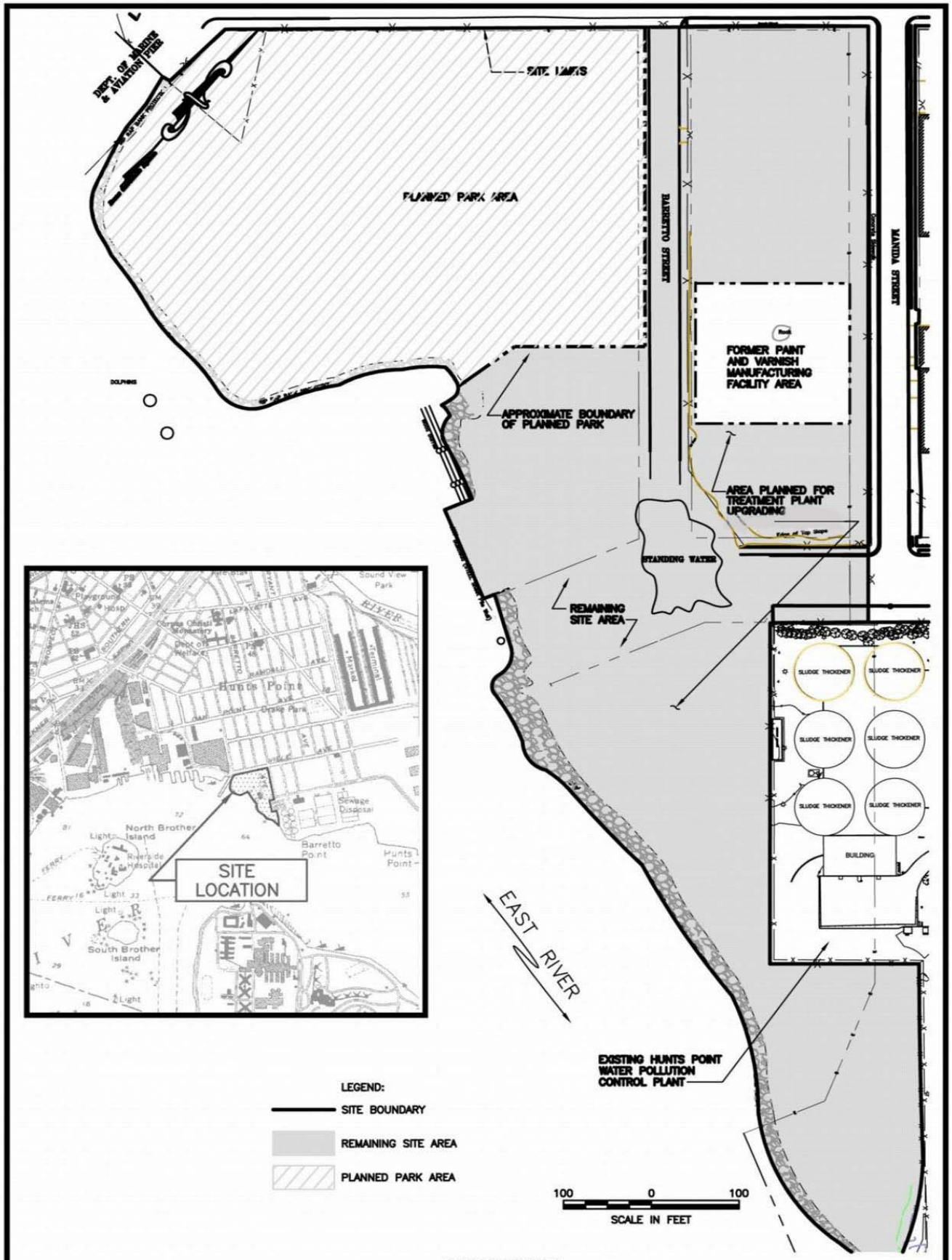
SOURCE: N.Y.S.D.O.T. CENTRAL PARK QUADRANGLE

BARRETTO POINT SITE
BRONX, NEW YORK

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

SITE LOCATION MAP

FIGURE 1



BARRETTO POINT SITE
BRONX, NEW YORK

SITE PLAN

Dvirka and Bartilucci CONSULTING ENGINEERS
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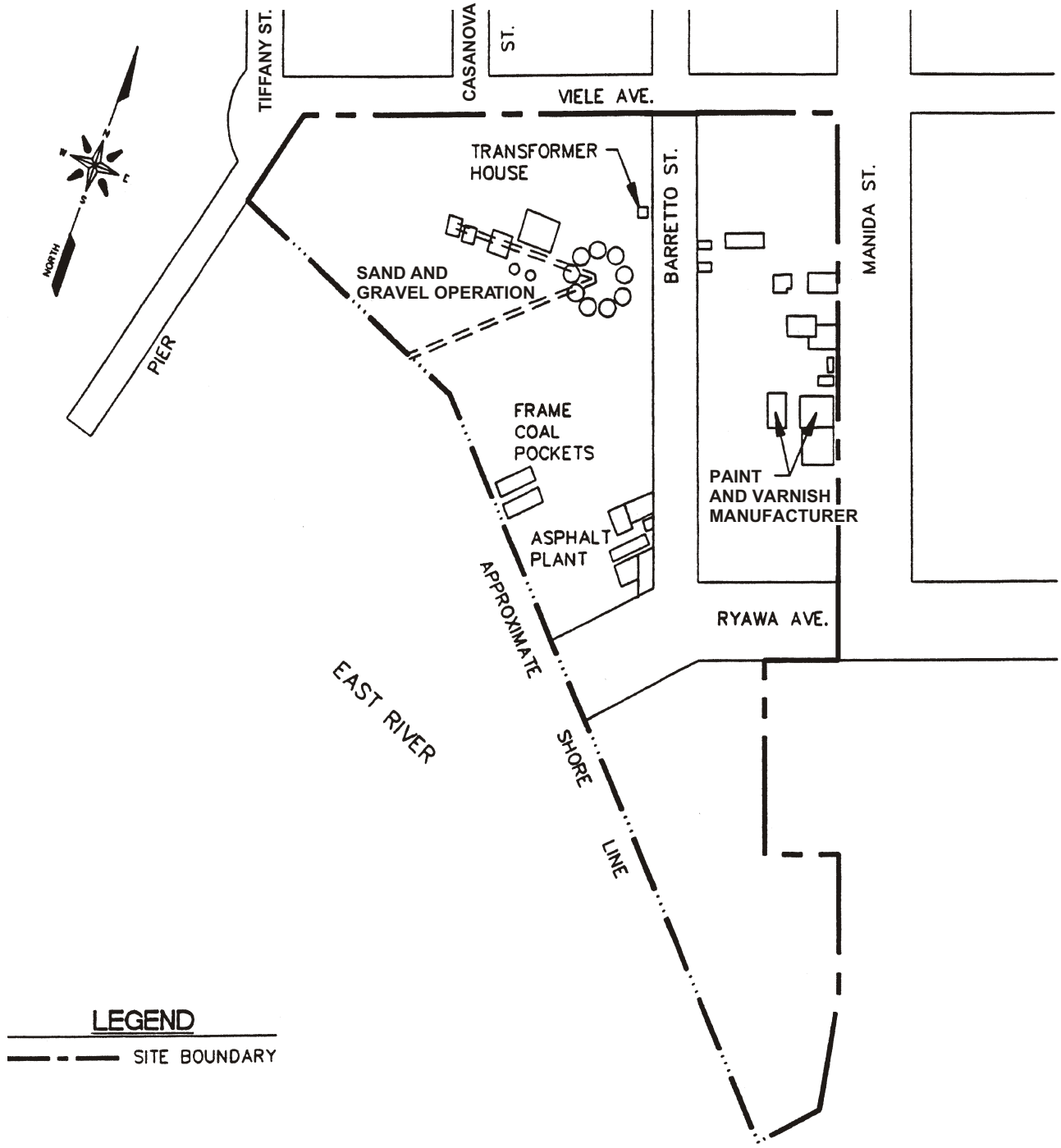
FIGURE 1-1



SOURCE: TRC ENVIRONMENTAL CORPORATION WORK PLAN, MAY 1998

RLA/DWG/BARRETO1616(7/24/00)

Dvirka and Bartilucci CONSULTING ENGINEERS
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BARRETTO POINT SITE
BRONX, NEW YORK

HISTORIC SITE INFORMATION FROM 1950 AERIAL PHOTOGRAPH

FIGURE 3

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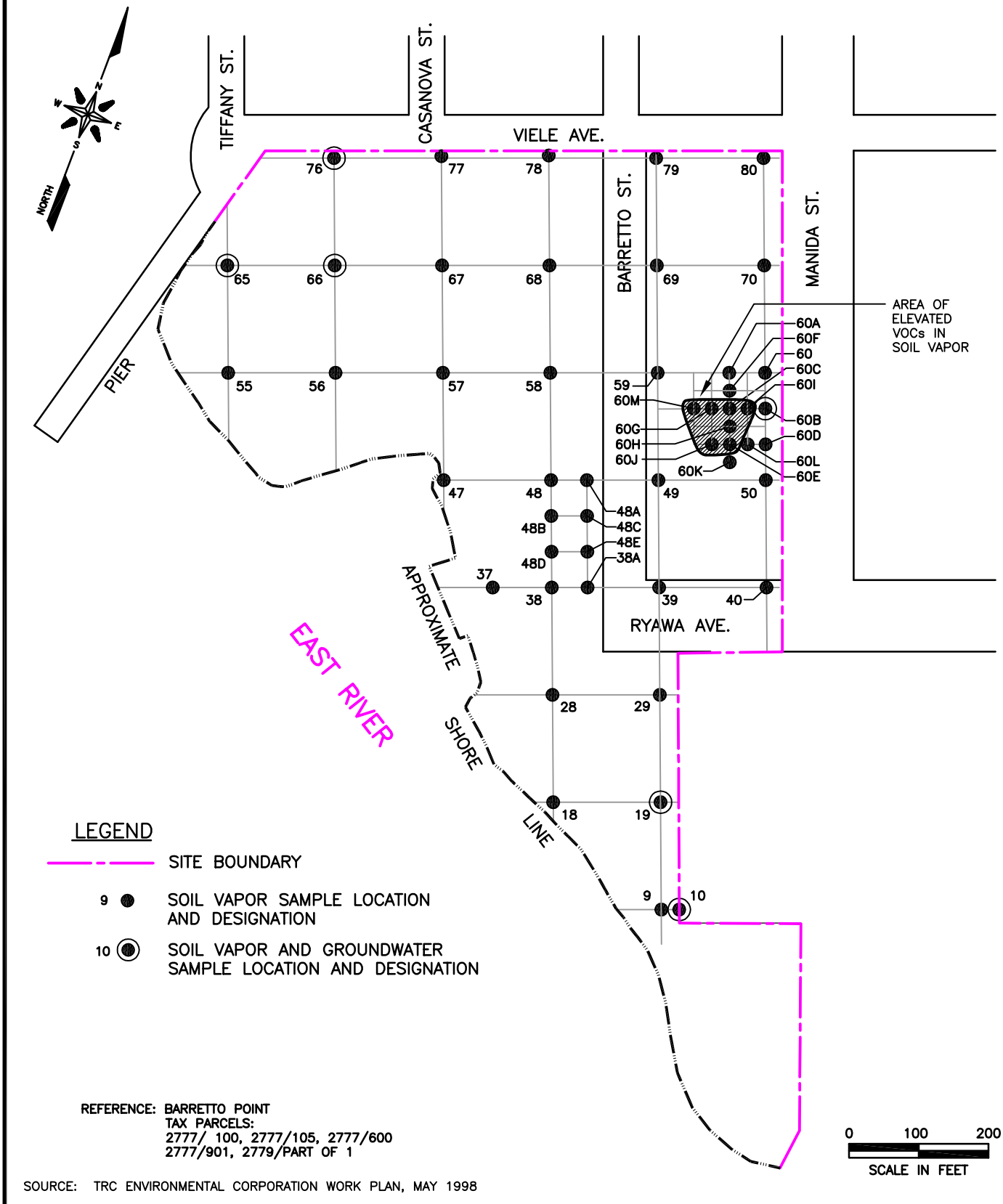

BARRETTO POINT SITE
BRONX, NEW YORK

AREA OF ELEVATED VOLATILE ORGANIC COMPOUNDS IN SOIL VAPOR

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

FIGURE 4

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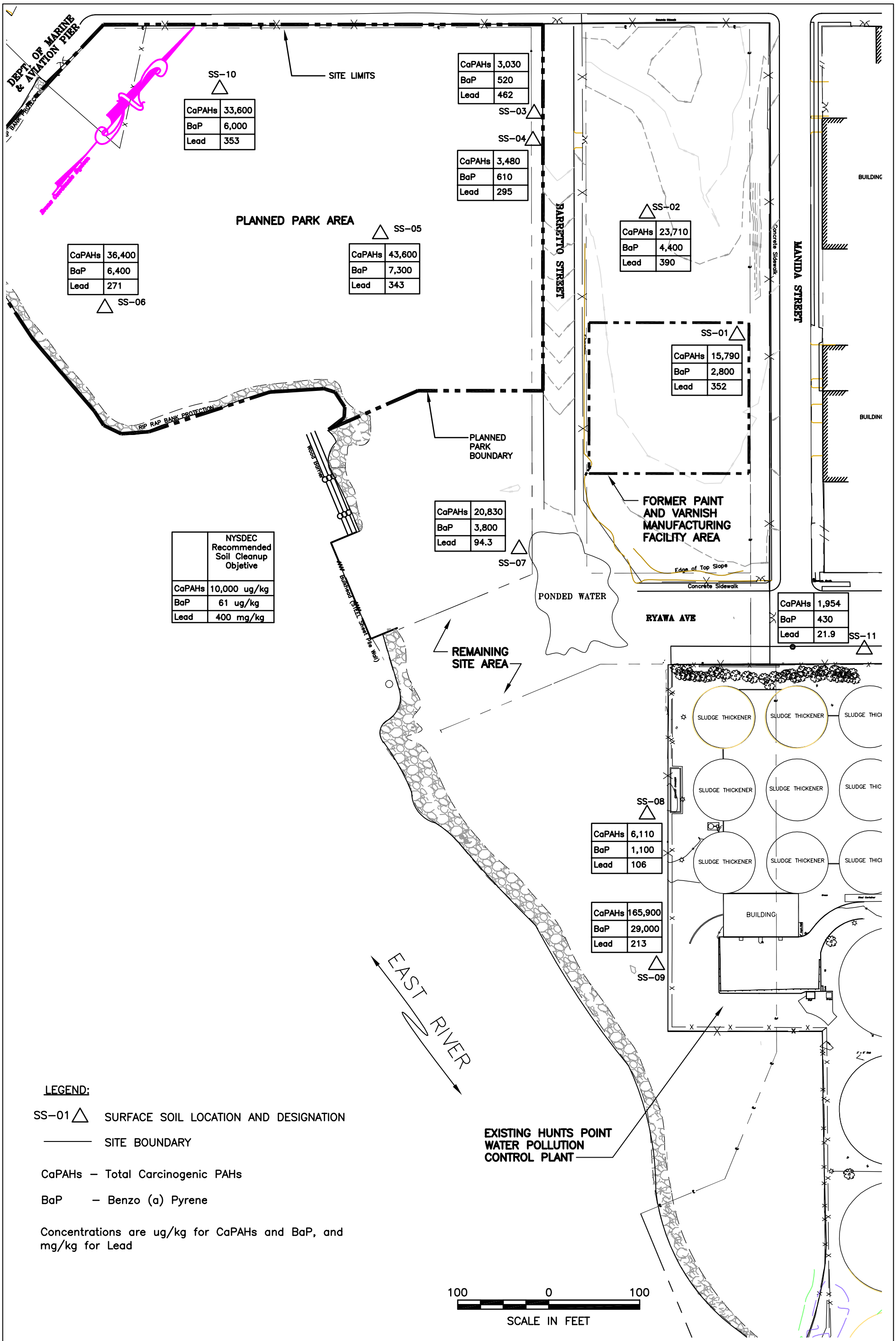

	NYSDEC Recommended Soil Cleanup Objetive
CaPAHs	10,000 ug/kg
BaP	61 ug/kg
Lead	400 mg/kg

LEGEND:

SS–01 △ SURFACE SOIL LOCATION AND DESIGNATION

——— SITE BOUNDARY

CaPAHs – Total Carcinogenic PAHs

BaP – Benzo (a) Pyrene

Concentrations are ug/kg for CaPAHs and BaP, and mg/kg for Lead

BARRETTO POINT SITE
BRONX, NEW YORK

SURFACE SOIL RESULTS FOR PRIMARY INDICATORS OF CONTAMINATION

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

FIGURE 5

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DEPT. OF MARINE & AVIATION PIER

RIP RAP BANK PROTECTION

Sewer Outfall Pipes

TP-04

Depth	3–5'	11–13'
CaPAHs	1,840	4,650
BaP	360	910
Lead	222	92.1

SITE LIMITS

SB-01

Depth	13–15'
CaPAHs	ND
BaP	ND
Lead	3

Depth	7–9'
CaPAHs	39
BaP	ND
Lead	10.1

TP-03

BARRETTO STREET

FORMER PAINT AND VARNISH MANUFACTURING FACILITY AREA

Concrete Sidewalk

MANIDA STREET

TP-05

Depth	1–3'
CaPAHs	27,040
BaP	4,600
Lead	346

PLANNED PARK AREA

Depth	1–2'
CaPAHs	ND
BaP	ND
Lead	1.8

Depth	4–6'	13–15'
CaPAHs	17,580	4,810
BaP	3,100	870
Lead	659	573

SB-02

Depth	4–6'
CaPAHs	8,700
BaP	1,500
Lead	571

TP-02

TP-01

Depth	2–3'
CaPAHs	1,090
BaP	190
Lead	84.2

RIP RAP BANK PROTECTION

PLANNED PARK BOUNDARY

TP-06

	NYSDEC Recommended Soil Cleanup Objetive
CaPAHs	10,000 ug/kg
BaP	61 ug/kg
Lead	400 mg/kg

Depth	2–4'
CaPAHs	61,000
BaP	11,000
Lead	141

TP-07

Edge of Top Slope

Concrete Sidewalk

Wood Barrier

Bulkhead (STEEL Sheet Pile Wall)

SB-03

STANDING WATER

RYAWA

Depth	4–6'	8–10'
CaPAHs	31,160	460
BaP	5,500	ND
Lead	236	77.4

REMAINING SITE AREA

Depth	2–4'	13–15'
CaPAHs	61,000	4,760
BaP	11,000	860
Lead	141	336

TT-04

SLUDGE THICKENER

SLUDGE THICKENER

SLUDGE THICKENER

SLUDGE THICKENER

SLUDGE THICKENER

SLUDGE THICKENER

SB-04

Depth	6–8'	12–14'
CaPAHs	25,800	499
BaP	3,300	85
Lead	118	58.3

BUILDING

EAST RIVER

Depth	4–6'
CaPAHs	1,697
BaP	310
Lead	72.4

TP-08

EXISTING HUNTS POINT WATER POLLUTION CONTROL PLANT

Depth	8–10'	14–16'
CaPAHs	1,359	196
BaP	290	48
Lead	53.9	16.1

SB-05

100 0 100

SCALE IN FEET

LEGEND:

TP–01 TEST PIT/TEST TRENCH LOCATION AND DESIGNATION

SB–01 SOIL BORING LOCATION AND DESIGNATION

SITE BOUNDARY

CaPAHs Total Carcinogenic PAHs

BaP Benzo (a) Pyrene

ND Not Detected

Concentrations are ug/kg for CaPAHs and BaP, and mg/kg for Lead

NOTE:

ONLY SAMPLES FROM ABOVE THE WATER TABLE ARE SHOWN

ITALICIZED SAMPLES REPRESENT NATIVE SOIL

BARRETTO POINT SITE
BRONX, NEW YORK

SUBSURFACE SOIL RESULTS FOR PRIMARY INDICATORS OF CONTAMINATION

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

FIGURE 6

TP-42 (15)		
DEPTH	PID	FID
0–15	0–5	0

TP-17 (15)				
DEPTH	PID	FID	TVOCs	TICs
0–6	0–25	0–10		
6–15	0–30	30–200		
14			26	U

TP-25 (15)				
DEPTH	PID	FID	TVOCs	TICs
0–15	0–3	0–30		
15			19	U

TP-26 (15)				
DEPTH	PID	FID	TVOCs	TICs
0–2	0–5	0		
2–4	5–50	0–20		
4–15	0–5	0		
14			20	U

DISCOLORATION, VERY FAINT PETROLEUM ODOR 2–3'
GROUNDWATER AT 15'

TP-23 (4)		
DEPTH	PID	FID
0–2	35–150	–
2–4	1000–1500	50–100

CHEMICAL ODOR 1–2'
PETROLEUM ODOR, STAINING 2–4'
SCRAP METAL/POSSIBLE DRUM 2'

TP-39 (16)		
DEPTH	PID	FID
0–16	0–2	0–10

GROUNDWATER AT 16'

TP-23A (8)		
DEPTH	TVOCs	TICs
4	35,400	1,758,000

SOLVENT ODOR 2–6'

TP-38 (12)				
DEPTH	PID	FID	TVOCs	TICs
0–12	0	0		
11			17	U

GROUNDWATER AT 12'

SB-14 (12R)				
DEPTH	PID	TVOCs	TICs	
3–5	0	24	U	
9–9.5	70	38	2237	

SB-12 (18)				
DEPTH	PID	FID	TVOCs	TICs
0–18	0–3	–		
11–12			15	U

GROUNDWATER AT 18'

SB-15 (6R)				
DEPTH	PID	TVOCs	TICs	
4–6	0	12	6	

SB-16 (7R)			
DEPTH	PID	TVOCs	TICs
4–6	0	7	U

SB-17 (9R)			
DEPTH	PID	TVOCs	TICs
4–6	0	14	31

SB-18 (8R)			
DEPTH	PID	TVOCs	TICs
4–6	1200	13	74

TP-11A (17)		
DEPTH	TVOCs	TICs
12.5	43	6,950

SOLVENT ODOR 9–16'

TP-12 (13)		
DEPTH	PID	FID
0–10	0–5	0–10
10–12	0–50	0–50
12–13	300–500	>1000

PETROLEUM STAINING/ODOR 12–13'

TP-24 (12)		
DEPTH	PID	FID
0–10	0–20	0–100
10–12	500–1000	>1000

PETROLEUM ODOR, STAINING 10–12'

TP-11 (12)		
DEPTH	PID	FID
0–2	10–50	100–300
2–5	5–10	100
5–8	0–10	0–10
8–11	100–400	50–100
11–12	500–1000	>1000

TRACE TO SLIGHT CHEMICAL ODOR 10–11'
STRONG CHEMICAL ODOR 11–12'

GP-01S (18)		
DEPTH	PID	FID
0–18	300–1500	50–600

GROUNDWATER AT 16'
SLIGHT PETROLEUM ODOR 4–12'
STRONG FUEL OIL ODOR 12–16'
STAINING/SHEEN 16–17'

SB-22 (20)			
DEPTH	PID	TVOCs	TICs
4–6	60	180	40,030
9–10.5	50	108	28,040
14–15.5	990	103	16,490
18–20	30	86	20,660

GROUNDWATER AT 18.5'
SLIGHT SOLVENT ODOR 4–18'

TP-13 (14)		
DEPTH	PID	FID
0–2	100–150	30–50
2–4	50–300	10–20
4–5	50–150	0–10
5–9	5–200	0–10
9–14	50–300	0–40

SLIGHT FUEL ODOR 9–14'
STAINING, CRUSHED DRUM 1–2'

SB-19 (3.5R)			
DEPTH	PID	TVOCs	TICs
3–3.5	90	28	7

GP-02S (10)		
DEPTH	PID	FID
0–2	0–5	0
2–10	25–400	10–100

SLIGHT CHEMICAL ODOR 6–10'

SB-21 (10R)			
DEPTH	PID	TVOCs	TICs
4–6	50	4500	1,553,000
9–10	280	677	170,300

TP-02 (2)				
DEPTH	PID	FID	TVOCs	TICs
0–2	>2000	>1000		
1–2			751,350	1,397,000

STRONG POSSIBLE PAINT THINNER ODOR

SB-23 (5R)			
DEPTH	PID	TVOCs	TICs
3–5	30	17	80

TP-16 (13)		
DEPTH	PID	FID
0–3	5–100	50–100
3–5	25–100	200–400
5–8	50–250	100
8–13	75–1500	100–500

TRACE TO SLIGHT FUEL OIL ODOR 8–13'

TP-09 (6)		
DEPTH	PID	FID
0–4	1–5	50–100
4–6	10–25	300

TRACE CHEMICAL ODOR 4–6'

SB-20 (5R)			
DEPTH	PID	TVOCs	TICs
4–4.5	100	12	U

TP-01 (3)				
DEPTH	PID	FID	TVOCs	TICs
0–3	1200–>2000	400–>1000	–	–
2–3	–	–	–	1,830

VERY STRONG PAINT THINNER ODOR 0–3'

SB-06 (24)				
DEPTH	PID	FID	TVOCs	TICs
10–12	200–600	0–100		
12–17	300–1000	>1000		
17–24	0–50	0–40		
17–19			900	1,238

SLIGHT CHEMICAL ODOR 10–17'
GROUNDWATER AT 19'

TP-02A (17)		
DEPTH	TVOCs	TICs
11	174,000	1,216,000

SOLVENT ODOR 2–17'

TP-27 (15)				
DEPTH	PID	FID	TVOCs	TICs
0–15	0–5			
15			20	U

GROUNDWATER AT 15'

SB-11 (14R)		
DEPTH	PID	FID
0–10	0–5	0–2
10–14	20–40	–

SLIGHT PAINT ODOR 4–14'
POSSIBLE PAINT FLECKS 10–14'

TP-19A (8)		
DEPTH	TVOCs	TICs
4	48,200	710,500

SOLVENT ODOR 3–6'

TP-10A (17.5)		
DEPTH	TVOCs	TICs
4	659,000	5,247,000

SOLVENT ODOR 1–17.5'

TP-10 (2)			
DEPTH	PID	FID	
0–2	>1000	300–500	

STRONG CHEMICAL ODOR 0–2'

TP-14A (11)		
DEPTH	TVOCs	TICs
4	21	20,800

SOLVENT ODOR 1–9'

SB-28 (15R)			
DEPTH	PID	TVOCs	TICs
4–5	110	22	14
9–9.5	180	55	4,650

SB-29 (5R)			
DEPTH	PID	TVOCs	TICs
4–5	65	31	991

SB-24

SB-25 (5R)			
DEPTH	PID	TVOCs	TICs
3–4.5	0–5	85	U

TP-19 (1)		
DEPTH	PID	FID
0–1	>1000	>1000

VERY STRONG PAINT THINNER ODOR

SB-26 (6R)				
DEPTH	PID	TVOCs	TICs	
4–6	300	893	934	

PAINT ODOR 4–6'

SB-27 (7R)			
DEPTH	PID	TVOCs	TICs
4–6	0	112	795

TP-14 (5)		
DEPTH	PID	FID
0–2	25–100	10–100
2–5	100–300	100–300

STAINING 2–4'
STRONG TO VERY STRONG FUEL OIL ODOR 2–4'

TP-22 (3)		
DEPTH	PID	FID
0–1	0	0
1–3	150–250	100–200

PETROLEUM ODOR,
STAINING 1–3'

GP-03S (6R)		
DEPTH	PID	FID
0–6	0–5	1–2

SB-07 (14R)		
DEPTH	PID	FID
0–14	0–10	0

SLIGHT PETROLEUM ODOR AT 12'

TP-21 (3)		
DEPTH	PID	FID
0–3	100–300	>1000

STAINING, STRONG PETROLEUM ODOR 2–3'

TP-28 (16)		
DEPTH	PID	FID
0–16	0	0–10

GROUNDWATER AT 15'

TP-37 (7)		
DEPTH	PID	FID
0–2	0–5	10–100
2–3	0–5	100–500
3–5	25–100	200
5–7	1300–1500	700–>1000

CONTAINERS 2–3'
PAINT RESIDUE 2–5'
SLIGHT CHEMICAL ODOR 2–7'
STAINING AT 3'

SB-30

SB-32 (5R)			
DEPTH	PID	TVOCs	TICs
4–5	105	55	675

SB-31 (5R)			
DEPTH	PID	TVOCs	TICs
3–5	200	442	115

TP-15 (7)		
DEPTH	PID	FID
0–1	0	0
1–2	5–25	100
2–3	25–50	500–1000
3–4	150–250	500
4–7	100–800	>1000

SLIGHT CHEMICAL ODOR 5–6'
TRACE STAINING 2–3'

SB-13 (11R)				
DEPTH	PID	FID	TVOCs	TICs
0–11	0–1	–		
4–6			13	U

SB-33 (6R)			
DEPTH	PID	TVOCs	TICs
4–6	0	34	407

SB-34 (4R)			
DEPTH	PID	TVOCs	TICs
3–4	45	18	798

TP-29 (15)				
DEPTH	PID	FID	TVOCs	TICs
0–15	0	0		
14			17	U

GROUNDWATER AT 15'

TP-SB10 (17.5)		
DEPTH	TVOCs	TICs
7	52,000	1,165,000

SOLVENT ODOR 2–16.5'

SB-09 (21)		
DEPTH	PID	FID
0–2	0	5
2–8	300–1900	100–350
8–21	0–50	0–5

GROUNDWATER AT 15'
PAINT RESIDUE 0–2',
PAINT THINNER ODOR 0–8'

TP-20A (13)		
DEPTH	TVOCs	TICs
5	113	17,050

SOLVENT ODOR 3–11'

SB-08 (17)		
DEPTH	PID	FID
0–4	0–10	0
4–6	5–50	10
6–17	0–25	0–6

GROUNDWATER AT 16'
PAINT RESIDUE 4–6'

TP-18 (7)		
DEPTH	PID	FID
0–6	5–20	10–100
6–7	500–1000	200

PAINT ODOR, POSSIBLE PAINT
RESIDUE/CONTAINER 6–7'

TP-18A (13)		
DEPTH	TVOCs	TICs
7	57,550	4,770,000

SOLVENT ODOR 5–11'

SB-35

TP-36 (4)		
DEPTH	PID	FID
0–1	0–5	0–10
1–4	5–15	10–100

CRUSHED PAINT CANS 1–4'
PAINT RESIDUE 3–4'

SB-10 (16)		
DEPTH	PID	FID
0–10	0–20	5
10–13	65–300	100–350
13–16	0–5	0–5

MODERATE PAINT ODOR 5–16'

SB-36 (20)			
DEPTH	PID	TVOCs	TICs
4–6	2	105	1,264
9–9.5	>2000	104	293
14–16	520	31	U
18–20	0	5	U

TP-20 (2)		
DEPTH	PID	FID
0–2	2–50	>1000

PAINT ODORS, STAINING,
PAINT RESIDUE 1–2'

SB-37 (20)			
DEPTH	PID	TVOCs	TICs
4–6	180	32	920
9–11	110	31	379
14–16	480	75	1,266
18–20	0	5	U

SB-38 (6R)			
DEPTH	PID	TVOCs	TICs
4–6	0	4	91

TP-33A (10)		
DEPTH	TVOCs	TICs
6	30,800	3,327,000

SOLVENT ODOR 4–8'

TP-30 (8)		
DEPTH	PID	FID
0–1	0	–
1–4	50–100	100–400
4–8	50–550	>1000

TP-30A (12)		
DEPTH	TVOCs	TICs
8	4,246	106,500

SOLVENT ODOR 4–10'

TP-35 (15)		
DEPTH	PID	FID
0–2	25–50	100–>1000*
2–4	50	50
4–5	5–10	200–300
5–10	25–200	>1000*
10–13	5–25	100–600
13–15	0	>1000

GROUNDWATER AT 14'
*DECAYING LUMBER IN ZONE
CRUSHED DRUMS AND PAINT
RESIDUE 2–5'
SLIGHT PAINT THINNER/VARNISH ODOR 2–11'

TP-33 (5)		
DEPTH	PID	FID
0–3	0–5	>1000*
3–4	10–35	10–30
4–5	–	–

STRONG POSSIBLE PAINT ODOR 4–5' (NO READINGS RECORDED)
CONTAINERS, POSSIBLE PAINT RESIDUE 4–5'
*DECAYING LUMBER IN ZONE

CHEMICAL ODOR 4–8'
CRUSHED 5 GAL CONTAINER 5–6'

TP-41 (15)				
DEPTH	PID	FID	TVOCs	TICs
0–15	0	0–10		
14			7	U

TP-31 (16)		
DEPTH	PID	FID
0–2	0	0
2–5	10–50	100
5–8	0	100
8–16	0	0–10

GROUNDWATER AT 16'
SLIGHT FUEL ODOR,
DISCOLORED SOIL 2–5'

TP-34 (15)		
DEPTH	PID	FID
0–2	0–25	100
2–6	0–2	200–500*
6–12	0	100
12–15	0	0

GROUNDWATER AT 15'
*DECAYING LUMBER IN ZONE

TP-32 (15)				
DEPTH	PID	FID	TVOCs	TICs
0–4	0	0–10		
4–6	25–100	10–100		
6–10	10–100	10–100		
10–15	0–10	0		
15			21	237

GROUNDWATER AT 15'
FUEL ODOR, DISCOLORED SOIL 6–10'

TP-32A (6)		
DEPTH	TVOCs	TICs
3	30	17,470

SOLVENT ODOR 2–4'

APPROXIMATE LOCATION OF THE FORMER PAINT AND VARNISH MANUFACTURING FACILITY

TP-40 (13)				
DEPTH	PID	FID	TVOCs	TICs
0–1	5–30	100		
1–2	25–30	50–100*		
2–4	50–150	>1000*		
4–5	10–25	>1000*		
5–6	2–10	100–200		
6–7	1–3	0–<10		
7–9	0	100–200		
9–10	5–50	10–20		
10–13	1–2	0–5		
12			58	11

GROUNDWATER AT 13'
*DECAYING LUMBER IN ZONE

LEGEND:

- HISTORIC PROPERTY LINE
- ESTIMATED AREA OF SOIL REQUIRING REMEDIATION
- TEST PIT EXCAVATED IN 2000
- SOIL BORING CONSTRUCTED IN 2000
- TEST PIT EXCAVATED IN 2002
- SOIL BORING CONSTRUCTED IN 2002
- SOIL BORING NOT CONSTRUCTED
- (20) MAXIMUM DEPTH OF TEST PIT/SOIL BORING, 'R' INDICATES REFUSAL

PID AND FID READINGS IN PARTS PER MILLION

TVOCs: TOTAL VOLATILE ORGANIC COMPOUNDS, IN MICROGRAMS PER KILOGRAM

TICs: TOTAL TENTATIVELY IDENTIFIED COMPOUNDS, IN MICROGRAMS PER KILOGRAM

- VOCs GREATER THAN 1,000 MICROGRAMS PER KILOGRAM OR 1 MILLIGRAM PER KILOGRAM
- VOCs GREATER THAN 10,000 MICROGRAMS PER KILOGRAM OR 10 MILLIGRAM PER KILOGRAM
- VOCs GREATER THAN 100,000 MICROGRAMS PER KILOGRAM OR 100 MILLIGRAM PER KILOGRAM
- PID/FID READINGS GREATER THAN 1,000 PARTS PER MILLION

1 Milligram per Kilogram = 1 PPM
1 Microgram per Kilogram = 1 PPB

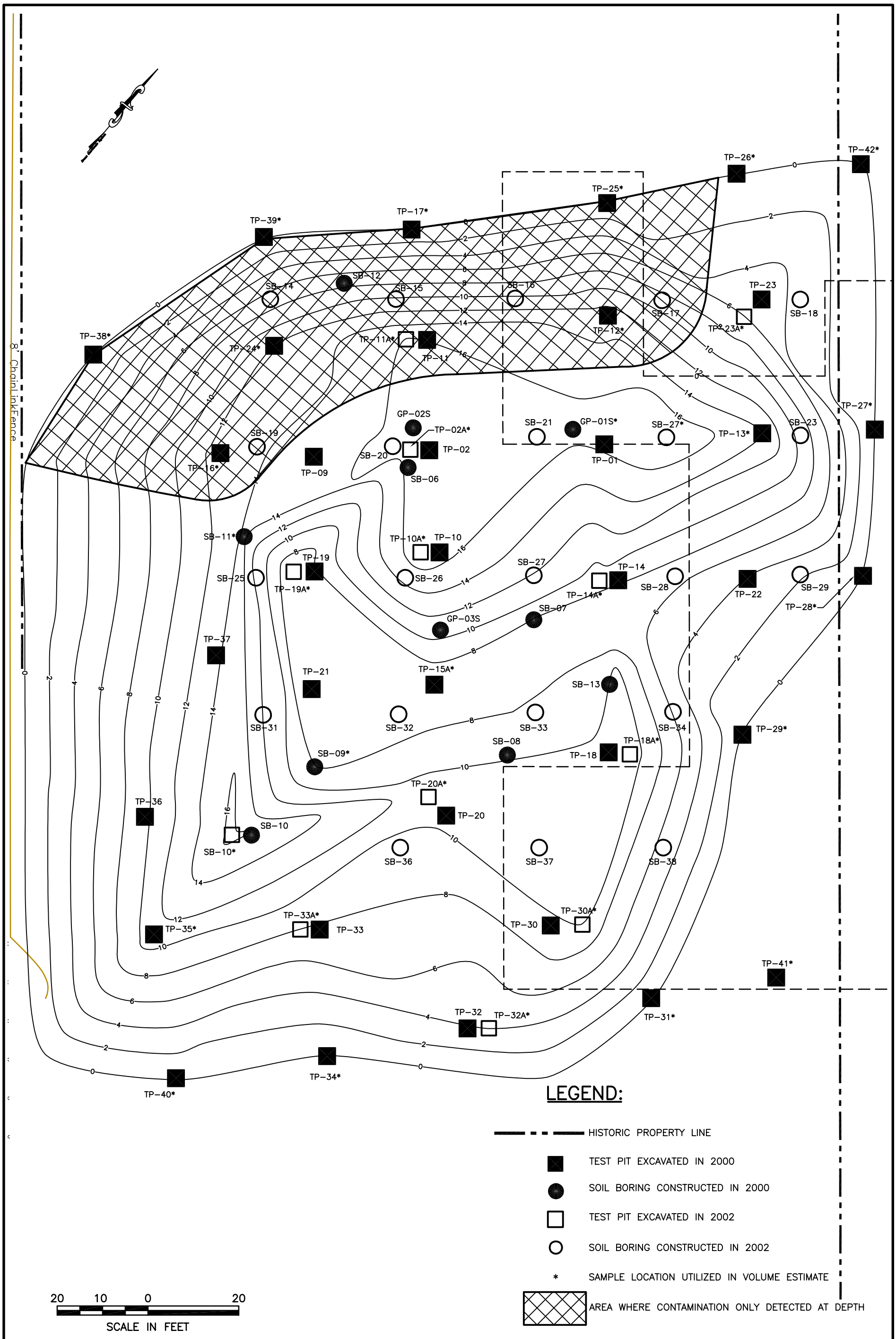
20 0 20
SCALE IN FEET

BARRETTO POINT SITE
BRONX, NEW YORK

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

SUMMARY OF SOIL BORING AND TEST PIT SAMPLE RESULTS FORMER PAINT AND VARNISH MANUFACTURING FACILITY AREA

FIGURE 7



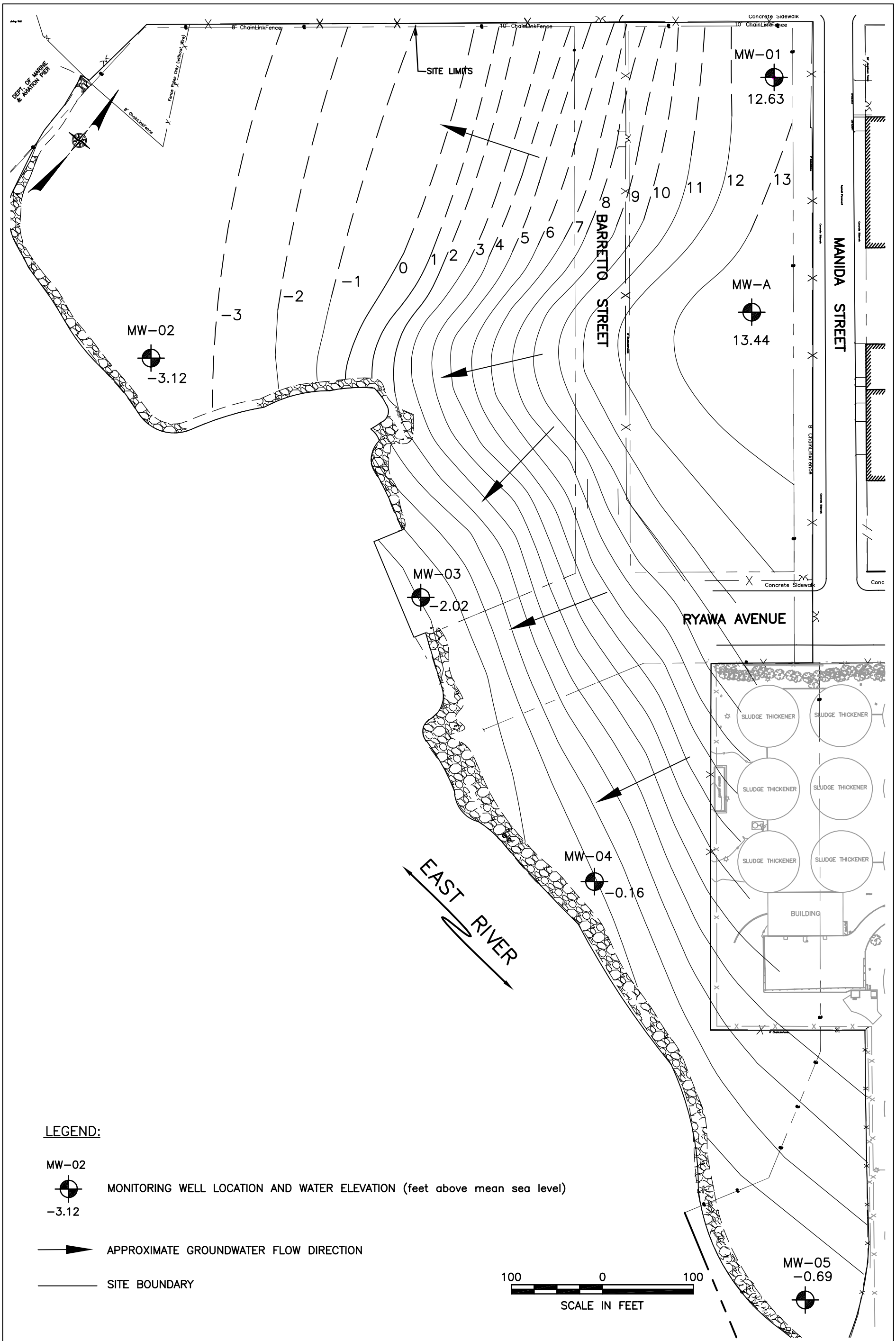
BARRETTO POINT SITE
BRONX, NEW YORK

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

ESTIMATED DEPTH OF SOIL REQUIRING REMEDIATION WITHIN FORMER PAINT AND VARNISH MANUFACTURING AREA

FIGURE 8

F:\1616\1616-WE-0510.dwg, 04/10/03 03:42:44 PM, LGlubiak



BARRETTO POINT SITE
BRONX, NEW YORK

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

WATER TABLE ELEVATION CONTOUR MAP AT APPROXIMATE LOW TIDE
MAY 10, 2000

FIGURE 9

DEPT. OF MARINE & AVIATION PIER

RIP RAP BANK PROTECTION

SITE LIMITS

PLANNED PARK AREA

BARRETTO STREET

MW-01 (1)

FORMER PAINT AND VARNISH MANUFACTURING FACILITY AREA

MW-A (20)

TW-06 (13,885)

Rock

GP-01W (2,967)

TW-09 (5,248)

TW-10 (17,400)

TW-08 (74)

Concrete Sidewalk

MANIDA STREET

MW-02 (U)

DOLPHINS

RIP RAP BANK PROTECTION

APPROXIMATE BOUNDARY OF PLANNED PARK

RIP RAP BANK PROTECTION

AREA PLANNED FOR TREATMENT PLANT UPGRADE

Edge of Top Slope

MW-03 (U)

STANDING WATER

BULKHEAD (STEEL SHEET PILE WALL)

REMAINING SITE AREA

SLUDGE THICKENER

SLUDGE THICKENER

SLUDGE THICKENER

SLUDGE THICKENER

SLUDGE THICKENER

SLUDGE THICKENER

MW-04 (U)

BUILDING

EAST RIVER

LEGEND:

SITE BOUNDARY

REMAINING SITE AREA

PLANNED PARK AREA

MW-A (20) — PERMANENT MONITORING WELL, DESIGNATION AND TOTAL VOC CONCENTRATION IN MIGROGRAMS/LITER

TW-8 (74) — TEMPORARY WELL, DESIGNATION AND TOTAL VOC CONCENTRATION IN MIGROGRAMS/LITER

U — UNDETECTED

EXISTING HUNTS POINT WATER POLLUTION CONTROL PLANT

MW-05 (24)

100 0 100

SCALE IN FEET

BARRETTO POINT SITE
BRONX, NEW YORK

Dvirka and Bartilucci CONSULTING ENGINEERS
A DIVISION OF WILLIAM F. COSULICH ASSOCIATES, P.C.

TOTAL VOC RESULTS IN GROUNDWATER SAMPLES

FIGURE 10

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APPENDIX A

Responsiveness Summary

RESPONSIVENESS SUMMARY

Barretto Point Environmental Restoration Site

New York (C),Bronx County, New York

Site No. B-00032-2

The Proposed Remedial Action Plan (PRAP) for the Barretto Point site, was prepared by the New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health (NYSDOH) and was issued to the document repositories on August 30, 2003. The PRAP outlined the remedial measure proposed for the contaminated soil and groundwater at the Barretto Point site.

The release of the PRAP was announced by sending a notice to the public contact list, informing the public of the opportunity to comment on the proposed remedy.

A public meeting was held on September 18, 2003, which included a presentation of the Site Investigation (SI) and the Remedial Alternatives Report (RAR) as well as a discussion of the proposed remedy. The meeting provided an opportunity for citizens to discuss their concerns, ask questions and comment on the proposed remedy. These comments have become part of the Administrative Record for this site. The public comment period for the PRAP ended on October 14, 2003.

This responsiveness summary responds to all questions and comments raised during the public comment period. The following are the comments received, with the NYSDEC's responses:

COMMENT 1: It is difficult for the public to understand why the area of the site proposed to be used for the construction of the park will receive a less stringent cleanup than the area proposed for the treatment plant digester construction. Why are the proposed remedies for each area so different?

RESPONSE 1: The types of contaminants found in the Planned Park Area (semi-volatile organic compounds and metals) are less mobile and remain tightly bound to the soil, therefore, capping with clean soil is sufficiently protective of human health and the environment. On the other hand, the contaminants found in the area of the site proposed for the construction of the water treatment plant digesters (volatile organic compounds) are much more mobile. Based on the nature and magnitude of the contamination in this area, it is believed that the best way to minimize the threat posed by the buried waste in the former paint and varnish manufacturing area is to excavate the waste and contaminated soil.

COMMENT 2: Why wasn't a thicker soil cover proposed for the Planned Park Area? Who decided that 2 feet of clean soil cover is enough?

RESPONSE 2: Historically, a two-foot thick soil cover has been used at sites which are used as parks. The NYSDEC believes that two feet of soil cover is adequate to prevent direct contact exposures with residual contaminants in soils. Two feet of soil cover exceeds the recommendations of the United States Environmental Protection Agency (US EPA) to reduce exposure to soil hazards (US EPA, 2001. Lead; Identification of Dangerous

Levels of Lead. Final Rule. Federal Register 66(4): 1206-1240; US EPA, 1994. Guidance on Residential Lead-Based Paint, Lead-Contaminated Dust, and Lead Contaminated Soil, July 14, 1994). Two feet of soil also exceeds the US EPA's 10-inch requirement for cleanup of polychlorinated biphenyls (PCB) spills in residential areas. The Federal Register 40 CFR Part 761, Polychlorinated Biphenyls Spill Cleanup Policy states "Soil and other similar materials in residential/commercial areas must be cleaned up to 10 ppm PCBs, and a cap of clean materials containing less than 1 ppm PCBs (the average background level for PCBs in soil) equal to a minimum of 10 inches must be placed on top of the excavated area."

COMMENT 3: Where has two feet of clean fill been used as a remedial measure before?

RESPONSE 3: The NYSDEC has issued many Records of Decision (RODs) where a 2-foot soil cover is an integral part of the selected remedy. Several of those RODs were for Environmental Restoration projects which were then used as parks, including 115 Front Street in the Village of Greenport (Suffolk County), the Irvington Waterfront Park in the Village of Irvington (Westchester County), and the Paper Mill Island Site in the Village of Baldwinsville (Onondaga County), to name a few.

COMMENT 4: While the two feet of clean fill may have been used in residential developments, won't the type of use associated with a park be much different and more intensive, and therefore, increase the likelihood of potential exposures? Will there be a demarcation barrier under the two feet of clean fill?

RESPONSE 4: Yes, a demarcation barrier will be placed between the remaining fill and the two-foot soil cover to identify the base of the cover and the top of the contaminated fill. In its application for State assistance under the brownfield program, the City of New York stated that the intended use of a portion of the site was for a waterfront park. The selected remedy was based on this intended use and is protective of public health and the environment. The two feet of soil cover will provide an adequate layer of protection from residually contaminated soils in the Planned Park Area, while the demarcation barrier will serve as a warning to anyone who might excavate soils in the future. Provided that the controls are maintained, no exposure to site-related contamination is expected to occur.

COMMENT 5: Is it common for remediated brownfield properties to be used for industrial purposes rather than residential?

RESPONSE 5: Yes.

COMMENT 6: When will the park construction start?

RESPONSE 6: The New York City Department of Parks and Recreation is expected to begin construction of the park sometime between December 2003 and February 2004.

COMMENT 7: How long will the park construction take?

RESPONSE 7: It is expected that construction of the park will take eighteen (18) months to complete.

COMMENT 8: Is the project fully funded?

RESPONSE 8: Regarding the environmental investigation and remediation of the 13-acre Barretto Point site, the City of New York submitted an application for participation in the ERP under the 1996 Clean Water/Clean Air Bond Act for investigation of the Barretto Point site. Approval of the application allowed the City to enter into a State Assistance Contract (SAC) with the NYSDEC which provided cost share funding to undertake the investigation and prepare the site investigation/remedial alternatives report. The cost share funding for this phase of the Barretto Point project was 75% State and 25% City. It is expected that the City will be approved to enter into a similar SAC with the NYSDEC for the remediation of the site. Based on recently enacted legislation (Section 56-0503 of the ECL), the cost share funding for the remediation of the site will be 90% State and 10% City.

COMMENT 9: Have long term funding provisions been made to make sure that the annual environmental checks are done?

RESPONSE 9: The City will be responsible for providing the funding to fulfill the requirement for annual certification by a licensed Professional Engineer, as called for in the ROD. The annual certification will have to confirm that the soil cover has been maintained, that the environmental easement remains in effect, and that the soils management plan has been complied with.

The public offered additional comments that did not pertain to the selection of the remedy, but related to the construction of the park and the proposed upgrades to the HPWPCP. These comments have been forwarded to the New York City Department of Environmental Protection (NYCDEP), the New York City Department of Parks and Recreation (NYCDPR), and the New York City's Mayor's Office for their consideration/appropriate action as part of their processes to implement the re-use of the property.

APPENDIX B

Administrative Record

Administrative Record

Barretto Point
Site No. B00032-2

6. Proposed Remedial Action Plan for the Barretto Point site, dated August 2003, prepared by the NYSDEC.

7. Fact Sheet for the Barretto Point site, dated August 2003, prepared by the NYSDEC.

8. "Remedial Alternatives Report for the Barretto Point Site", January 2003, prepared by Dvirka and Bartilucci Consulting Engineers.

9. "Site Investigation Report for the Barretto Point Site", November 2000, prepared by Dvirka and Bartilucci Consulting Engineers.

10. "Interim Site Investigation Report for the Barretto Point Site", February 2000, prepared by Dvirka and Bartilucci Consulting Engineers.

11. "Public Participation Plan for Barretto Point", August 1999, prepared by the NYCDEP and the NYCEDC.

12. "Site Investigation/Remedial Alternatives Report Work Plan for the Barretto Point Site", June 1998, prepared by TRC Environmental Corporation.