DRAFT
SUPPLEMENTAL REMEDIAL INVESTIGATION REPORT

PELHAM BAY LANDFILL
BRONX, NEW YORK

Prepared for:

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

59-17 JUNCTION BOULEVARD
CORONA, NEW YORK 11368

92C4087

MAY 1993

Prepared by:

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Woodward-Clyde Consultants, Inc.

May 24, 1993
92C4087

Dr. Lin Kan
NYCDEP
59-17 Junction Blvd.
Corona, NY 11368

Re: Pelham Bay Landfill
Bronx, New York
Draft Supplemental Remedial Investigation Report

Dear Lin:

Woodward-Clyde Consultants, Inc. (WCCI) is pleased to submit three (3) copies of the Draft Supplemental Remedial Investigation (SRI) for your review. As we discussed during our May 21, 1993 meeting, the review period is very short because of the Memorial Day holiday.

WCCI will send the Final SRI to the appropriate personnel by May 28, 1993 to meet the June 1, 1993 deadline. We will contact you by May 28, 1993 to address any questions or comments that you may have.

Very truly yours,

Peter G. Naumoff
Assistant Project Geologist

A J Ciancia pgn
Andrew J. Ciancia
Project Manager

PN/mab
Enclosure

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1.0
INTRODUCTION

This report describes the results of a Supplemental Remedial Investigation (SRI) that was conducted on March 31, and April 1, 1993 at the Pelham Bay Landfill, Bronx, New York. The SRI consisted of collecting on-site, background, and off-site soil samples and submitting them for chemical analyses. The objective of the SRI was to investigate off-site shallow soils that may have been adversely impacted by surface water runoff and/or leachate seeps from the landfill.

1.1 SRI BACKGROUND

A Remedial Investigation (RI) was conducted at the Pelham Bay Landfill beginning in March, 1992 to supplement the information collected during previous site investigations. The purpose of the RI was to further evaluate the nature and extent of contamination at the site, and to assess the potential risks to human health and environment. The data collected during the RI investigation was also used in a feasibility study to evaluate environmentally sound and economic approaches for landfill closure. The regulatory framework within which the RI was conducted, the investigative approaches, and the results of the RI are described in the Final Remedial Investigation Report, Pelham Bay Landfill, Bronx, New York (Woodward-Clyde Consultants, Inc.,1993b).

On February 25, 1993, as a result of discussions held between the New York City Department of Environmental Protection (NYCDEP), New York State Department of Environmental Conservation (NYSDEC), and Woodward-Clyde Consultants, Inc. (WCCI), NYCDEP authorized the implementation of a SRI program to address a data gap, the evaluation of off-site soils, that was identified during the RI. The SRI was therefore designed to investigate off-site shallow soils that may have been adversely impacted by surface water runoff and/or leachate seeps from the landfill.

1.2 REPORT ORGANIZATION

The text of this report is organized into four sections. Section one is an introduction that includes a summary of the site background and a description of the overall investigative

approach for the SRI. Section two is a description of the investigation activities, objectives, and methods, and a summary of the soil sampling procedures. The nature and extent of constituents in off site-soils and a comparison of results to background levels is found in Section 3. A summary and conclusions are presented in Section 4.0.

1.3 SITE BACKGROUND

1.3.1 Site Description

The Pelham Bay Landfill is a 94 acre site located at 40° 51' 23" latitude, 73° 48' 52" longitude in the Bronx, a borough of New York City, New York (Figure 1). The site is bordered by the Hutchinson River to the north and east, Eastchester Bay to the east and south, Pelham Bay Park to the south-west, and Bruckner Boulevard Extension to the north-west. The Co-op City housing complex is approximately one half mile northwest of the site.

1.3.2 Site History

Before landfilling activity began, the area which now contains Pelham Bay Landfill was a 28 acre partially wooded, grassy area owned and operated by the New York City Department of Parks and Recreation. In 1963 The New York Department of Sanitation (DOS) assumed operation of the area and a municipal solid waste disposal facility, Pelham Bay Landfill, was opened.

The landfill generally received rubbish, street cleanings, commercial wastes, construction and demolition debris, and household waste. The material was delivered by private carters, DOS, and City, State, and Federal agencies. Hazardous material may also have been delivered to Pelham Bay Landfill. During testimony on May 6, 1982 before a Senate Committee on crime, a driver/dispatcher for the Hudson Oil Refining Company stated that from 1974 to 1980, oil waste sludges, metal plating wastes, lacquer, and solvents were illegally disposed of at several New York City landfills, including Pelham Bay Landfill.

Pelham Bay Landfill ceased operations on December 31, 1978 because of a court decision. The landfill has remained inactive ever since.

1.3.3 Previous Investigations

Numerous environmental sampling events have been conducted since the landfill closed to investigate the impact of the landfill on public health and the environment. These sampling events are summarized in the Final RI Report (WCCI, 1993b).

1.4 OVERALL INVESTIGATION APPROACH

1.4.1 Objectives

The objective of the SRI was to investigate off-site shallow soils that could have been affected by Pelham Bay Landfill. Surface water runoff, as well as leachate seeping from the landfill, could potentially carry constituents from the landfill to off-site locations. Focusing on these transport mechanisms, two main sampling locations were selected. The first main sampling location was along erosion gullies on the slopes of the landfill and their respective discharge points. The other sampling location was at the discharge point of historic leachate seeps originating from the landfill.

The sampling locations along the erosion gullies were selected through site surveys and maps. The historic seep locations were identified by NYCDEP, local residents, and WCCI.

1.4.2 Methods

The field sampling program followed the procedures outlined in the Final RI Report (WCCI, 1993b; section two). The surface soil sampling followed the procedures described in the Pelham Bay RI Work Plan (WCCI, 1992; section 4.3.1.4) and was conducted in accordance with USEPA guidance (USEPA, 1991).

1.4.3 Quality Assurance/Quality Control (QA/QC)

1.4.3.1 Overview

The SRI was conducted in accordance with the QA/QC program detailed in the Final RI Report (WCCI, 1993b).

1.4.3.2 Analytical Data Document Control

The analytical data generated by laboratory analysis of the soil samples collected for the SRI were tracked by the process described in the Final RI Report (WCCI, April, 1993). This process tracked the status of the environmental analytical data from the time of collection through the input of the validated analytical data into a computer data base (Figure 2).

2.1 SHALLOW SOIL SAMPLING

A total of twenty-one surface soil samples were collected from eighteen locations on March 31 and April 1, 1993 (Figure 3). The work was performed in accordance with the Scope of Work letter from WCCI to NYCDEP (dated March 12, 1993), and the letter from NYSDEC to the HAZ MAT Division of NYSDEC, reviewing the minutes of the March 25, 1993 SRI meeting. Eighteen samples, one duplicate sample, a matrix spike sample (MS), a matrix spike duplicate sample (MSD), and a field blank sample collected. The sample labeling system is described below. The samples were hand delivered to Chemtech Consultants Group, Inc. Laboratory after each day of sampling.

A duplicate sample was collected from sample location SRI-9B and was labeled SRI-DUP. The field blank was prepared before collecting sample SRI-5A. It was labeled FBSRI. The MS/MSD sample was collected from location SRI-1. Trip blanks accompanied the samples each day of sampling. The trip blank for March 31, 1993 was labeled "Trip Blk" and the trip blank for April 1, 1993 was labeled "Trip Blk 4/1".

Soil samples were collected from an area approximately one foot in diameter and from about 0 to 4 inches below the ground surface. Before the samples were collected, vegetation was removed from the sample location using a decontaminated stainless steel scoop. Samples for volatile organic analysis were collected first. Additional soil was then collected and transferred to a disposable aluminum tray. The soil was homogenized in the tray for uniformity and transferred to labeled, laboratory-prepared sampling containers. A new tray was used for each sample then discarded.

The field blank was prepared by pouring laboratory-supplied deionized water over a decontaminated stainless steel sampling scoop, into a disposable aluminum tray, and then into labeled, laboratory-prepared sample containers. The field blank containers contained laboratory-prepared preservatives; NaOH for cyanide, HNO_3 for inorganics, and HCl for volatile organic compounds (VOCs). Amber bottles were used for pesticide samples.

All sampling locations were staked, documented with photographs, and located using established surveyed points (e.g., adjacent monitoring wells). Sampling notes were recorded in a dedicated field notebook.

All samples were packed in coolers with ice as soon as they were collected. The samples were hand delivered to the laboratory at the end of each sampling day following chain-of-custody protocols outlined in the Pelham Bay RI Work Plan (WCCI, 1992) and Pelham Bay QA/QC Plan (WCCI, 1991). The samples were analyzed for Target Compound List (TCL) volatile organic compounds, TCL semi-volatile organic compounds (SVOs), TCL pesticides/PCBs, and Target Analyte List inorganics (and cyanide). All Samples were analyzed according to NYSDEC 1989 Analytical Services Protocols.

2.1.1 On Site Soil Sampling

Five of the twenty-one samples were collected on site from surface water runoff channels on the south-west side of the landfill. These samples were labeled SRI-5A, 6A, 7A, 8A, and 9A (Figure 4).

2.1.2 Off Site Soil Sampling

Four off-site samples were collected along Shore Road adjacent to the west side of the landfill (off-site area 1). This area had seeps that historically drained off site before a french drain collection system was installed. The samples collected along Shore Road were labeled SRI-1, 2, 3, and 4. The five off-site discharge point samples were labeled SRI-5B, 6B, 7B, 8B, and 9B. These were collected from an area in Pelham Bay Park adjacent to the site (off-site area 2). Figure 5 shows the sampling areas.

2.1.3 Background Soil Sampling

Four background samples were collected from off-site areas which should not have been affected by Pelham Bay Landfill surface water flow or leachate seeps. Two samples (SRI-10 and 13) were collected in Pelham Bay Park, and two samples (SRI-11 and 12) were collected along roads in the vicinity of the landfill (Figure 6).

Background sample SRI-10 was collected in the interior of Pelham Bay Park, in a small wooded area south of the landfill. The collection area was topographically higher than the base of the landfill and consequently, should not have been affected by surface water runoff or leachate seeping from the landfill. The area also contained mature trees, suggesting it was relatively undisturbed for a long time.

Background sample SRI-11 was collected from a grassy median at the intersection of Shore Road and City Island Road. This location is on the opposite side of the Hutchinson River from the landfill; it should not have been affected by surface water runoff or leachate seeping from the landfill.

Background sample SRI-12 was collected from a grassy area at Interchange 8B of the Bruckner Expressway. This location is in a hydraulically upgradient direction from the landfill.

Background sample SRI-13 was collected in Pelham Bay Park, next to the War Memorial Monument southwest of the landfill. This location is in a hydraulically upgradient direction from the landfill.

3.1 INTRODUCTION

For discussion purposes, and as described in the Pelham Bay RI (WCCI, 1993b), the analytical results of the background samples collected during the SRI are here used as comparison data for the rest of the soil samples. The background samples were collected in areas that should not have been affected by surface water runoff or leachate seeping from the landfill. Therefore, these samples may reflect typical urban, shallow soil conditions and can serve as a reference point for the other samples.

In addition, because of the urban setting of the landfill area, and because of the tendency for lead to accumulate in such a setting, NYSDEC verbally provided a 200 milligrams per kilogram (mg/kg) reference guideline for lead in soils (January 13, 1993 meeting).

In the following sections, detected organic compounds and inorganic analytes that are attributable to blank contamination are not discussed in the text. These data, however, are included in the summary tables.

3.2 SHALLOW SOIL SAMPLES

Twenty-one shallow soil samples were submitted for TCL analysis of VOCs, SVOs, Pesticide/PCBs, and TAL analysis of inorganics and cyanide following 1989 ASP protocols. Sample locations are shown in Figures 3 and 6. Table 1 is a summary of the sample locations and elevations. Summaries of the VOC, SVO, Pesticide/PCBs, and inorganics/cyanide analytical results are presented in Tables 2 through 8. The analytical results are discussed below by area of sample collection. Area 1 is the Historic Seep location, Area 2 is the Surface Water Runoff Channel location, and Area 3 encompasses the background soil sample locations.

3.2.1 Historic Leachate Seep Area Samples (Area 1)

This section discusses the analytical results of off-site soil samples SRI-1 through SRI-4. The data are compared to the background samples collected in the Pelham Bay area.

3.2.1.1 Volatile Organic Compounds

No volatile organic compounds were detected in soil samples collected from Area 1 (Table 2; Figure 7).

3.2.1.2 Semi-Volatile Organic Compounds

A summary of the SVO results is presented in Table 3. Two groups of SVOs were identified: polycyclic aromatic hydrocarbons (PAHs) and phthalates. Figure 8 shows the sample locations. Table 4 presents the maximum SVO background concentrations and Figure 9 shows the background SVO results.

PAHs

PAHs were detected in three of the four samples at concentrations ranging from 100 ug/kg to 1,120 ug/kg. Three SVO compounds were detected (see Table 3). The total PAH concentrations did not exceed maximum background concentrations.

Phthalates

Phthalate compounds were detected in two samples at concentrations of 160 ug/kg and 1,430 ug/kg. Two phthalate compounds were detected (see Table 3). The maximum background phthalate concentration was 460 ug/kg.

3.2.1.3 Pesticide/PCBs

No pesticides or PCBs were detected in soil samples collected from Area 1 (Table 5; Figure 10).

3.2.1.4 Inorganics/Cyanide

The results of the inorganic analyses are presented in Table 6. The locations of all samples with inorganic concentrations that exceed the maximum background concentrations are shown in Figure 11. Background inorganic concentrations are shown in Figure 12. The maximum background inorganic concentrations are listed in Table 7.

Calcium, copper, iron, manganese, sodium, and zinc were detected in the QA/QC field blank (Table 8). Consequently, the presence of these analytes in a SRI soil sample may possibly be attributable to external (laboratory, field) cross contamination. Following standard USEPA data validation procedures (USEPA, 1989), the "five times" rule is used. A given analyte in a sample that is present at concentrations less than five times the concentration found in the field blank is qualified with a "U" (undetected). Sample concentrations that exceed the five-time limit are not qualified.

Antimony, cadmium, selenium, silver, thallium, and cyanide were undetected in the samples.

Aluminum was found in all four samples at concentrations ranging from 5,960 mg/kg to 13,600 mg/kg. The maximum background aluminum level was 14,200 mg/kg (Samples SRI-12 and -13).

Arsenic was detected in three samples with concentrations ranging from 1.8 mg/kg to 3.9 mg/kg. The maximum background concentration was 13 mg/kg.

Barium was detected in all samples at concentrations ranging from 33.8 mg/kg to 127 mg/kg. The maximum background concentration was detected in sample SRI-13 at a concentration of 136 mg/kg.

Beryllium was detected in only one sample (SRI-1) at a concentration of 0.91 mg/kg. It was detected in three background samples with a maximum concentration of 1.3 mg/kg.

Common soil constituents, calcium, iron, magnesium, and potassium generally did not exceed background concentrations. The magnesium concentration in sample SRI-3 (19,300

mg/kg), however, exceeded the maximum background concentration of 5,300 mg/kg and the potassium concentration in sample SRI-1 (2,300 mg/kg) exceeded the background concentration of 1,400 mg/kg.

Chromium was detected in all samples at concentrations ranging from 4.5 mg/kg to 45 mg/kg. The chromium level in only one sample (SRI-1, 45 mg/kg) exceeded the maximum background chromium level of 38.4 mg/kg.

Cobalt was detected in all samples at concentrations ranging from 6.5 mg/kg to 13.8 mg/kg. Three samples (SRI-1, SRI-2, and SRI-4) exceeded the maximum background level of 9.2 mg/kg.

Lead did not exceed the NYSDEC reference level of 200 mg/kg in any sample. The lead levels ranged from 32.6 mg/kg to 102 mg/kg.

Manganese concentrations did not exceed the maximum background level of 485 mg/kg. Manganese levels ranged from 217 mg/kg to 367 mg/kg.

Mercury was detected in only one sample. Sample SRI-4 contained 0.28 mg/kg of mercury. It did not exceed the maximum background mercury level of .35 mg/kg.

Sample SRI-1 exceeded the maximum nickel background concentration of 42 mg/kg with a concentration of 82.6 mg/kg. The other three samples had nickel concentrations ranging from 13.9 mg/kg to 22.5 mg/kg.

Vanadium was detected in all samples at concentrations ranging from 30.3 mg/kg to 41.2 mg/kg. The vanadium levels did not exceed the maximum background concentration of 58.6 mg/kg.

Concentrations of zinc exceeded the maximum background levels in three samples. Sample SRI-1 contained 1,060 mg/kg of zinc, sample SRI-3 contained 785 mg/kg of zinc, and sample SRI-4 contained 1,710 mg/kg of zinc. The maximum background zinc concentration was 247 mg/kg.

3.2.2 Runoff Channel Samples (Area 2)

This section discusses the analytical results of soil samples SRI-5A,B through SRI-9A,B that were collected from surface water runoff channels. The "A" samples were collected on the landfill upgradient of the off-site "B" samples. The on-site samples were used to "finger print" and help assess the source of constituents in off-site soils.

3.2.2.1 Volatile Organic Compounds

A summary of the Area 2 VOC analytical results is presented in Table 2. Only one sample contained detectable levels of VOCs. Sample SRI-9B contained 91 ug/kg of acetone, a common laboratory contaminant. Other VOCs were not detected (Figure 7).

3.2.2.2 Semi-Volatile Organic Compounds

A summary of the SVO results presented in Table 3. Two groups of SVOs were identified: PAHs and phthalates. Figure 8 shows the sample locations. Table 4 presents the maximum SVO background concentrations. Figure 9 shows the maximum background SVO concentrations.

PAHs

PAHs were detected in nine of the ten shallow soil samples at concentrations ranging from 390 ug/kg to 25,370 ug/kg. Up to 13 PAH compounds were detected (see Table 3). Sample SRI-7B, containing a PAH level of 25,370 ug/kg, was the only sample that exceeded the maximum background PAH concentration of 16,630 ug/kg.

Phthalates

Phthalate compounds were detected in seven of the samples collected in Area 2. Three phthalate compounds were detected (see Table 3). Phthalate levels in sample SRI-8A (630 ug/kg) exceeded the maximum background concentration of 460 ug/kg.

Comparison of SVO Off-Site to On-Site Samples. Two samples were collected from

each of the five surface water runoff channels discharging from the landfill into Pelham Bay Park. The upgradient on-site samples were collected to "fingerprint" potential constituents found in each respective downgradient off-site sample. Only two samples, SRI-7B and SRI-8A, contained SVO levels that exceeded background concentrations.

Total PAHs exceeded maximum background levels in off-site sample SRI-7B. Total PAHs did not exceed maximum background levels in on-site sample SRI-7A.

Total phthalates exceeded background levels in on site sample SRI-8A, but off site sample SRI-8B did not exceed the maximum background level.

3.2.2.3 Pesticide/PCBs

No pesticides or PCBs were detected in soil samples collected from Area 2.

3.2.2.4 Inorganics/Cyanide

The results of the inorganic analyses are presented in Table 6. The locations of all samples with inorganic concentrations that exceed the maximum background concentrations are presented in Figure 11. Background sample concentrations are shown in Figure 12. The maximum background inorganic concentrations are listed in Table 7.

Calcium, copper, iron, manganese, sodium, and zinc were detected in the QA/QC field blank (Table 8). Consequently, the presence of these analytes in a SRI soil sample may possibly be attributable to external (laboratory, field) cross contamination. Following standard USEPA data validation procedures (USEPA, 1989), the "five times" rule is used. A given analyte in a sample that is present at concentrations less than five times the concentration found in the field blank is qualified with a "U" (undetected). Sample concentrations that exceed the five-time limit are not qualified.

Cadmium, selenium, silver, thallium, and cyanide were undetected in the Seep area samples.

The common soil constituents, aluminum, calcium, iron, magnesium, manganese, and potassium were generally below background levels, with a few exceptions. The QA/QC

duplicate sample, collected at off-site locate SRI-9B, exceeded the background concentration of calcium (15,500 mg/kg) with a concentration of 60,400 mg/kg. Three on-site samples and one off-site sample exceeded the background concentration of potassium (1,400 mg/kg) with a high of 2,000 mg/kg (off-site SRI-8B).

Antimony was detected in only one sample. Off-site sample SRI-5B contained 12.6 mg/kg of antimony. Antimony was not detected in the background samples.

Arsenic levels did not exceed the background concentration of 13 mg/kg. Only relatively low levels of arsenic were detected; the highest concentration was 2.9 mg/kg in SRI-5B.

Barium and beryllium levels did not exceed background concentrations. Barium was detected in all samples, with a high concentration of 87 mg/kg (SRI-5A). Beryllium was detected in only two samples, with a high concentration of 1.1 mg/kg. The maximum background barium concentration was 136 mg/kg.

Chromium was detected in all samples, with concentrations ranging from 7.3 mg/kg (SRI-7B) to 30.8 mg/kg (SRI-8B). None of the samples exceeded the maximum background concentration of 38.4 mg/kg.

Cobalt was detected in all samples, with concentrations ranging from 4.3 mg/kg (SRI-9B) to 10.1 mg/kg (SRI-5A). Only one sample (SRI-5A) exceeded the maximum background concentration of 9.2 mg/kg.

Lead did not exceed the NYSDEC reference level of 200 mg/kg in any sample. Lead concentrations ranged from 40.2 mg/kg to (SRI-6B) to 161 mg/kg (SRI-DUP).

Mercury was detected in only two samples (SRI-5A and SRI-7A) with a high concentration of 0.27 mg/kg. The maximum background mercury concentration was 0.35 mg/kg.

Nickel was detected in all samples. Only one sample exceeded the maximum background concentration of 42 mg/kg. Sample SRI-9A had a nickel concentration of 48.3 mg/kg.

Vanadium was detected in all samples with concentrations ranging from 12.5 mg/kg to 39.7

mg/kg. None of the samples exceeded the maximum background concentration of 58.6 mg/kg.

Comparison of Inorganic Off-Site to On-Site Samples. Two samples were collected from each of the five surface water runoff channels discharging into Pelham Bay Park. The upgradient on-site samples were collected to "fingerprint" potential constituents found in each respective downgradient off-site sample. Table 7 presents the maximum concentrations of background inorganic data. A brief discussion of the comparison of on-site to off-site samples is presented below.

Cobalt and potassium exceeded maximum background levels in on-site sample SRI-5A. Inorganic constituents did not exceed maximum background levels in off-site sample SRI-5B.

Potassium exceeded maximum background levels in on-site sample SRI-6A. Magnesium exceeded maximum background levels in off-site sample SRI-6B.

Potassium exceeded maximum background levels in on-site sample SRI-7A. Constituents did not exceed maximum background levels in off-site sample SRI-7B.

Constituents in on-site sample SRI-8A did not exceed maximum background levels. Magnesium and potassium exceeded maximum background levels in off-site sample SRI-8B.

Nickel exceeded maximum background levels in on-site sample SRI-9A. Magnesium exceeded maximum background levels in off-site sample SRI-9B and calcium and magnesium exceeded maximum background levels in duplicate sample SRI-DUP (collected from location SRI-9B).

3.2.3 Background Samples (Area 3)

This section discusses the analytical results of background samples SRI-10 through SRI-13. The samples were collected from:

- The interior of Pelham Bay Park (SRI-10)

- City Island Road (SRI-11)
- The Bruckner Interchange (SRI-12)
- The Pelham Bay Park War Memorial (SRI-13)

3.2.3.1 Volatile Organic Compounds

No volatile organic compounds were detected in the background soil samples.

3.2.3.2 Semi-Volatile Organic Compounds

A summary of the analytical results for the background SVO samples is presented in Table 3. Table 4 presents the SVO maximum background concentrations. Four groups of SVOs were identified: PAHs, phthalates, phenols, and a miscellaneous SVO compound. Figure 9 shows the background sample locations.

PAHs

PAHs were detected in three of the four background samples at concentrations ranging from 200 ug/kg to 16,630 ug/kg. Up to 12 PAH compounds were detected (see Table 3). SRI-10 contained the maximum total PAH concentration of 16,630 ug/kg.

Phthalates

Phthalates were detected in three of the four background samples at concentrations ranging from 140 ug/kg to 460 ug/kg. Three phthalate compounds were detected (see Table 3). Sample SRI-12 contained the maximum phthalate concentration of 460 ug/kg.

Phenols

Phenols were detected in only one background sample. Four phenol compounds were detected in sample SRI-10 with a total concentration of 1,200 ug/kg (see Table 3).

Miscellaneous SVO

A miscellaneous SVO compound was detected in one background sample. Sample SRI-12 contained 650 ug/kg of n-nitrosodi-n-propylamine.

3.2.3.3 Pesticide/PCBs

The results of the pesticide/PCB analyses are presented in Table 5. Only one pesticide was detected in the background shallow soil samples. Sample SRI-12 contained 180 ug/kg of 4-4-DDT.

PCBs were not detected in the background soil samples.

3.2.3.4 Inorganics/Cyanide

The results of the inorganic analyses are presented in Table 6. The locations of background samples with detectable levels of inorganic constituents are presented in Figure 8. Background sample concentrations are shown in Figure 12. The maximum background inorganic concentrations are listed in Table 7.

Calcium, copper, iron, manganese, sodium, and zinc were detected in the QA/QC field blank (Table 8). Consequently, the presence of these analytes in a SRI soil sample may possibly be attributable to external (laboratory, field) cross contamination. Following standard USEPA data validation procedures (USEPA, 1989), the "five times" rule is used. A given analyte in a sample that is present at concentrations less than five times the concentration found in the field blank is qualified with a "U" (undetected). Sample concentrations that exceed the five-time limit are not qualified.

Antimony, cadmium, selenium, silver, thallium, and cyanide were not detected in the background samples.

Aluminum was detected at concentrations ranging from 13,200 mg/kg to 14,200 mg/kg.

Arsenic was detected in all samples at concentrations ranging from 4.3 to 13 mg/kg. The

maximum concentration was detected in the sample collected from the Bruckner Interchange (SRI-12).

Barium was detected in all samples at concentrations ranging from 61.4 mg/kg to 136 mg/kg.

Low levels of beryllium were detected in three samples. The maximum background concentration was 1.3 mg/kg.

A wide range of calcium concentrations were detected in the background samples. Calcium levels ranged from 1,120 mg/kg (SRI-10, Park interior) to 15,500 mg/kg (SRI-12, Bruckner Interchange).

Relatively consistent chromium concentrations were detected in the samples. The values ranged from 22.7 mg/kg to 38.4 mg/kg.

Cobalt was detected in all samples at concentrations ranging from 8.3 mg/kg to 9.2 mg/kg.

Iron was detected in all samples at concentrations ranging from 16,600 mg/kg to 20,500 mg/kg.

Lead was detected in all samples. Two samples had lead levels that exceeded NYSDEC guidelines of 200 mg/kg. Sample SRI-12 (Bruckner Interchange) contained 413 mg/kg lead and sample SRI-13 (War Memorial) contained 204 mg/kg lead.

Magnesium was detected in all samples at concentrations ranging from 2,940 mg/kg to 5,300 mg/kg.

Relatively consistent manganese concentrations were detected in all samples. Manganese concentrations ranged from 355 mg/kg to 485 mg/kg.

Mercury was detected in two samples. Sample SRI-10 (Park interior) contained 0.16 mg/kg mercury and sample SRI-12 (Bruckner Interchange) contained 0.35 mg/kg mercury.

Nickel was detected in all samples at concentrations ranging from 22.6 mg/kg to 42 mg/kg.

Potassium was detected in all samples at concentrations ranging from 593 mg/kg to 1,400 mg/kg.

Vanadium was detected in all samples at concentrations ranging from 42.4 mg/kg to 58.6 mg/kg.

3.2.4 Tentatively Identified Compounds

This section describes the tentatively identified compounds (TICs) that were detected in the soil samples. The TIC data are summarized in Tables 2 and 3.

For data presentation, the TICs found in any given sample were grouped in the summary tables on the basis of their similarity, and not by chemical composition. For example, if the laboratory identified several compounds as "unknown hydrocarbons", the compounds were grouped together even though their chemical composition may not be the same.

3.2.4.1 Historic Leachate Seep Samples

VOC TICs were not detected in soil samples collected from this area.

SVO TICs were detected in all samples at concentrations ranging from 1,670 ug/kg to 6,840 ug/kg. The number of detected SVO TICs varied from two to five.

3.2.4.2 Runoff Channel Samples

VOC TICs were detected in three samples at concentrations ranging from 16 ug/kg to 52 ug/mg. The number of detected VOC TICs varied from one to two.

SVO TICs were detected in nine samples at concentrations ranging from 1,070 ug/kg to 284,500 ug/kg. The number of detected TICs varied from two to twenty-six.

3.2.4.3 Background Samples

VOC TICs were not detected in the background soil samples.

SVO TICs were detected in three samples at concentrations ranging from 2,790 ug/kg to 38,760 ug/kg. The number of detected TICs varied from three to thirty.

4.0
SUMMARY AND CONCLUSIONS

This section summarizes the SRI analytical data and presents conclusions about the off-site, on-site, and background shallow soil samples.

4.1 SUMMARY

Twenty one shallow soil samples were collected from three main sampling areas on and around Pelham Bay Landfill. The samples were collected to assess what effects, if any, the landfill had on off-site soils. Four background samples were collected to help distinguish typical urban soils from soils potentially affected by the landfill. The background samples served as a reference standard for the other soil samples.

Volatile Organic Compounds

Only one soil sample had detectable levels of VOCs. The off-site sample SRI-9B contained 91 ug/kg of acetone, a common laboratory contaminant.

Semi-volatile Organic Compounds

SVOs were detected in nearly all soil samples at concentrations ranging from 100 ug/kg (off-site sample SRI-1) to 25,590 ug/kg (off-site sample SRI-7B). Only two samples, off-site sample SRI-6B and background sample SRI-13, did not contain detectable levels of SVOs. PAHs were the most common type of SVO compound detected in the samples.

Pesticides and PCBs

Only one soil sample had detectable levels of pesticides. Background sample SRI-12 contained 180 ug/kg of 4-4'-DDT.

PCBs were not detected in any soil sample.

Inorganics

Because inorganic analytes are ubiquitous in soil due to natural or anthropomorphic processes, this summary focuses on five analytes that potentially pose the greatest risk to human health and the environment. They are arsenic, chromium, cyanide, lead, and mercury.

Arsenic was detected in most of the soil samples. The arsenic levels in on-site and off-site soil samples were generally consistent, ranging from 1.3 mg/kg (SRI-9B Duplicate) to 3.9 ug/kg (off-site sample SRI-1). In contrast, the arsenic levels in all four background samples were higher, ranging from 4.3 mg/kg to 13 mg/kg.

Chromium was detected in every soil sample, including the background samples. The chromium levels were generally consistent across the Pelham Bay area, ranging from 7.3 mg/kg (off-site SRI-7B) to 45 mg/km (off-site sample SRI-1). Background chromium levels ranged from 22.7 mg/kg to 38.4 mg/kg.

Cyanide was not detected in any of the soil samples.

Lead was detected in every soil sample, including the background samples. The reference level for lead (supplied by NYSDEC) is 200 mg/kg. On-site and Off-site lead levels ranged from 32.6 mg/kg (off-site sample SRI-2) to 161 mg/kg (SRI-9B Duplicate). Two background samples exceeded the 200 mg/kg reference level. Background sample SRI-12 contained 413 mg/kg lead and sample SRI-13 contained 204 mg/kg lead. The other two background samples had lead concentrations of 112 mg/kg (SRI-11) and 132 mg/kg (SRI-10).

Mercury was detected in one off-site sample, one on-site sample, and two background samples. Off-site sample SRI-4 contained 0.28 mg/kg of mercury, on-site sample SRI-5A contained 0.27 mg/kg of mercury, and background samples SRI-10 and SRI-12 contained 0.16 and 0.35 mg/kg of mercury, respectively.

4.2 CONCLUSIONS

The results of the SRI show that:

- Hotspots, or areas of grossly contaminated soils where not found during the SRI.
- VOCs, pesticides, and PCBs are nearly absent in the on-site, off-site, and background soil samples.
- SVOs compounds, especially PAHs, are ubiquitous in the Pelham Bay area. Similar SVO levels were detected in on-site, off-site, and background samples.
- Inorganic constituents are ubiquitous in the area. Concentrations of of all inorganic analytes in off-site samples are generally similar to background concentrations.
- There are no common constituent exceedences between the upgradient (on-site) and downgradient (off-site) Surface Water Runoff Channel samples.
- Relatively high levels of zinc (up to 1,710 mg/kg) were detected in the Historic Leachate Seep Area samples. The source of the zinc is uncertain.

A comparison of shallow off-site soil sample data to on-site and background soil sample data shows that the concentrations of analytes in off-site soils are generally below or consistent with on-site and background soil samples. This indicates that overland or surface water transport of constituents from the landfill to soils off site is a minor to non-existent pathway. The chemical composition of off-site soils adjacent to the landfill, when compared to the background samples, reflect a typical urban environment. No further action is proposed for off-site soils.

5.0
REFERENCES

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Tables

TABLE 1
ENVIRONMENTAL SOIL SAMPLES
PELHAM BAY SRI
92C4087

Sample Number	Approximate Sample Location*			Sample Date	Sample Depth Below Grade (approximate)	Sample Elevation* (approximate)	Location
	Longitude	Latitude	Elevation				
SRI-1	642492	313390	24'	4/1/93	0-4"	23.66' - 24'	Off Site (1)
SRI-2	642249	313125	10'	4/1/93	0-4"	9.66' - 10'	Off Site (1)
SRI-3	642190	313048	10'	4/1/93	0-4"	9.66' - 10'	Off Site (1)
SRI-4	642047	312890	10'	4/1/93	0-4"	9.66' - 10'	Off Site (1)
SRI-5A	642350	311782	17'	3/31/93	0-4"	16.66' - 17'	On Site
SRI-5B	642191	311725	10'	3/31/93	0-4"	9.66' - 10'	Off Site (2)
SRI-6A	642086	311737	15'	3/31/93	0-4"	14.66' - 15'	On Site
SRI-6B	642178	311701	9'	3/31/93	0-4"	8.66' - 9'	Off Site (2)
SRI-7A	642206	311655	15'	3/31/93	0-4"	14.66' - 15'	On Site
SRI-7B	642162	311659	9'	3/31/93	0-4"	8.66' - 9'	Off Site (2)
SRI-8A	642255	311602	15'	3/31/93	0-4"	14.66' - 15'	On Site
SRI-8B	642089	311657	8'	3/31/93	0-4"	7.66' - 8'	Off Site (2)
SRI-9A	642708	311619	21'	3/31/93	0-4"	20.66' - 21'	On Site
SRI-9B	642758	311510	7'	3/31/93	0-4"	6.66' - 7'	Off Site (2)
SRI-10	**	**	**	3/31/93	0-4"	**	Background
SRI-11	**	**	**	4/1/93	0-4"	**	Background
SRI-12	**	**	**	4/1/93	0-4"	**	Background
SRI-13	**	**	**	4/1/93	0-4"	**	Background
SRI-DUP	642758	311510	7'	3/31/93	0-4"	6.66' - 7'	Off Site (2)

Notes: * - Ground and sample elevations are above the Bronx Datum.
Bronx Datum = 2.608 feet above mean sea level, latitude
and longitude measured from NYS datum.

** - Background samples measured off of USGS quad; Flushing, New York, 1979

(1) - Indicates Offsite location along Shore Road

(2) - Indicates Offsite location located in Pelham Bay Park

SRI-DUP was taken at sampling location SRI-9B

Prepared by: DAJ
Checked by:
92C4087

TABLE 2
PELHAM BAY SRI
SOIL - VOLATILE ORGANIC COMPOUND DATA SUMMARY
92C4987

Location:	AREA 1				AREA 2													
Sample ID:	SRI-1	SRI-2	SRI-3	SRI-4	SR1-5A	SR1-5ARE	SRI-5B	SRI-6A	SRI-6B	SRI-7A	SRI-7B	SRI-8A	SRI-8ARE	SRI-8B	SRI-9A	SRI-9B	SRI-DUP	SRI-DUPRE
Date:	4/1/93	4/1/93	4/1/93	4/1/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	4/1/93	4/1/93
Matrix:	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
Units:	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Depth:	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"
Toluene																		
Acetone																91 J		
Total:																91		
Tentitively Identified Compounds																		
Unknown Aromatic																		
Unknown					16 J						52 J					38.20 J	8.20 J	
Total:					16						52					38.20	8.20	

Location:	BACKGROUND			
Sample ID:	SRI-10	SRI-11	SRI-12	SRI-13
Date:	3/31/93	4/1/93	4/1/93	4/1/93
Matrix:	soil	soil	soil	soil
Units:	ug/kg	ug/kg	ug/kg	ug/kg
Depth:	0-4"	0-4"	0-4"	0-4"
Toluene				
Acetone				
Total:				
Tentitively Identified Compounds				
Unknown Aromatic				
Unknown				
Total:				

Notes: J = Detected below the reporting limit

Prepared by: DAJ
Checked by: CAH

TABLE 3
SOIL - SEMI-VOLATILE ORGANIC DATA SUMMARY
PELHAM BAY SRI
92C4087

Location:	AREA 1				AREA 2										
Sample ID:	SRI-1	SRI-2	SRI-3	SRI-4	SRI1-5A	SRI-5B	SRI-6A	SRI-6B	SRI-7A	SRI-7B	SRI-8A	SRI-8B	SRI-9A	SRI-9B	SRI-DUP
Date:	4/1/93	4/1/93	4/1/93	4/1/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	4/1/93
Matrix:	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
Units:	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Depth:	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"
PAH's															
Acenaphthylene						260 J				240 J					
Acenaphthene											80 J				
Flourene										160 J	80 J				
Phenanthrene				130 J	600	1200			220 J	2200	900	350 J	300 J	880	280 J
Anthracene						280 J				390 J	120 J		90 J	220 J	
Fluroanthene	100 J		510	200 J	840	2400	130 J		320 J	4600	1300	900	700	1100	400 J
Pyrene			610	210 J	1150	2600	150 J		360 J	4800	1300	650	630	920	270 J
Benzo(a)anthracene					370 J	1200			130 J	1800	460		320 J	390 J	130 J
Chrysene					460	1300			160 J	2200	500	370 J	360 J	390 J	130 J
Benzo(b)fluroanthene					900 J	1700 J	110 J		490 J	2500 J	1000 J	540 J	580 J	680 J	160 J
Benzo(k)fluroanthene					800 J	2000 J			420 J	3800	850	620	540	670 J	200 J
Benzo(a)pyrene					230 J	1400 J			100 J	1900	420	350 J	470	540 J	160 J
Ideno(1,2,3-cd) pyrene					230 J	480 J			110 J	660	200 J		140 J	120 J	
Dibenze(a,h)anthracene										120 J					
Benzo(g,h,i)perylene						420 J									
Total:	100	0	1,120	540	5,580	15,240	390	0	2,310	25,370	7,210	3,780	4,130	5,910	1,730
Phthalates															
Di-n-butylphthalate		160 J		430 J	90 J	160 J	110 J			100 J	80 J		160 J		
Butylbenzylphthalate										120 J					
Bis (2-Ethylhexyl) phthalate				1000	350 J	240 J					550	120 J			
Total:	0	160	0	1,430	440	400	110	0	0	220	630	120	160	0	0
Phenols															
2-Chlorophenol															
4-Chloro-3-methylphenol															
4-Nitrophenol															
Pentachlorophenol															
Total:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chlorinated Hydrocarbons															
Total:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other SVO's															
N-Nitrosodi-n-propylamine															
Total:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE 3
SOIL - SEMI-VOLATILE ORGANIC DATA SUMMARY
PELHAM BAY SRI
92C4087

Location:	AREA 1				AREA 2										
Sample ID:	SRI-1	SRI-2	SRI-3	SRI-4	SR1-5A	SRI-5B	SRI-6A	SRI-6B	SRI-7A	SRI-7B	SRI-8A	SRI-8B	SRI-9A	SRI-9B	SRI-DUP
Date:	4/1/93	4/1/93	4/1/93	4/1/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	4/1/93
Matrix:	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
Units:	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Depth:	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"
Tentitively Identified Compounds															
Unknown		664 J		670 J	3,100		650 J	ND	1,790 J	1,460 J	1,330 J	2,200 J	1,600 J	2,200 J	360 J
Ethane,1,2,2-trichloro-2-fluoro-		670 J													
Ethane,2,2-dichloro-1,1,1-trifluro	370 J														
Nonacosane	1,300 J	932 J											1,200 J		
Benzeneamine,4-(6-methyl-2-be			1,900 J												
Ethane,1,1,2,2-tetrachloro-				670 J											
Nonanamide				1,000 J											
9-Octadecenamide, (Z)-				1,600 J											
Aromatic Hydrocarbon					20,700 J										
Furan,2,3-dihydro-4-methyl-					2,900 J		420 J		1,100 J	850 J	1,100 J				260 J
3-BENZYL-5-CHLORO					1,500 J										
Heptadecane						1,200 J									
3-Penten-2-ol									290 J						
2-Propanol,1-[1-methyl-2(2									350 J						
1,3-Cyclopentanedione, 2-bro									350 J						
2,6-Dimethyl-3,4-bis(trimeth									530 J						
3-Penten-2-one,(E)-										360 J					
2-Penten,4-methyl-										210 J					300 J
Silane, dimethyl-										350 J					230 J
Ethane,1,1-dichloro-2,2-dif										400 J					
Heptane,3,3,5-trimethyl-										380 J					
Dodecanamide,N,N-bis(2-hydr										220 J					
Penethrene,2-methyl-										910 J					
4H-Cyclopenta[def]phenanthre										770 J					
Anthracene, 2-methyl-										260 J					
2-Phenylnaphthalene										410 J					
Phenanthrene, 2,5-dimethyl-										220 J					
Cyclopenta(def)phenanthrenon										330 J					
Benzene, 1,1-(1,3-butadiyne										230 J					
11H-Benzo[b]fluorene										210 J					
Pyrene,1-methyl-										570 J					
Pyrene,4-methyl-										220 J					
7H-Benz[de]anthracen-7-one										260 J					
Benzo[c]penathrene										290 J					
Benzo[j]fluroanthene										970 J					
Hexadecane										980 J					
Benzo[e]pyrene										4,080 J					240 J
a PAH										500 J					
Dibenzo[def,mon]crysene										600 J		3,200 J			
1,2-benzenediol, 3-fluoro-											310 J				
2-Pentene,4-methyl-,(Z)-												2,000 J			

TABLE 3
SOIL - SEMI-VOLATILE ORGANIC DATA SUMMARY
PELHAM BAY SRI
92C4087

Location:	AREA 1				AREA 2										
Sample ID:	SRI-1	SRI-2	SRI-3	SRI-4	SR1-5A	SRI-5B	SRI-6A	SRI-6B	SRI-7A	SRI-7B	SRI-8A	SRI-8B	SRI-9A	SRI-9B	SRI-DUP
Date:	4/1/93	4/1/93	4/1/93	4/1/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	4/1/93
Matrix:	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
Units:	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Depth:	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"
Dodecane,4,6-dimethyl-												2,200 J			
Eicosane, 7-hexyl-												18,500 J			
Hexacosane												6,200 J			
Heptadecane, 9-hexyl-												97,700 J			
Heneicosane, 3-methyl-												14,500 J			
Undecane,2,9-dimethyl-												8,200 J			
Decane,3,3,6-trimethyl-												3,900 J			
Pentadecane,8-hexyl-												39,400 J			
Heptanenitrile												5,800 J			
Dodecane 5-cyclohexyl-,5-cy												6,800 J			
Unknown Hydrocarbon												3,200 J			
Hexane,3,3,4-trimethyl-												2,600 J			
Tridecane, 7-hexyl-												42,200 J	1,100 J		
9-Eicosene, (E)-												4,800 J			
Cycolhexane,1-(1,5-dimethyl												2,000 J			
Tritetracontane												2,400 J		4,000 J	
Dodecane 2-cyclohexyl-,2-cy												2,800 J			
Tetratriacontane												3,100 J			
Benzothiazole													1,600 J		
Undecane,4,4-dimethyl-														630 J	
14-Octadecenal														5,000 J	
Docosane, 9-butyl-														3,000 J	
Methacrylamide															360 J
Benzo[b]napththo[2,3,d]furan															
Pyrene, 2-methyl-															
Benzo[b]napththo[1,2,d]thioph															
3,4-Dihydrocyclopenta(cd)pyr															
Triphenylene, 2-methyl-															
Benz(A)anthracene-7,12-dione															
2-Propen-1-one, 1-(2-hydroxy															
Octacosane															
1-Hexacosanal															
Eicosane, 10-methyl-															
Phosphonic acid, dioctadecyl															
Heptacosane															
Docosane, 7-hexyl-															
Hydrocarbon															
Ethane,1,1,2-trichloro-2-fl															
Benzo[1,2-b:4,3-b']dithiope															
9-Octadecenamide,(Z)-															
Cyclotetracosane															
Tetratetracontane				2900 J		3200 J						10,800 J			
Total:	1,670	2,266	1,900	6,840	28,200	4,400	1,070	0	4,410	16,040	2,740	284,500	5,500	14,830	1,750

TABLE 3
SOIL - SEMI-VOLATILE ORGANIC DATA SUMMARY
PELHAM BAY SRI
92C4087

Location:	BACKGROUND			
Sample ID:	SRI-10	SRI-11	SRI-12	SRI-13
Date:	3/31/93	4/1/93	4/1/93	4/1/93
Matrix:	soil	soil	soil	soil
Units:	ug/kg	ug/kg	ug/kg	ug/kg
Depth:	0-4"	0-4"	0-4"	0-4"
PAH's				
Acenaphthylene	610		200 J	
Acenaphthene				
Flourene				
Phenanthrene	870		600	
Anthracene	180 J		160 J	
Fluroanthene	2700	100 J	1300	
Pyrene	2100	100 J	1100	
Benzo(a)anthracene	1400		580	
Chrysene	1800		710	
Benzo(b)fluroanthene	690 J		1300 J	
Benzo(k)fluroanthene	4100		1400	
Benzo(a)pyrene	1900		1000	
Ideno(1,2,3-cd) pyrene			360 J	
Dibenze(a,h)anthracene	160 J			
Benzo(g,h,i)perylene	120 J		360 J	
Total:	16,630	200	9,070	0
Phthalates				
Di-n-butylphthalate		140 J	130 J	
Butylbenzylphthalate	220 J			
Bis (2-Ethylhexyl) phthalate	130 J		330 J	
Total:	350	140	460	0
Phenols				
2-Chlorophenol	310 J			
4-Chloro-3-methylphenol	310 J			
4-Nitrophenol	310 J			
Pentachlorophenol	270 J			
Total:	1,200	0	0	0
Chlorinated Hydrocarbons				
Total:	0	0	0	0
Other SVO's				
N-Nitrosodi-n-propylamine			650	
Total:	0	0	650	0

TABLE 3
SOIL - SEMI-VOLATILE ORGANIC DATA SUMMARY
PELHAM BAY SRI
92C4087

Location:	BACKGROUND			
Sample ID:	SRI-10	SRI-11	SRI-12	SRI-13
Date:	3/31/93	4/1/93	4/1/93	4/1/93
Matrix:	soil	soil	soil	soil
Units:	ug/kg	ug/kg	ug/kg	ug/kg
Depth:	0-4"	0-4"	0-4"	0-4"
Tentitively Identified Compounds				ND
Unknown	1,200 J			
Ethane,2,2-trichloro-2-fluoro-				
Ethane,2,2-dichloro-1,1,1-trifluro				
Nonacosane				
Benzeneamine,4-(6-methyl-2-be				
Ethane,1,1,2,2-tetrachloro-				
Nonanamide				
9-Octadecenamide, (Z)-				
Aromatic Hydrocarbon				
Furan,2,3-dihydro-4-methyl-				
3-BENZYL-5-CHLORO				
Heptadecane	3,490 J			
3-Penten-2-ol				
2-Propanol,1-[1-methyl-2(2				
1,3-Cyclopentanedione, 2-bro				
2,6-Dimethyl-3,4-bis(trimeth				
3-Penten-2-one,(E)-				
2-Penten,4-methyl-				
Silane, dimethyl-				
Ethane,1,1-dichloro-2,2-dif				
Heptane,3,3,5-trimethyl-				
Dodecanamide,N,N-bis(2-hydr				
Penethrene,2-methyl-				
4H-Cyclopenta[def]phenanthre				
Anthracene, 2-methyl-	540 J			
2-Phenylnaphthalene				
Phenanthrene, 2,5-dimethyl-				
Cyclopenta(def)phenanthrenon				
Benzene, 1,1-(1,3-butadiyne				
11H-Benzo[b]fluorene	2,310 J			
Pyrene,1-methyl-				
Pyrene,4-methyl-	740 J			
7H-Benz[de]anthracen-7-one	1,940 J			
Benzo[c]penathrene				
Benzo[j]fluroanthene	630 J			
Hexadecane				
Benzo[e]pyrene	3,100 J			
a PAH				
Dibenzo[def,mon]crysene	3,800 J			
1,2-benzenediol, 3-fluoro-				
2-Pentene,4-methyl-,(Z)-				

TABLE 3
SOIL - SEMI-VOLATILE ORGANIC DATA SUMMARY
PELHAM BAY SRI
92C4087

Location:	BACKGROUND			
Sample ID:	SRI-10	SRI-11	SRI-12	SRI-13
Date:	3/31/93	4/1/93	4/1/93	4/1/93
Matrix:	soil	soil	soil	soil
Units:	ug/kg	ug/kg	ug/kg	ug/kg
Depth:	0-4"	0-4"	0-4"	0-4"
Dodecane,4,6-dimethyl-				
Eicosane, 7-hexyl-				
Hexacosane				
Heptadecane, 9-hexyl-				
Heneicosane, 3-methyl-				
Undecane,2,9-dimethyl-				
Decane,3,3,6-trimethyl-				
Pentadecane,8-hexyl-			600 J	
Heptanenitrile				
Dodecane 5-cyclohexyl-,5-cy				
Unknown Hydrocarbon		1,200 J		
Hexane,3,3,4-trimethyl-				
Tridecane, 7-hexyl-				
9-Eicosene, (E)-				
Cycolhexane,1-(1,5-dimethyl				
Tritetracontane			1,100 J	
Dodecane 2-cyclohexyl-,2-cy				
Tetratriacontane				
Benzothiazole				
Undecane,4,4-dimethyl-				
14-Octadecenal				
Docosane, 9-butyl-				
Methacrylamide	570 J			
Benzo[b]napththo[2,3,d]furan	530 J			
Pyrene, 2-methyl-	710 J			
Benzo[b]napththo[1,2,d]thioph	680 J			
3,4-Dihydrocyclopenta(cd)pyr	1,100 J			
Triphenylene, 2-methyl-	900 J			
Benz(A)anthracene-7,12-dione	560 J			
2-Propen-1-one, 1-(2-hydroxy	520 J			
Octacosane	570 J			
1-Hexacosanal	990 J			
Eicosane, 10-methyl-	3,700 J			
Phosphonic acid, dioctadecyl	1,500 J			
Heptacosane	580 J			
Docosane, 7-hexyl-	1,400 J			
Hydrocarbon	6,700 J			
Ethane,1,1,2-trichloro-2-fl		540 J		
Benzo[1,2-b:4,3-b']dithiope		420 J		
9-Octadecenamide,(Z)-		630 J		
Cyclotetracosane			1,800 J	
Tetratetracontane				
Total:	38,760	2,790	3,500	0

Notes: ND = Not detected
J = Detected below the reporting limit or is an estimated value.

Prepaired by:
Checked by:

TABLE 4
SOIL - PESTICIDE/PCB DATA ANALYSIS
PELHAM BAY SRI
92C4087

Location:	AREA 1					AREA 2										
Sample ID:	SRI-1	SRI-1RE	SRI-2	SRI-3	SRI-4	SR1-5A	SRI-5B	SRI-6A	SRI-6B	SRI-7A	SRI-7B	SRI-8A	SRI-8B	SRI-9A	SRI-9B	SRI-DUP
Date:	4/1/93	4/1/93	4/1/93	4/1/93	4/1/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	4/1/93
Matrix:	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
Units:	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Depth:	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"
Pesticides																
4,4'-DDT																
Total:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Location:	BACKGROUND			
Sample ID:	SRI-10	SRI-11	SRI-12	SRI-13
Date:	3/31/93	4/1/93	4/1/93	4/1/93
Matrix:	soil	soil	soil	soil
Units:	ug/kg	ug/kg	ug/kg	ug/kg
Depth:	0-4"	0-4"	0-4"	0-4"
Pesticides				
4,4'-DDT			180 J	
Total:	0	0	180	0

ND = Not Detected
DUP taken at location SRI-9B

Prepaired by: DAJ
Checked by: CAH

TABLE 5
SOIL - INORGANIC DATA SUMMARY
PELHAM BAY SRI
92C4087

Location:	AREA 1					AREA 2									
Sample ID:	SRI-1	SRI-2	SRI-3	SRI-4	SR1-5A	SRI-5B	SRI-6A	SRI-6B	SRI-7A	SRI-7B	SRI-8A	SRI-8B	SRI-9A	SRI-9B	SRI-DUP
Date:	4/1/93	4/1/93	4/1/93	4/1/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	3/31/93	4/1/93
Matrix:	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil	soil
Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Depth:	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"	0-4"
Aluminium	13600	11000	5960	6980	7550	11000	7830	6340	8870	3900	6480	10000	6930	4630	4060
Antimony						12.6 B									
Arsenic	3.9		2.3 B	1.8 B	2.4 B	2.9	1.5 B			1.5 B	1.8 B	1.6 B	1.5 B		1.3 B
Barium	127	33.8 B	74.8	89.6	87	60	63.1	54.3	76.3	34.5 B	59.5	145	52.7	40.7 B	39.1 B
Beryllium	0.91 B				0.83 B						1.1 B				
Calcium	4950	13800	46700	7940	4880	3920	5300	11300	10800	5620	4300	11300	2940	9510	60400
Chromium	45	4.5	15.1	23.5	24.8	24.1	28	20.5	22.1	7.3	24	30.8	20	13.1	15.2
Cobalt	13.4 B	13.8 B	6.5 B	9.6 B	10.1 B	6.2 B	7 B	5.9 B	7.9 B	4.7 B	7.5 B	9.7 B	7.2 B	4.3 B	4.3 B
Copper	29 U	119 U	51.7 U	72.3 U	31.9 U	18.1 U	15.5 U	16.1 U	20.1 U	8.6 U	22.5 U	29.7 U	17.7 U	19.2 U	28.7 U
Iron	21800	23400	13000	13900	19200	15400	17100	12300	16900	7450	20100	20500	18000	12200	11600
Lead	99.2	32.6	91.7	102	101	63.8	69.3	40.2	93.9	35.8	60.4	122	61	38.7	161
Magnesium	7070	6470	19300	4550	3980	3510	4570	6660	4120	3230	3310	6660	2760	6120	35600
Manganese	309	217	258	367	268	231	262	197	251	106	252	407	182	189	207
Mercury				0.28	0.27				0.15						
Nickle	82.6	15.7	13.9	22.5	23	22.1	23.7	12.4	17.7	10.7	19.2	25	48.3	13.7	10.7 B
Potassium	2300	642 B	1050 B	1360 B	1410	899 B	1600	1120 B	1650	733 B	1110 B	2000	873 B	658 B	728 B
Sodium	420 U	2530 U	272 U	470 U	237 U	565 U	194 U	273 U	227 U	330 U	281 U	400 U	219 U	310 U	398 U
Vanadium	41.2	37.5	30.3	31.5	29.8	32.2	30	25.1	28.4	12.5	24.6	39.7	30.7	19.2	19.5
Zinc	1060	197	785	1710	168	81.7 U	98.5 U	64.6 U	128 U	36.4 U	88.2 U	177	87.9 U	81.2 U	85.2 U

TABLE 5
SOIL - INORGANIC DATA SUMMARY
PELHAM BAY SRI
92C4087

Location:	BACKGROUND			
Sample ID:	SRI-10	SRI-11	SRI-12	SRI-13
Date:	3/31/93	4/1/93	4/1/93	4/1/93
Matrix:	soil	soil	soil	soil
Units:	mg/kg	mg/kg	mg/kg	mg/kg
Depth:	0-4"	0-4"	0-4"	0-4"
Aluminium	14100	13200	14200	14200
Antimony				
Arsenic	5.2	4.3	13	5
Barium	67.7	61.4	103	136
Beryllium	1.2 B		0.93 B	1.3 B
Calcium	1530	1120 B	15500	6730
Chromium	30.3	30.8	22.7	38.4
Cobalt	9.2 B	8.3 B	8.5 B	9 B
Copper	33.9 U	37.6 U	52 U	41.3 U
Iron	18400	16600	20500	18200
Lead	132	112	413	204
Magnesium	3370	2940	3830	5300
Manganese	394	367	485	355
Mercury	0.16		0.35	
Nickle	39.4	33.7	22.6	42
Potassium	1050 B	593 B	1160 B	1400
Sodium	377 U	138 U	211 U	875 U
Vanadium	58.6	42.4	50.9	51.2
Zinc	91.3 U	96.9 U	247	154 U

Notes: B = detected above the Instrument Detection Limit
but below the Contract Detection Limit
SRI-DUP taken from SRI-9B
U = Compound Detected in Blank

Prepared by: DAJ
Checked by: PGN

TABLE 6
PELHAM BAY SRI
SRI - FIELD BLANK DATA SUMMARY
92C4987

Location:		
Sample ID:	FBSRI	
Date:	4/1/93	
Matrix:	water	
Units:	ug/l	
Depth:		
VOC's		
Toluene	1	J
Total:	1	
Tentitively Identified Compounds		
Unknown	9	J
Total:	9	
Inorganics		
Calcium	393	B
Copper	41.9	
Iron	33.1	B
Manganese	10.1	B
Sodium	2510	B
Zinc	31.1	

Note: FBSRI prepared before sampling SRI-5A
B = detected above the Instrument Detection Limit
but below the Contract Detection Limit
J = Detected below the reporting limit

Prepared by: DAJ
Checked by: PGN

TABLE 7
SEMI-VOLATILE ORGANIC DATA
MAXIMUM BACKGROUND CONCENTRATION TOTALS
PELHAM BAY SRI
92C4087

ANALYTE	SAMPLE LOCATION	CONCENTRATION mg/kg
Total PAH's	SRI-10	16,630
Total Phthalates	SRI-12	460
Total Phenols	SRI-10	1,200
Total Chlorinated Hydrocarbons		ND
Total Other SVO's	SRI-12	650

Notes:

SRI-10 - Pelham Bay Park interior
SRI-11 - City Island Road
SRI-12 - Bruckner Expressway
SRI-13 - Pelham Bay Park War Memorial

Prepared by: DAJ
Checked by: PGN

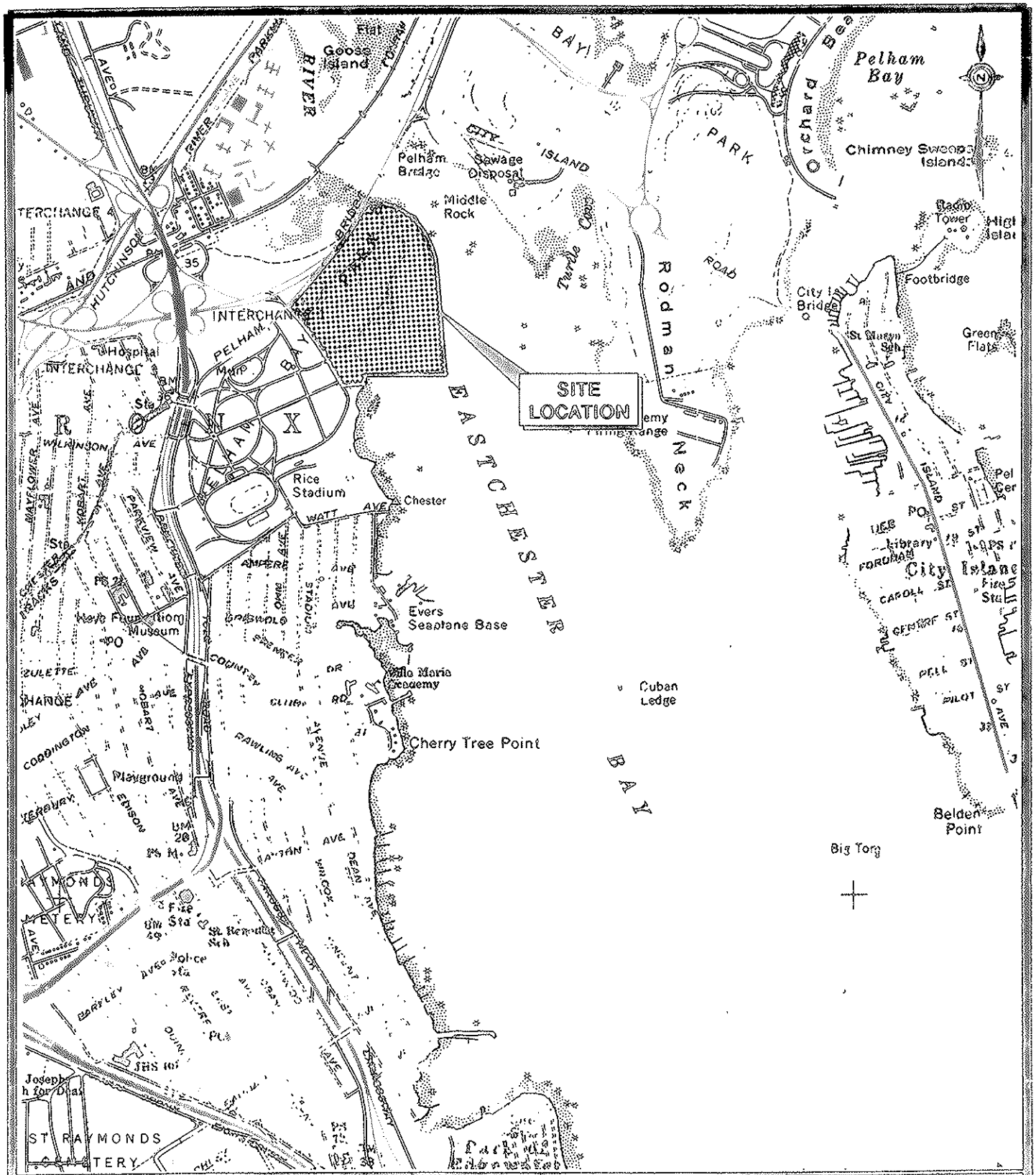
TABLE 8
INORGANIC DATA
MAXIMUM BACKGROUND CONCENTRATIONS
PELHAM BAY SRI
92C4087

ANALYTE	SAMPLE LOCATION	CONCENTRATION mg/kg
Aluminium	SRI-12&13	14200
Antimony		ND
Arsenic	SRI-12	13
Barium	SRI-13	136
Beryllium	SRI-13	1.3 B
Cadmium		ND
Calcium	SRI-12	15500
Chromium	SRI-13	38.4
Cobalt	SRI-10	9.2 B
Copper	SRI-12	52 U
Iron	SRI-12	20500
Lead	SRI-12	413
Magnesium	SRI-13	5300
Manganese	SRI-12	485
Mercury	SRI-12	0.35
Nickle	SRI-13	42
Potassium	SRI-13	1400
Selenium		ND
Silver		ND
Sodium	SRI-13	875 U
Thallium		ND
Vanadium	SRI-10	58.6
Zinc	SRI-12	247
Cyanide		ND

Notes: B = detected above the Instrument Detection Limit
but below the Contract Detection Limit
ND = Not detected in Background samples
U = Compound Detected in Blank
SRI-10 - Pelham Bay Park interior
SRI-11 - City Island Road
SRI-12 - Bruckner Expressway
SRI-13 - Pelham Bay Park War Memorial

Prepared by: DAJ
Checked by: PGN

Figures



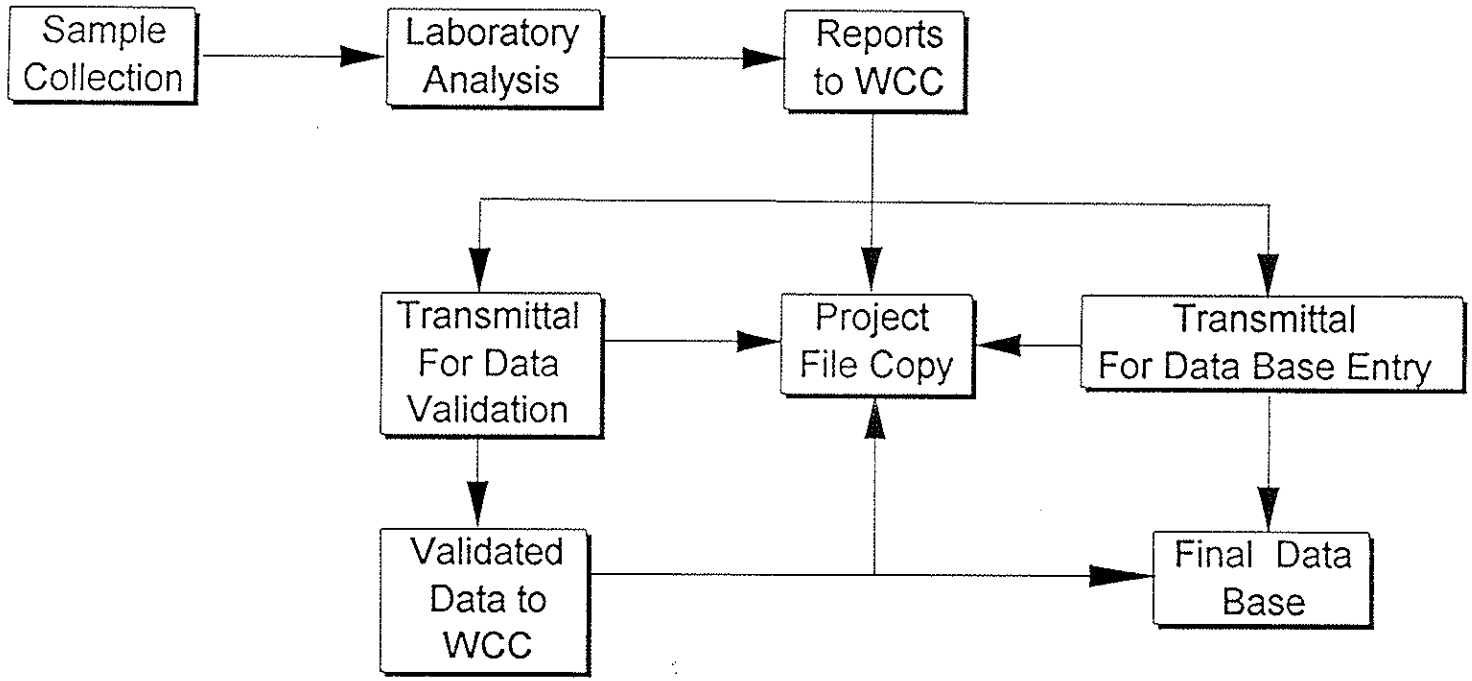
SITE LOCATION MAP
PELHAM BAY LANDFILL
BRONX, NEW YORK

WOODWARD – CLYDE CONSULTANTS, INC.

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
NEW YORK, NEW YORK

DR. BY:	KJF	SCALE:	AS SHOWN	PROJ. NO.:	92C4067
CK'D BY:	MEC	DATE:	SEPT. 29, 1992	FIG. NO:	1

MAP SOURCE:
FLUSHING, N.Y. USGS QUADRANGLE MAP, 1979.

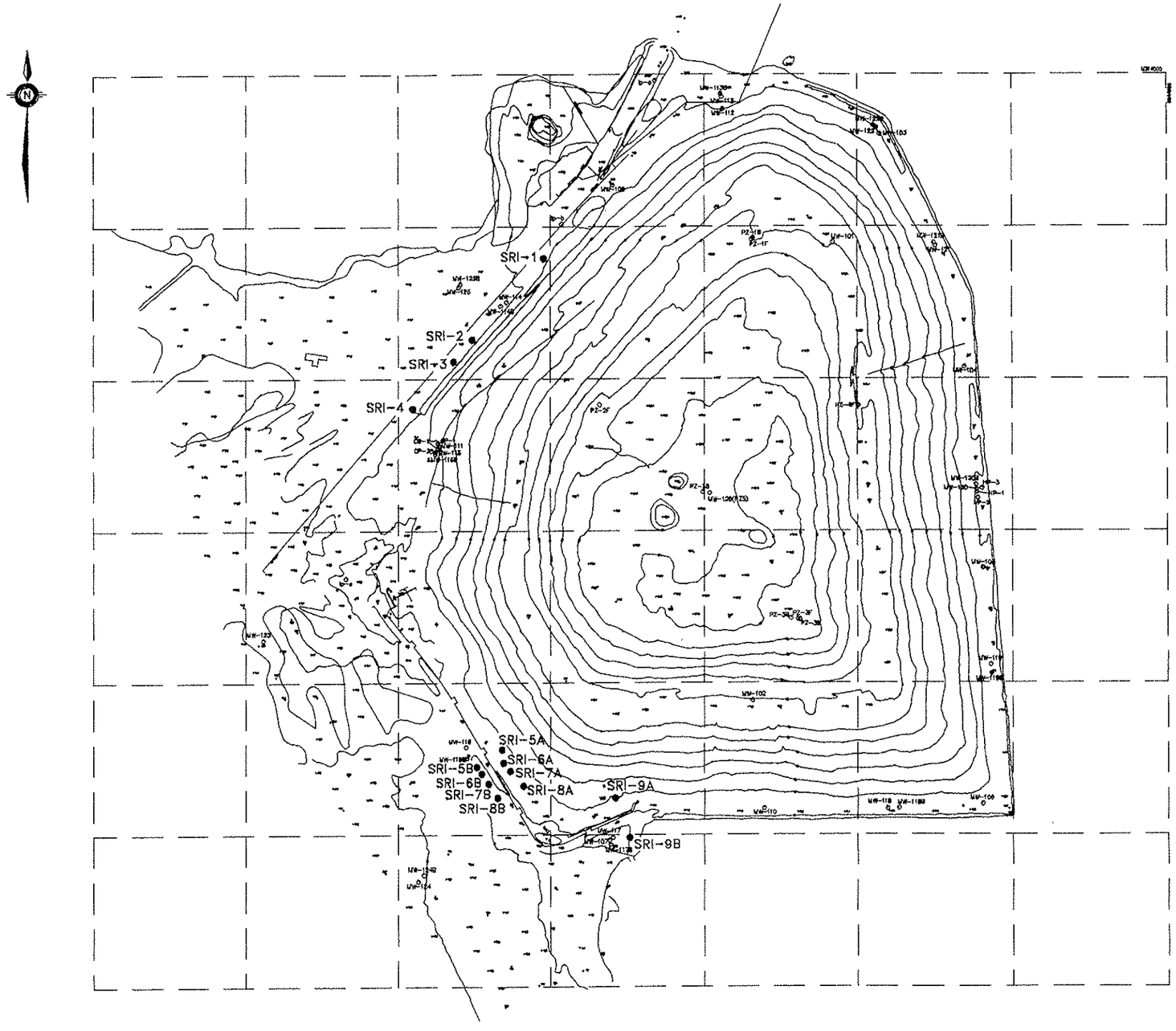


SAMPLE/DATA TRACKING PROCESS
PELHAM BAY LANDFILL
BRONX, NEW YORK

WOODWARD – CLYDE CONSULTANTS, INC.

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
NEW YORK, NEW YORK

DR. BY:	KJF	SCALE:	NONE	PROJ. NO.:	92C4087 – 8100
CK'D BY:	MEC	DATE:	1 OCT 1992	FIG. NO.:	2



LEGEND

● SRI-1 APPROXIMATE LOCATION OF SOIL SAMPLE

NOTES:

1. ON SITE SAMPLES: SRI-5A THROUGH SRI-9A.
2. OFF SITE SAMPLES: SRI-1 THROUGH SRI-4, SRI-5B THROUGH SRI-9B.
3. COORDINATES AND BEARINGS IN BRONX HIGHWAY DATUM.
4. ELEVATIONS ABOVE BRONX DATUM = 2.608 FEET ABOVE MEAN SEA LEVEL.
5. CONTOUR INTERVAL = 40 FEET.

MAP SOURCE:

GABRIEL E. SENIOR, P.C.
SITE SURVEY, 1992
WCCI FIELD SURVEY 3/31/93.

0 200 400 800 FT
SCALE

ON AND OFF SITE SHALLOW SOIL SAMPLING LOCATIONS PELHAM BAY LANDFILL BRONX, NEW YORK

WOODWARD-CLYDE CONSULTANTS, INC.
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR.BY	MG	SCALE	AS SHOWN	PROJ.	92C4087
CK'D.BY	PGN	DATE	MAY 24 1993	FIG.NO.	3

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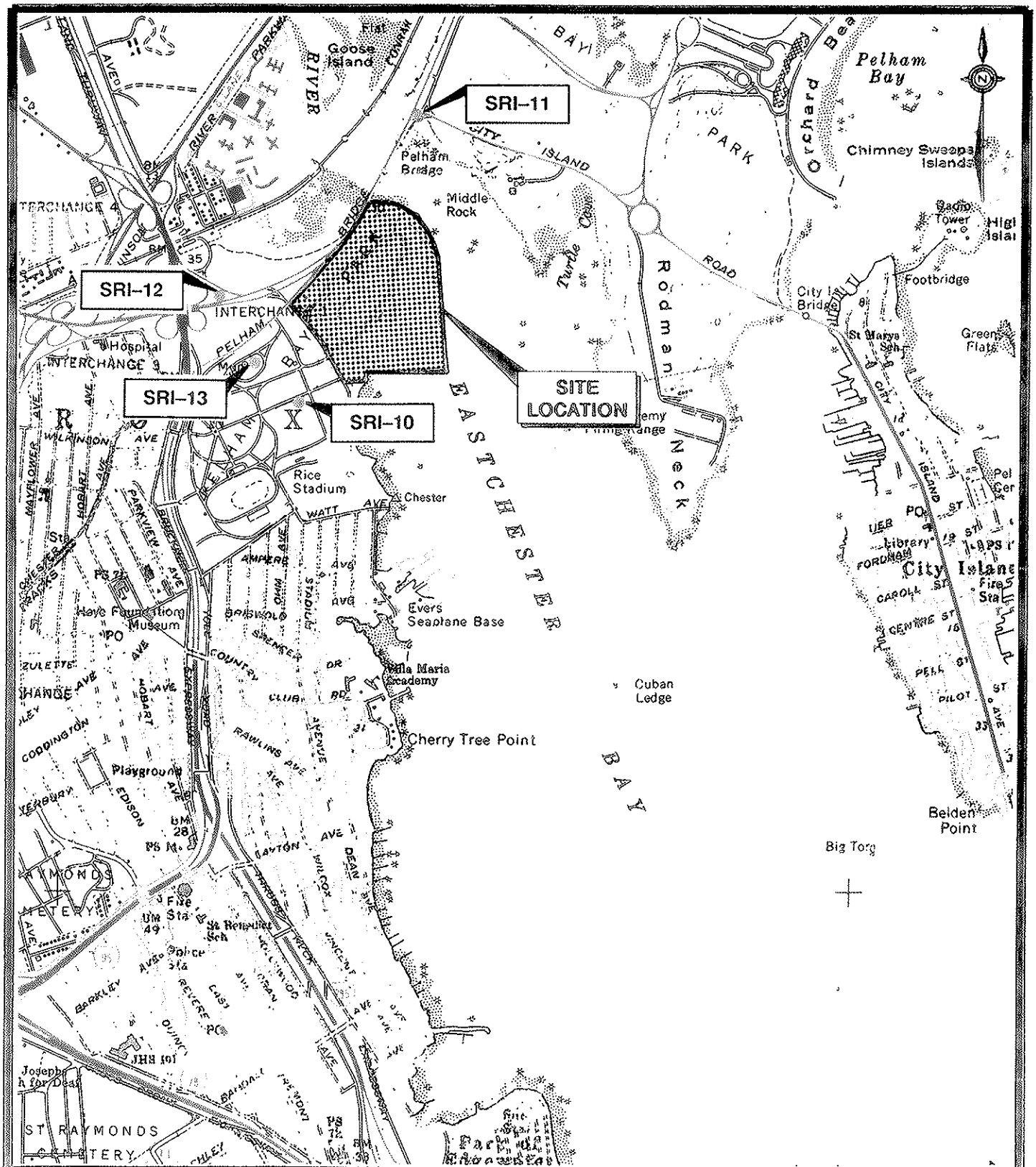


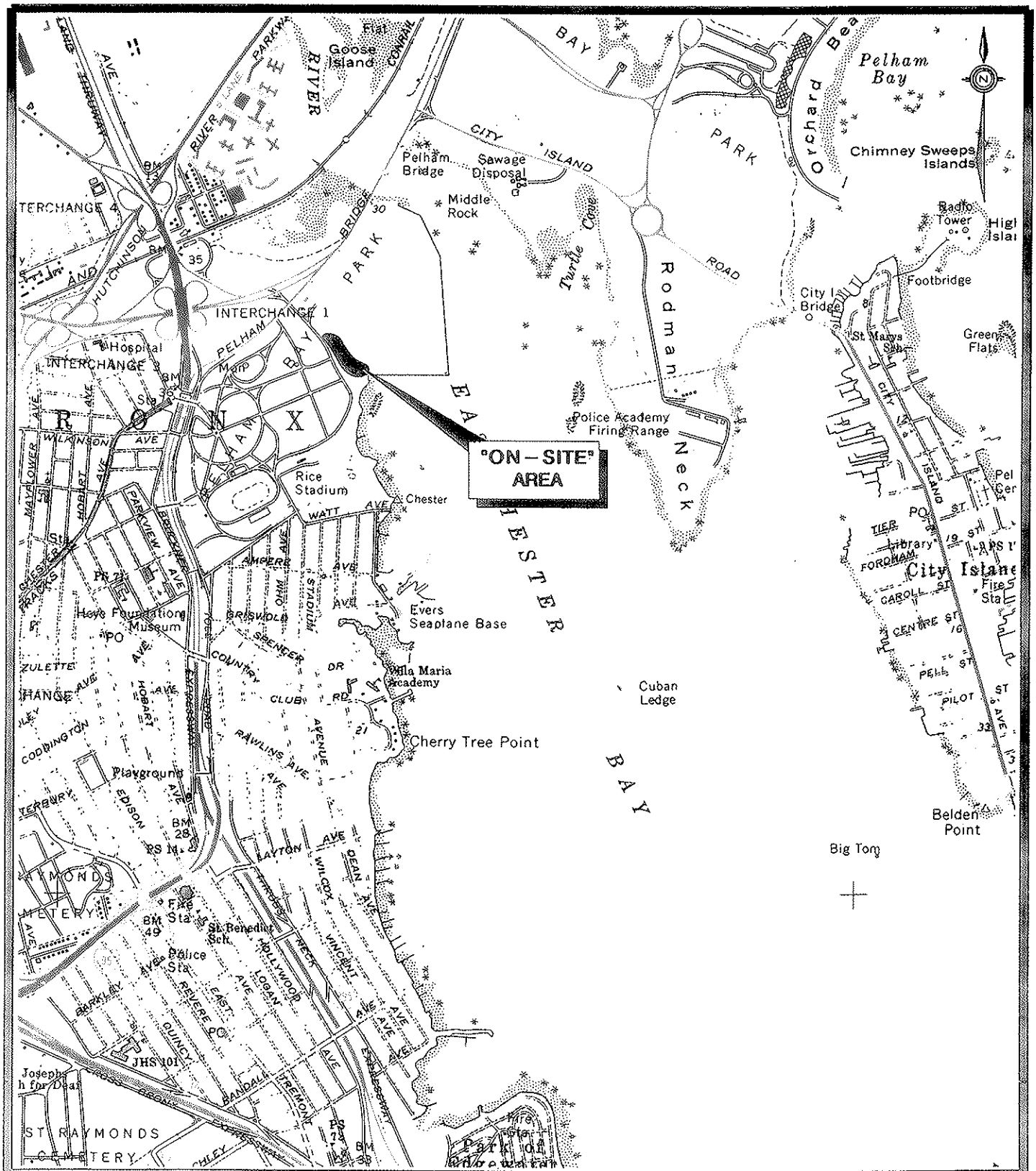
BACKGROUND SHALLOW SOIL SAMPLING LOCATIONS
PELHAM BAY LANDFILL
BRONX, NEW YORK

WOODWARD – CLYDE CONSULTANTS, INC.

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
NEW YORK, NEW YORK

DR. BY:	KJF	SCALE:	AS SHOWN	PROJ. NO.:	92C4087
CK'D BY:	MEC	DATE:	SEPT. 29, 1992	FIG. NO:	4

MAP SOURCE:
FLUSHING, N.Y. USGS QUADRANGLE MAP, 1979.

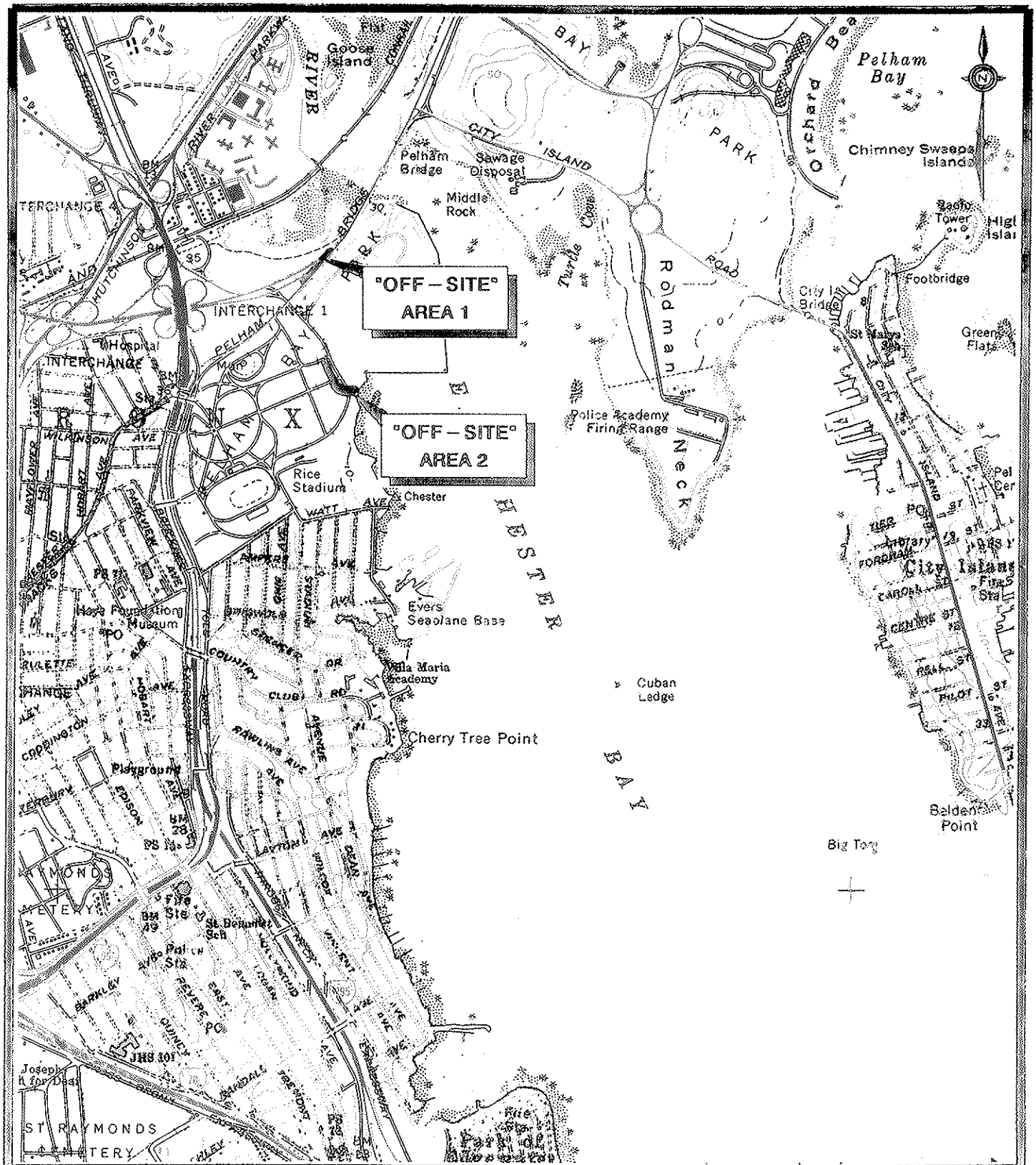


ON – SITE SHALLOW SOIL SAMPLING LOCATIONS
PELHAM BAY LANDFILL
BRONX, NEW YORK

MAP SOURCE:
FLUSHING, N.Y. USGS QUADRANGLE MAP, 1979.

WOODWARD – CLYDE CONSULTANTS, INC.
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
NEW YORK, NEW YORK

DR. BY:	KJF	SCALE:	AS SHOWN	PROJ. NO.:	92C4087
CK'D BY:	DAJ	DATE:	MAY 19, 1993	FIG. NO:	5



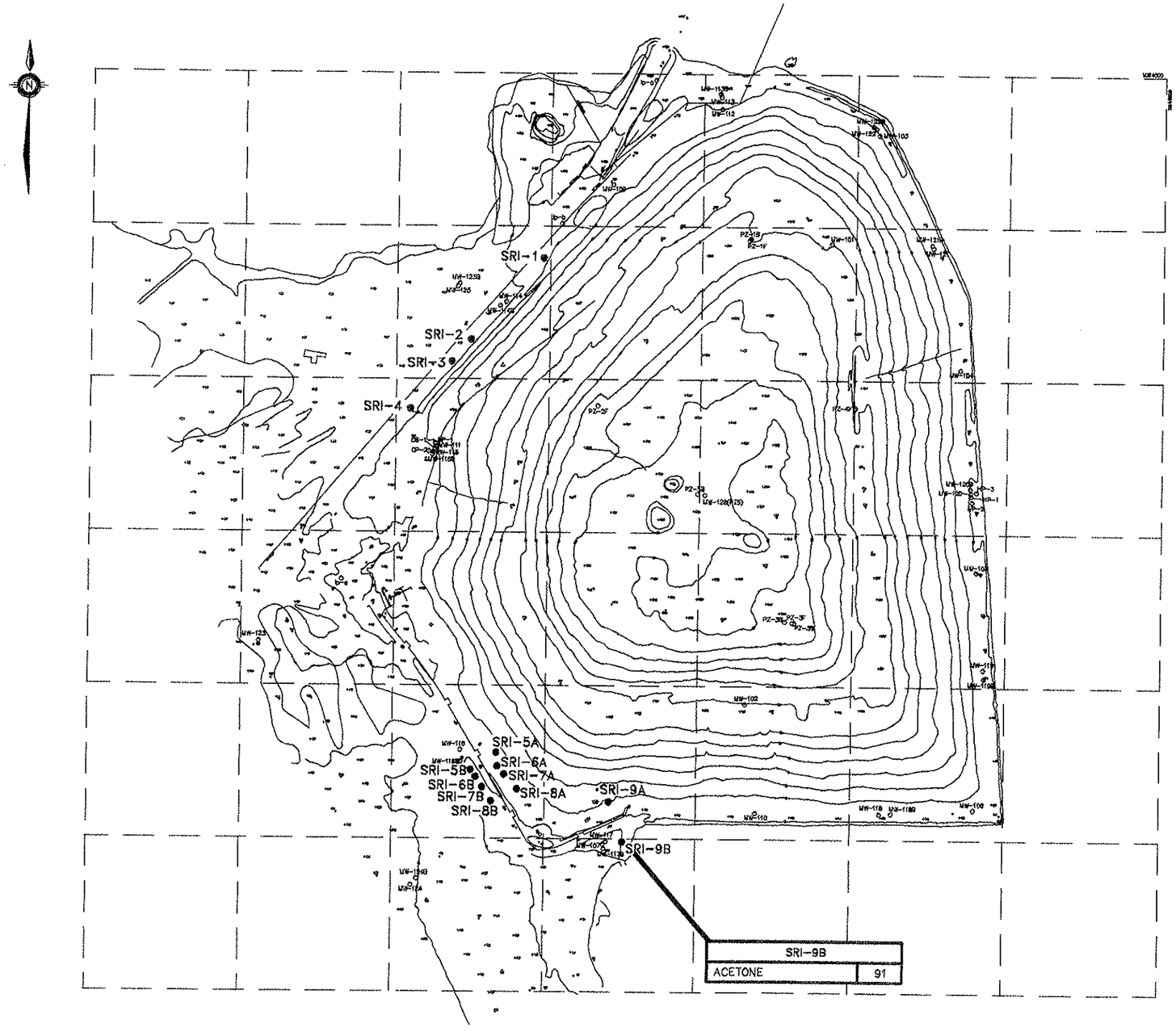
OFF – SITE SHALLOW SOIL SAMPLING LOCATIONS
PELHAM BAY LANDFILL
BRONX, NEW YORK

WOODWARD – CLYDE CONSULTANTS, INC.

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
NEW YORK, NEW YORK

DR. BY:	BAS	SCALE:	AS SHOWN	PROJ. NO.:	92C4087
CK'D BY:	MEC	DATE:	MAY 13, 1993	FIG. NO:	6

MAP SOURCE:
FLUSHING, N.Y. USGS QUADRANGLE MAP, 1979.



LEGEND

● SRI-1 APPROXIMATE LOCATION OF SOIL SAMPLE

NOTES:

1. UNITS ARE ug/kg.
2. ON SITE SAMPLES: SRI-5A THROUGH SRI-9A.
3. OFF SITE SAMPLES: SRI-1 THROUGH SRI-4, SRI-5B THROUGH SRI-9B.
4. COORDINATES AND BEARINGS IN BRONX HIGHWAY DATUM.
5. ELEVATIONS ABOVE BRONX DATUM = 2.608 FEET ABOVE MEAN SEA LEVEL.
6. CONTOUR INTERVAL = 40 FEET.

MAP SOURCE:

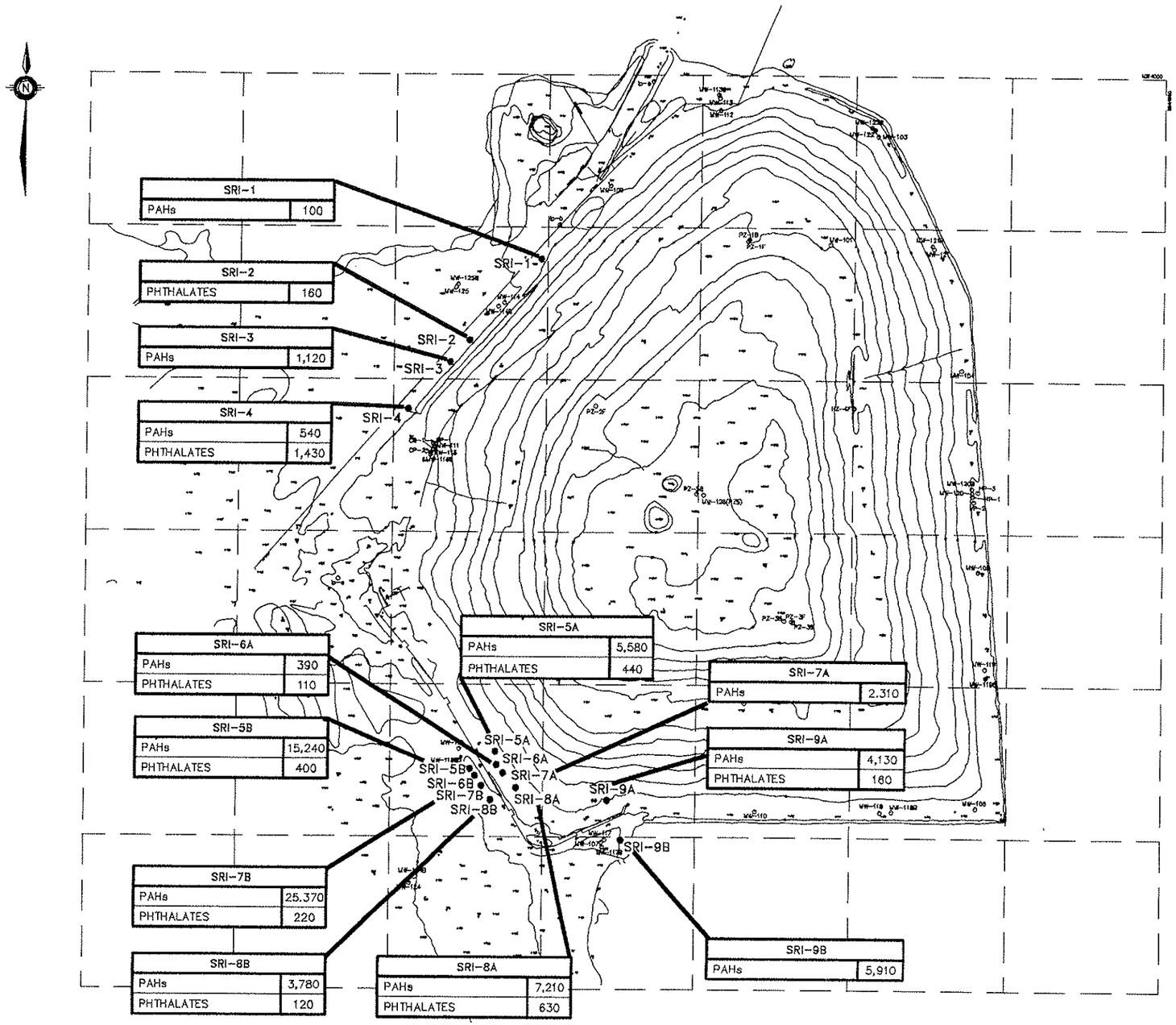
GABRIEL E. SENIOR, P.C.
SITE SURVEY, 1992
WCCI FIELD SURVEY 3/31/93.

0 200 400 800 FT
SCALE

SRI SHALLOW SOIL SAMPLING LOCATIONS SHOWING CONCENTRATIONS OF VOLATILE ORGANIC COMPOUNDS PELHAM BAY LANDFILL BRONX, NEW YORK

WOODWARD-CLYDE CONSULTANTS, INC.
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
WAYNE, NEW JERSEY

DR.BY	MG	SCALE	AS SHOWN	PROJ.	92C4087
CK'D.BY	PGN	DATE	MAY 24 1993	FIG.NO.	7



LEGEND

● SRI-1 APPROXIMATE LOCATION OF SOIL SAMPLE

NOTES:

1. UNITS ARE ug/kg.
2. ON SITE SAMPLES: SRI-5A THROUGH SRI-9A.
3. OFF SITE SAMPLES: SRI-1 THROUGH SRI-4, SRI-5B THROUGH SRI-9B.
4. COORDINATES AND BEARINGS IN BRONX HIGHWAY DATUM.
5. ELEVATIONS ABOVE BRONX DATUM = 2.608 FEET ABOVE MEAN SEA LEVEL.
6. CONTOUR INTERVAL = 40 FEET.

MAP SOURCE:

GABRIEL E. SENIOR, P.C.
SITE SURVEY, 1992
WCCI FIELD SURVEY 3/31/93.

0 200 400 800 FT
SCALE

SRI SHALLOW SOIL SAMPLING LOCATIONS
SHOWING CONCENTRATIONS OF SEMI-VOLATILE
ORGANIC COMPOUNDS
PELHAM BAY LANDFILL
BRONX, NEW YORK

WOODWARD-CLYDE CONSULTANTS, INC.

CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
NEW YORK, NEW YORK

DR.BY	MG	SCALE	AS SHOWN	PROJ.	92C4087
CK'D.BY	PGN	DATE	MAY 24 1993	FIG.NO.	8

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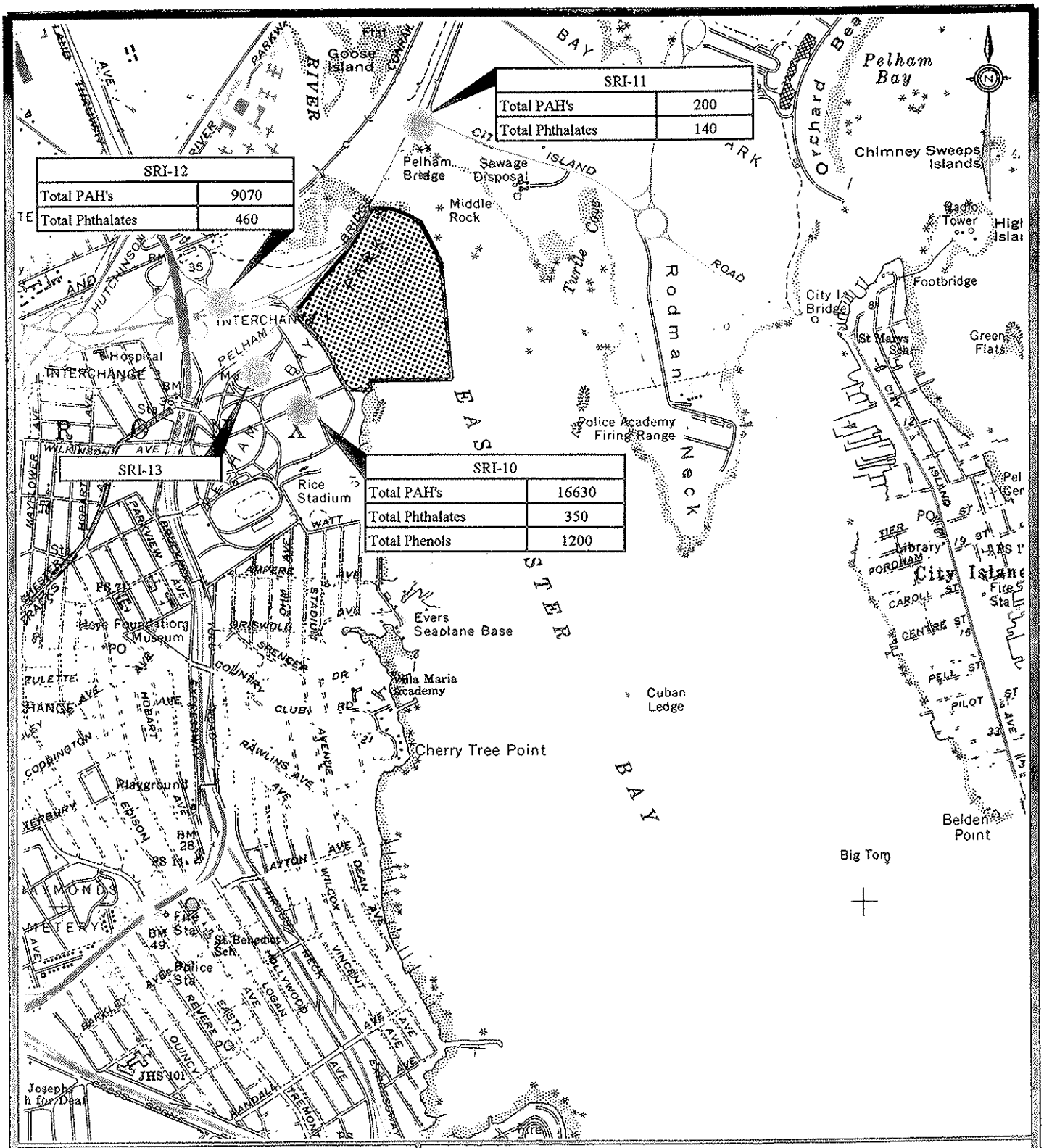


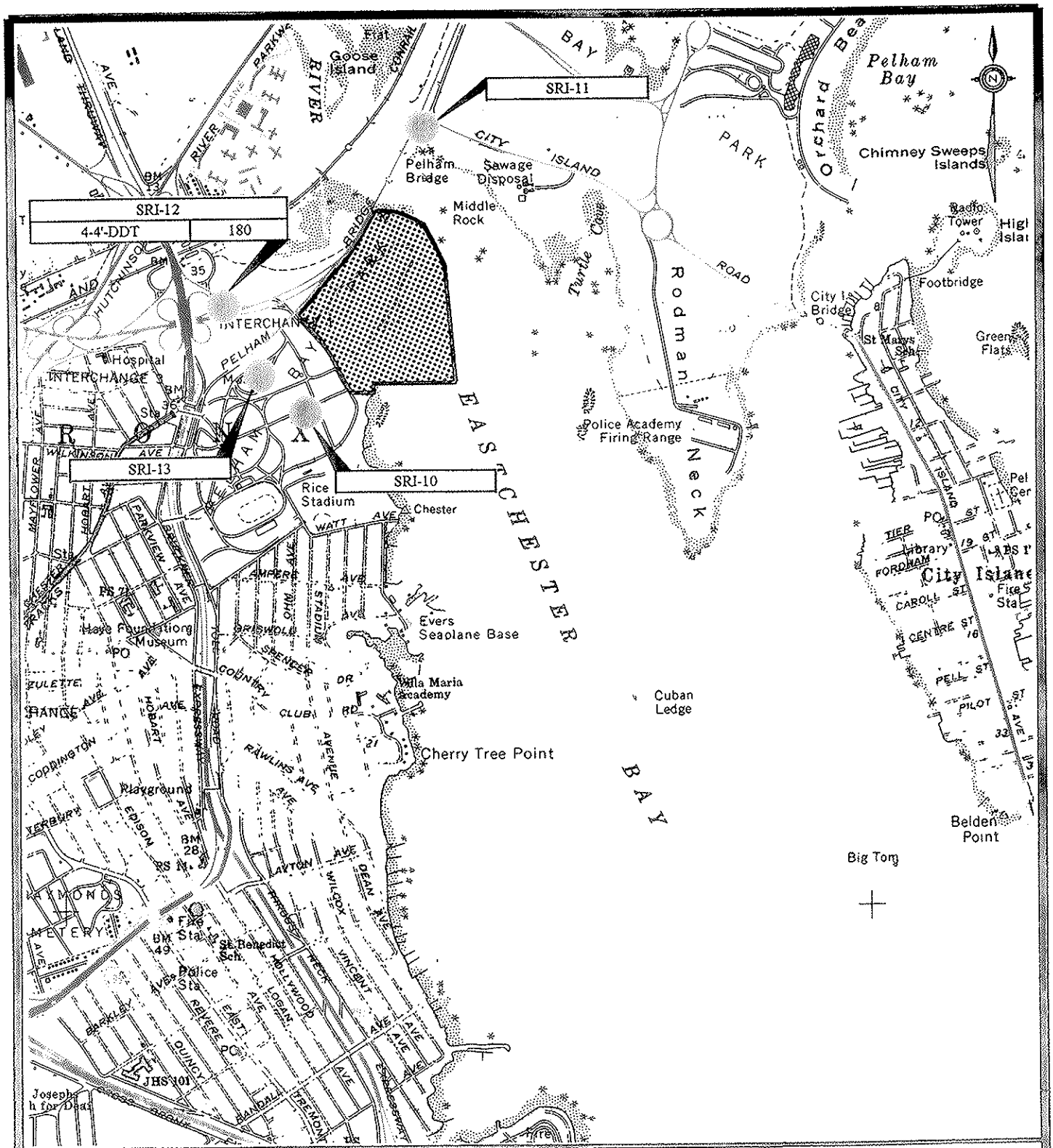
0 1000 2000 FT
SCALE

MAP SOURCE:
FLUSHING, N.Y. USGS QUADRANGLE MAP, 1979.

BACKGROUND ANALYTICAL RESULTS
SEMI – VOLATILE ORGANIC COMPOUNDS
PELHAM BAY LANDFILL
BRONX, NEW YORK

WOODWARD – CLYDE CONSULTANTS, INC.
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
NEW YORK, NEW YORK

DR. BY:	KJF	SCALE:	AS SHOWN	PROJ. NO.:	92C6087
CK'D BY:	DAJ	DATE:	MAY 19, 1993	FIG. NO:	9

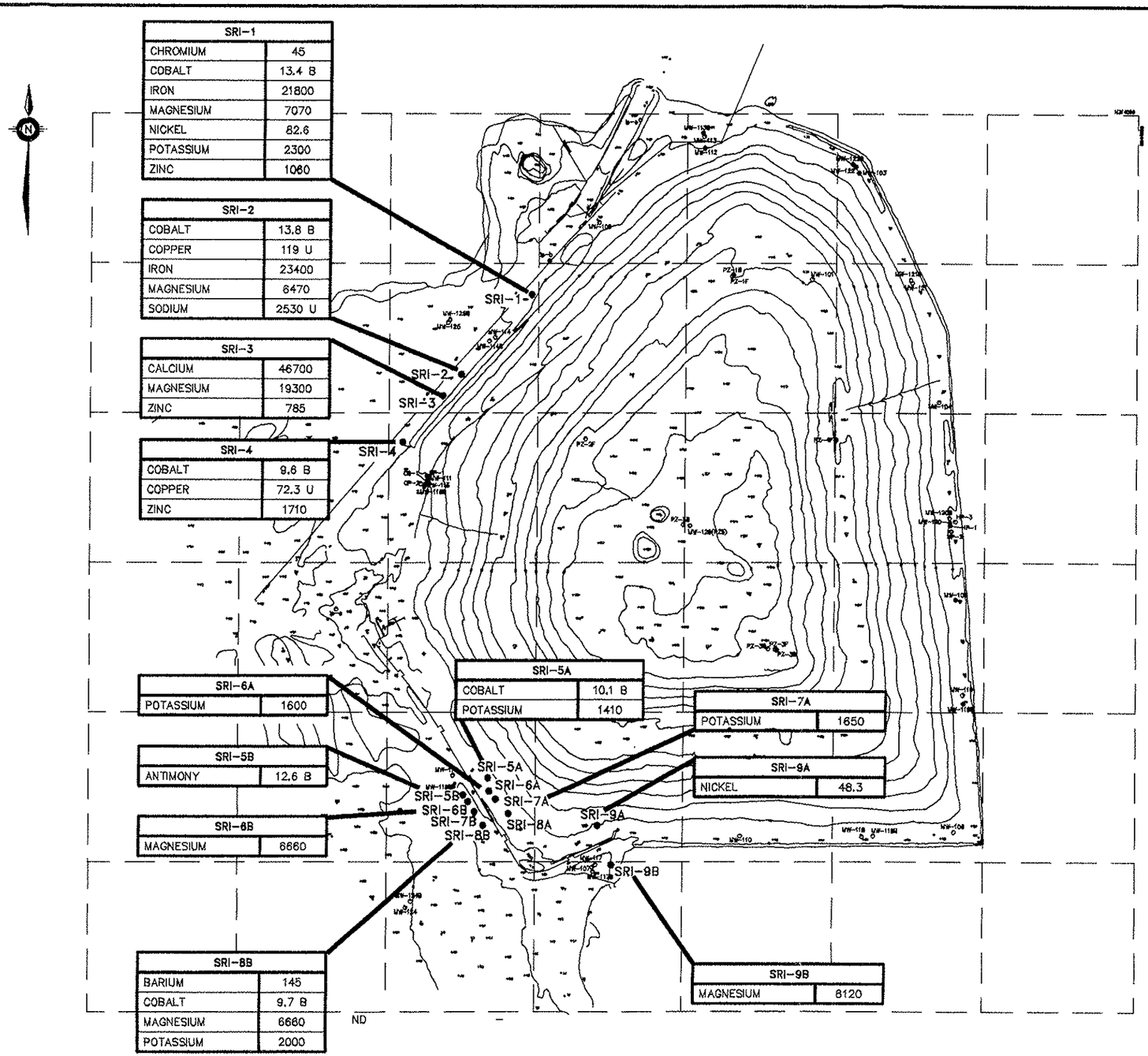


MAP SOURCE:
FLUSHING, N.Y. USGS QUADRANGLE MAP, 1979.

BACKGROUND ANALYTICAL RESULTS
PESTICIDE/PCB's
PELHAM BAY LANDFILL
BRONX, NEW YORK

WOODWARD – CLYDE CONSULTANTS, INC.
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
NEW YORK, NEW YORK

DR. BY:	KJF	SCALE:	AS SHOWN	PROJ. NO.:	92C4087
CK'D BY:	DAJ	DATE:	MAY 19, 1993	FIG. NO:	10



SRI-1	
CHROMIUM	45
COBALT	13.4 B
IRON	21800
MAGNESIUM	7070
NICKEL	82.6
POTASSIUM	2300
ZINC	1060

SRI-2	
COBALT	13.8 B
COPPER	119 U
IRON	23400
MAGNESIUM	6470
SODIUM	2530 U

SRI-3	
CALCIUM	46700
MAGNESIUM	19300
ZINC	785

SRI-4	
COBALT	9.6 B
COPPER	72.3 U
ZINC	1710

SRI-5A	
COBALT	10.1 B
POTASSIUM	1410

SRI-6A	
POTASSIUM	1600

SRI-5B	
ANTIMONY	12.6 B

SRI-6B	
MAGNESIUM	6660

SRI-7A	
POTASSIUM	1650

SRI-9A	
NICKEL	48.3

SRI-8B	
BARIUM	145
COBALT	9.7 B
MAGNESIUM	6660
POTASSIUM	2000

SRI-9B	
MAGNESIUM	8120

LEGEND

● SRI-1 APPROXIMATE LOCATION OF SOIL SAMPLE

NOTES:

1. UNITS ARE mg/kg.
2. ON SITE SAMPLES: SRI-5A THROUGH SRI-9A.
3. OFF SITE SAMPLES: SRI-1 THROUGH SRI-4, SRI-5B THROUGH SRI-9B.
4. COORDINATES AND BEARINGS IN BRONX HIGHWAY DATUM.
5. ELEVATIONS ABOVE BRONX DATUM = 2.608 FEET ABOVE MEAN SEA LEVEL.
6. CONTOUR INTERVAL = 40 FEET.
7. ONLY VALUES >200 ppm WERE REPORTED FOR LEAD.
8. B= REPORTED VALUE IS ACCEPTABLE (REPORTED VALUE LESS THAN THE CRDL (CONTRACT REQUIRED DETECTION LIMIT) BUT GREATER THAN THE IDL (INSTRUMENT DETECTION LIMIT).
9. ONLY SAMPLE CONCENTRATIONS CONCENTRATIONS WHICH EXCEED THE MAXIMUM REFERENCE CONCENTRATIONS FROM THE BACKGROUND SOIL SAMPLES.
10. U= COMPOUND DETECTED IN FIELD BLANK.

MAP SOURCE:

GABRIEL E. SENIOR, P.C.
SITE SURVEY, 1992
WCCI FIELD SURVEY 3/31/93.

0 200 400 800 FT
SCALE

SRI SHALLOW SOIL SAMPLING LOCATIONS SHOWING CONCENTRATIONS OF INORGANIC CONSTITUENTS PELHAM BAY LANDFILL BRONX, NEW YORK

WOODWARD-CLYDE CONSULTANTS, INC.
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
NEW YORK, NEW YORK

DR.BY	MG	SCALE	AS SHOWN	PROJ.	92C4087
CK'D.BY	PGN	DATE	MAY 11 1993	FIG.NO.	11

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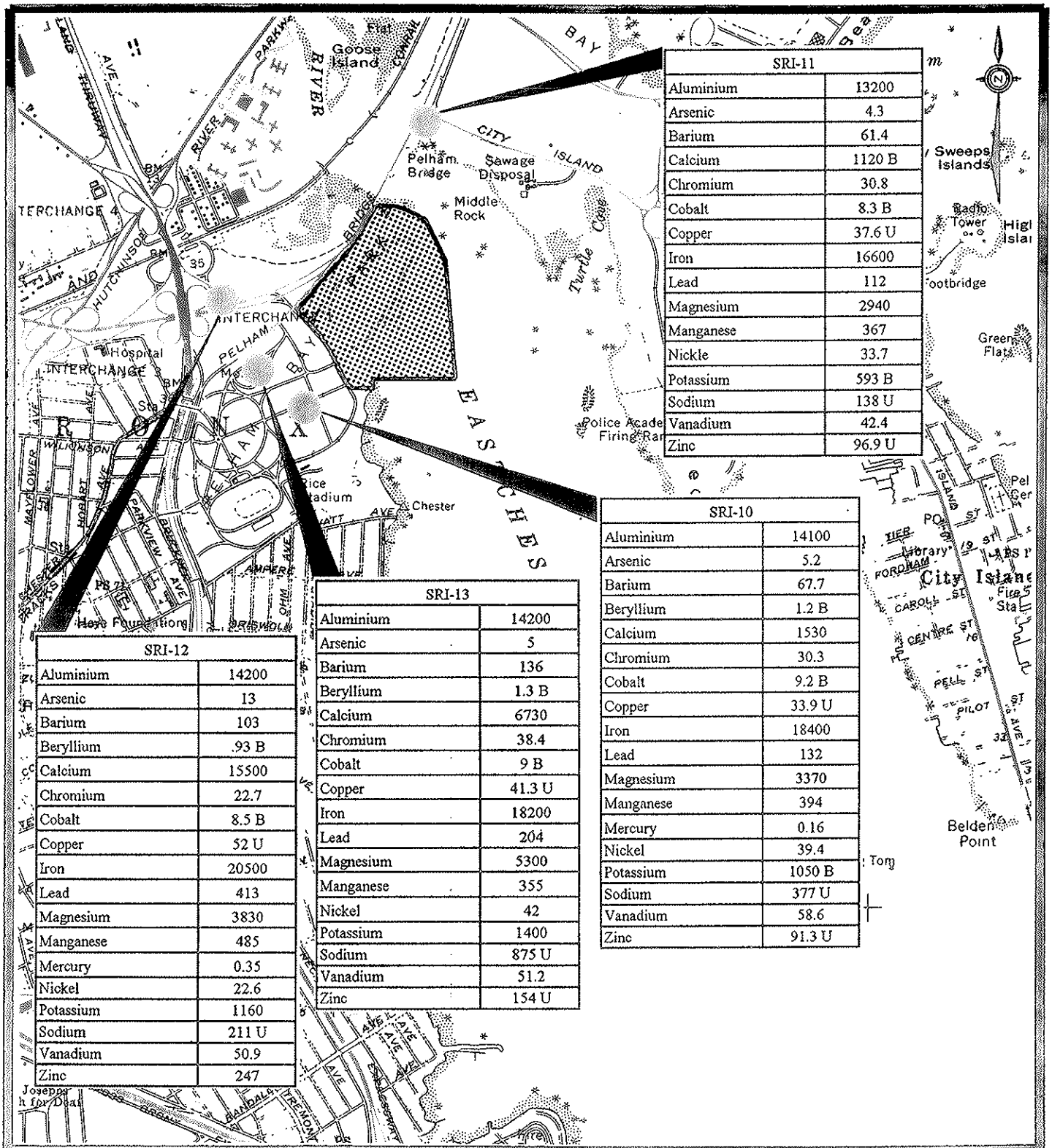

SRI-11	
Aluminium	13200
Arsenic	4.3
Barium	61.4
Calcium	1120 B
Chromium	30.8
Cobalt	8.3 B
Copper	37.6 U
Iron	16600
Lead	112
Magnesium	2940
Manganese	367
Nickle	33.7
Potassium	593 B
Sodium	138 U
Vanadium	42.4
Zinc	96.9 U

SRI-10	
Aluminium	14100
Arsenic	5.2
Barium	67.7
Beryllium	1.2 B
Calcium	1530
Chromium	30.3
Cobalt	9.2 B
Copper	33.9 U
Iron	18400
Lead	132
Magnesium	3370
Manganese	394
Mercury	0.16
Nickel	39.4
Potassium	1050 B
Sodium	377 U
Vanadium	58.6
Zinc	91.3 U

SRI-13	
Aluminium	14200
Arsenic	5
Barium	136
Beryllium	1.3 B
Calcium	6730
Chromium	38.4
Cobalt	9 B
Copper	41.3 U
Iron	18200
Lead	204
Magnesium	5300
Manganese	355
Nickel	42
Potassium	1400
Sodium	875 U
Vanadium	51.2
Zinc	154 U

SRI-12	
Aluminium	14200
Arsenic	13
Barium	103
Beryllium	.93 B
Calcium	15500
Chromium	22.7
Cobalt	8.5 B
Copper	52 U
Iron	20500
Lead	413
Magnesium	3830
Manganese	485
Mercury	0.35
Nickel	22.6
Potassium	1160
Sodium	211 U
Vanadium	50.9
Zinc	247

0 1000 2000 FT
SCALE

NOTE:
U = COMPOUND DETECTED IN FIELD BLANK.
B = REPORTED VALUE IS ACCEPTABLE [REPORTED VALUE LESS THAN THE CRDL (CONTRACT REQUIRED DETECTION LIMIT) BUT GREATER THAN THE IDL (INSTRUMENT DETECTION LIMIT)].

MAP SOURCE:
FLUSHING, N.Y. USGS QUADRANGLE MAP, 1979.

BACKGROUND ANALYTICAL RESULTS
INORGANIC COMPOUNDS
PELHAM BAY LANDFILL
BRONX, NEW YORK

WOODWARD–CLYDE CONSULTANTS, INC.
CONSULTING ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SCIENTISTS
NEW YORK, NEW YORK

DR. BY:	KJF	SCALE:	AS SHOWN	PROJ. NO.:	92C4087
CK'D BY:	DAJ	DATE:	MAY 19, 1993	FIG. NO:	12