ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES

PHASE II INVESTIGATION

Tow Path Road Landfill Site No. 546013
Town of Halfmoon Saratoga County

DATE: March 1993

Report

Prepared for:

New York State Department of Environmental Conservation

50 Wolf Road, Albany, New York 12233
Thomas C. Jorling, Commissioner

Division of Hazarous Waste Remediation
Michael J. O'Toole, Jr., P.E., *Director*

By:

Lawler, Matusky & Skelly Engineers

15 (12-75)

New York State Department of Environmental Conservation

MEMORANDUM

TO: Dan Steenberge
FROM: Dan Eaton
SUBJECT: Tow Path Road Landfill, #546013

DATE: March 17, 1993

Attached are two copies of the final report and one copy of the supporting documentation prepared for the referenced site.

We are planning an availability session with the public for April 7, 1993.

Call me if you have any questions.

ENGINEERING INVESTIGATIONS AT INACTIVE HAZARDOUS WASTE SITES IN THE STATE OF NEW YORK PHASE II INVESTIGATIONS

Tow Path Road Landfill Site
Town of Halfmoon, Saratoga County
NYSDEC I.D. No. 546013

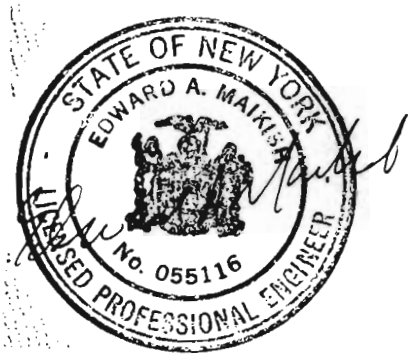
Report

Prepared for:

DIVISION OF HAZARDOUS WASTE REMEDIATION
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
50 Wolf Road
Albany, New York 12233-7010



LMSE-93/0141&576/067



Prepared by:

LAWLER, MATUSKY & SKELLY ENGINEERS
Environmental Science & Engineering Consultants
One Blue Hill Plaza
Pearl River, New York 10965

March 1993

TABLE OF CONTENTS

	Page No.
LIST OF FIGURES	iv
LIST OF TABLES	v
LIST OF PHOTOS	vi
1 EXECUTIVE SUMMARY	1-1
2 OBJECTIVES	2-1
3 DESCRIPTION OF PHASE II INVESTIGATION	3-1
3.1 Literature Review	3-1
3.2 Site Reconnaissance	3-1
3.3 Geophysics Survey	3-2
3.4 Test Trenches (November 1991)	3-4
3.4.1 Test Trench 1 (OHT-1)	3-5
3.4.2 Test Trench 2 (OHT-2)	3-6
3.4.3 Test Trench 3 (OHT-3)	3-6
3.4.4 Test Trench 4 (OHT-4)	3-7
3.4.5 Test Trench 5 (OHT-5)	3-8
3.4.6 Test Trench 6 (OHT-6)	3-8
3.4.7 Test Trench 7 (OHT-7)	3-9
3.4.8 Test Trench 8 (OHT-8)	3-9
3.4.9 Test Trench 9 (OHT-9)	3-10
3.5 Soil Gas Survey	3-11
3.5.1 Soil Gas Results	3-12
3.6 Test Trenches (September 1992)	3-19
3.6.1 Test Trench 1B (OHT-1B)	3-20
3.6.2 Test Trench 2B (OHT-2B)	3-21
3.6.3 Test Trench 3B (OHT-3B)	3-21
3.6.4 Test Trench 4B (OHT-4B)	3-22
3.6.5 Test Trench 5B (OHT-5B)	3-22
3.6.6 Test Trench 6B (OHT-6B)	3-23
3.6.7 Test Trench 7B (OHT-7B)	3-23
3.6.8 Test Trench 8B (OHT-8B)	3-24
3.6.9 Test Trench 9B (OHT-9B)	3-25
3.6.10 Test Trench 10B (OHT-10B)	3-26
3.6.11 Test Trench 11B (OHT-11B)	3-26

TABLE OF CONTENTS
(*Continued*)

	Page No.
3.6.12 Test Trench 12B (OHT-12B)	3-27
3.6.13 Test Trench 13B (OHT-13B)	3-27
3.6.14 Test Trench 14B (OHT-14B)	3-28
3.6.15 Test Trench 15B (OHT-15B)	3-29
3.6.16 Test Trench 16B (OHT-16B)	3-30
3.7 Sampling	3-30
3.7.1 Surface Water and Sediment Sampling	3-31
3.7.2 Leachate Sampling	3-32
3.8 Air Monitoring	3-32
4 SITE ASSESSMENT	4-1
4.1 Site History	4-1
4.2 Site Topography	4-5
4.3 Geology	4-6
4.3.1 Bedrock	4-6
4.3.2 Unconsolidated Deposits	4-7
4.4 Hydrogeology	4-8
4.5 Other Data	4-12
4.5.1 Residential Well Data	4-12
4.5.2 Surface Water and Sediment Data	4-14
4.5.3 Leachate Data	4-16
4.5.4 Soil Data	4-17
4.6 Phase II Results	4-18
4.6.1 Site Inspection	4-18
4.6.2 Environmental Surroundings	4-18
4.6.3 Waste Sample Data (November 1991)	4-19
4.6.4 Surface Water and Sediment Data	4-24
4.6.5 Leachate Data	4-32
4.6.6 Soil Sample Data	4-34
4.6.7 Waste Sample Data (September 1992)	4-35
4.6.8 Soil Gas Water Data	4-46

TABLE OF CONTENTS
(Continued)

	Page No.
4.7 Conclusions	4-47
4.7.1 Waste	4-47
4.7.2 Surface Water and Sediment	4-53
4.7.3 Leachate	4-55
4.7.4 Soil Gas	4-55
4.7.5 Soil Samples	4-56
4.7.6 Soil Gas Water Data	4-57
4.7.7 Summary of Conclusions	4-57
4.8 Recommendations	4-59
REFERENCES CITED	R-1
LIST OF SUPPORTING DOCUMENTATION	R-5
APPENDICES	
A - 1991 and 1992 Test Trench Logs	
B - Data Usability Summary	
C - Pertinent Files or Records	

LIST OF FIGURES

Figure No.	Title	Following Page
1-1	Site Location	1-1
1-2A-K	Site Features	1-1
3-1A-J	Soil Gas Point Locations	3-11
3-2	Typical Soil Gas Point	3-12
3-3A-J	Delineation Areas of Soil Gas Results	3-13
3-4	Statistical Analysis of Soil Gas Data	3-18
4-1A-K	Waste, Leachate, Surface Water and Sediment Contaminant Concentrations	4-1
4-2	Bedrock Geology Map	4-7
4-3	Surficial Geology Map	4-8
4-4	Site Cross Section	4-10
4-5	Number of Samples Required to Detect Difference	4-61

LIST OF TABLES

Table No.	Title	Page No.
3-1	Soil Gas Data Summary (August 1992)	3-13A1
3-2	Distribution of Aromatic Compounds in Soil Gas	3-13B1
3-3	Selection of Test Trench Locations	3-20A
3-4	Surface Water and Leachate Chemistry	3-31A
4-1	Existing Residential Well Samples Data Summary	4-12A1
4-2	Existing Surface Water Samples Data Summary	4-12B1
4-3	Existing Sediment Samples Data Summary	4-12C1
4-4	Leachate Sample Data Summary (May 1980)	4-12D
4-5	Existing Soil Samples Data Summary	4-12E1
4-6	Waste Samples Data Summary (November 1991)	4-19A1
4-7	Surface Water Samples Data Summary (November 1991)	4-24A1
4-8	Sediment Samples Data Summary (November 1991)	4-24B1
4-9	NYSDOH Surface Water Samples Data Summary (November 1991)	4-281A
4-10	Leachate Samples Data Summary (November 1991)	4-32A1
4-11	Soil Data Summary (August 1992)	4-34A
4-12	Waste Samples Data Summary (September 1992)	4-35A1
4-13	Water From Soil Gas Points Data Summary (August 1992)	4-46A1

LIST OF PHOTOS

Photo No.	Title	Following Page
1	Looking east at eastern end of landfill.	1-1
2	Uprooted tree showing debris.	1-1
3	Looking east; fill is to right of road. Taken at junction of Whites Lane.	1-1
4	Looking west; fill is on right side of road. Road has crossed over to other side of fill.	1-1
5	Bay area, looking south toward peninsula.	1-1
6	Looking north toward fill area.	1-1
7	Looking east. Clam Steam Tavern on left. Fill crosses to left of road east of tavern.	1-1
8	Looking west; double poles mark western end of fill	1-1

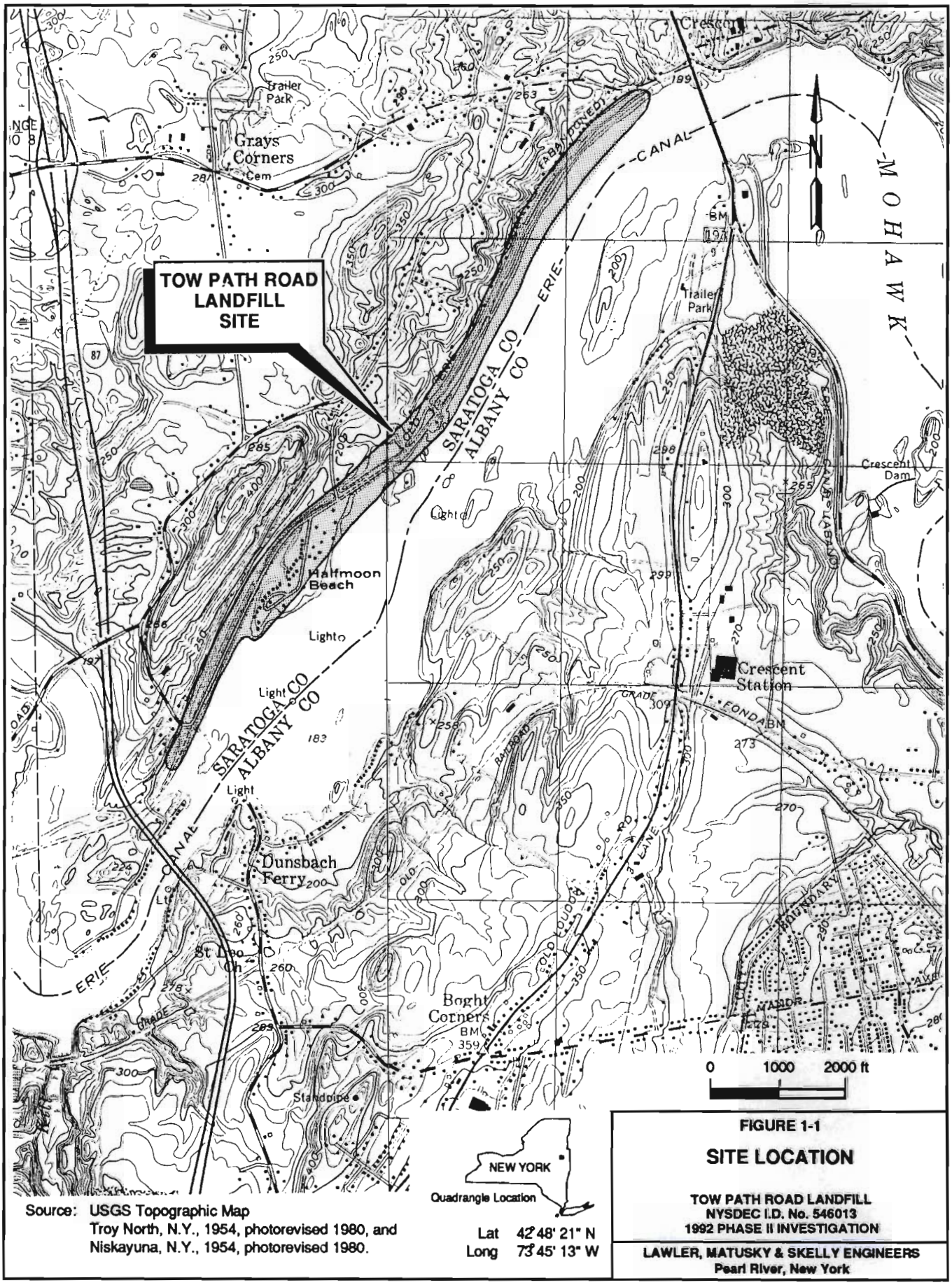
CHAPTER 1

EXECUTIVE SUMMARY

The Tow Path Road Landfill site (formerly known as the Old Halfmoon Landfill) is located in the Town of Halfmoon on Tow Path Road in Saratoga County (Figure 1-1). The site is part of the old Erie Canal, 2.5 miles of which was used as a landfill in the 1960s. The property is owned primarily by the Town of Halfmoon; however, several properties adjacent to the old canal property contain portions of the landfill. General landmarks near the site include the Mohawk River to the south, Route 9 to the east, and the Northway Twin Bridges to the west.

The history of the landfill involved several different operators. The Town of Halfmoon contracted Aetna Corporation from 1962 to 1967 and Chiarello Landfill and Disposal from 1967 to 1968. Various contributors reportedly sent waste to the landfill, including the cities of Troy, Cohoes, Watervliet, and Schenectady; the Village of Green Island; the towns of Waterford, Colonie, North and East Greenbush, and Halfmoon; and several industries, including Behr Manning Company.

In 1991 the New York State Department of Environmental Conservation (NYSDEC) contracted with Lawler, Matusky & Skelly Engineers (LMS) to perform a Phase II investigation of the Tow Path Road Landfill site. The work plan developed by NYSDEC required the completion of three tasks: literature search/data compilation, site reconnaissance/air monitoring, and site investigation. The site investigation portion included a magnetometer survey of the site, excavation of test trenches and sampling of the wastes from the trenches, and sampling of the surface water and sediments in the Mohawk River and the leachate from the landfill. Based on the findings, additional work consisting of a soil gas survey of the site, excavation of additional test trenches, and sampling of the wastes from the trenches was implemented. Figures 1-2A through 1-2K show the pertinent physical features of the site and the Phase II sampling locations.



Source: USGS Topographic Map
Troy North, N.Y., 1954, photorevised 1980, and
Niskayuna, N.Y., 1954, photorevised 1980.

Lat 42° 48' 21" N
Long 73° 45' 13" W

FIGURE 1-1

SITE LOCATION

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York



Photo 1. Looking east at eastern end of landfill.



Photo 2. Uprooted tree showing debris.



Photo 3. Looking east; fill is to right of road. Taken at junction of Whites Lane.



Photo 4. Looking west; fill is on right side of road. Road has crossed over to other side of fill.



Photo 5. Bay area, looking south toward peninsula.



Photo 6. Looking north toward fill area.



Photo 7. Looking east; Clam Steam Tavern on left. Fill crosses to left of road east of tavern.



Photo 8. Looking west; double poles mark western end of fill.

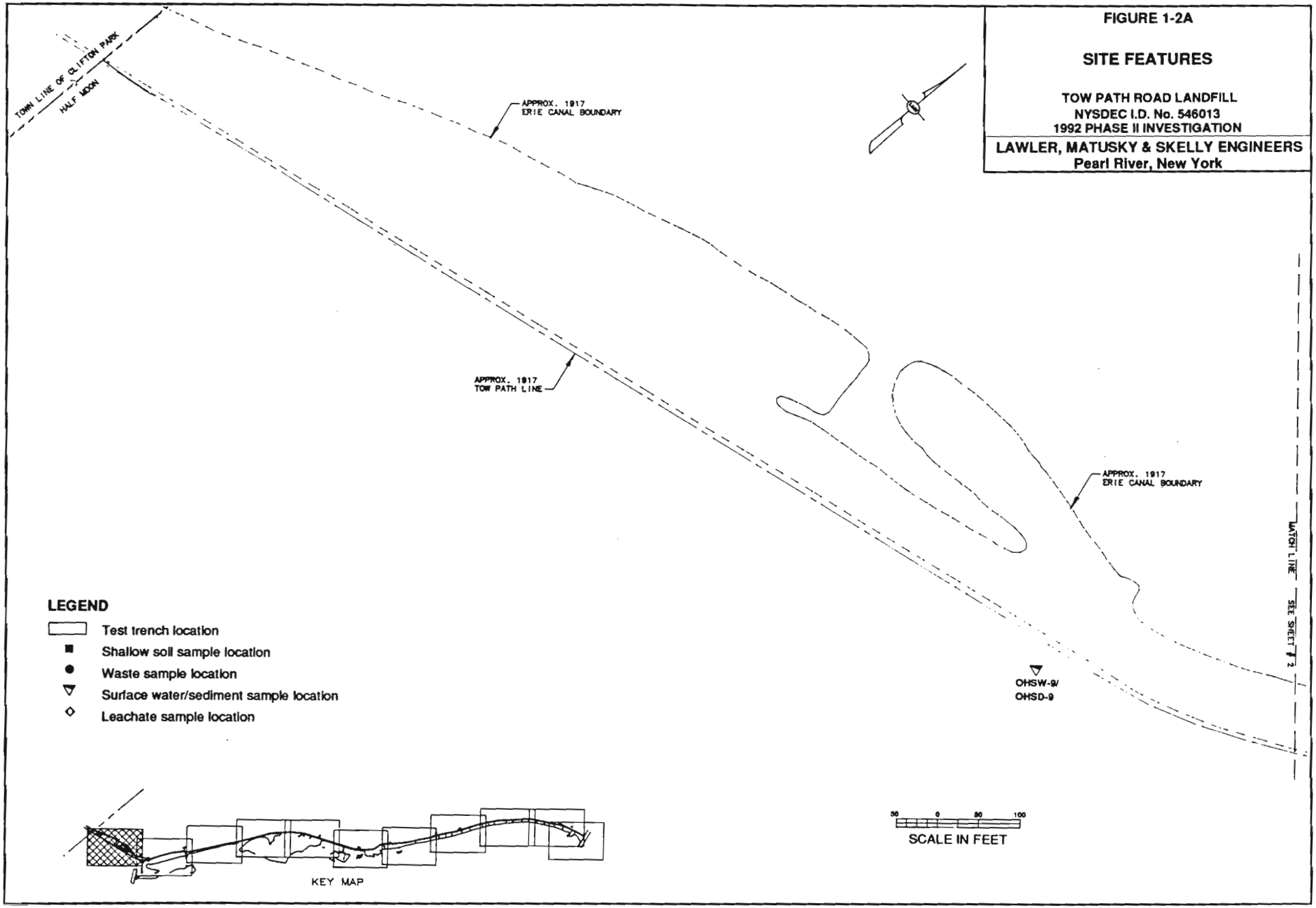


FIGURE 1-2A

SITE FEATURES

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

FIGURE 1-2B

SITE FEATURES

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

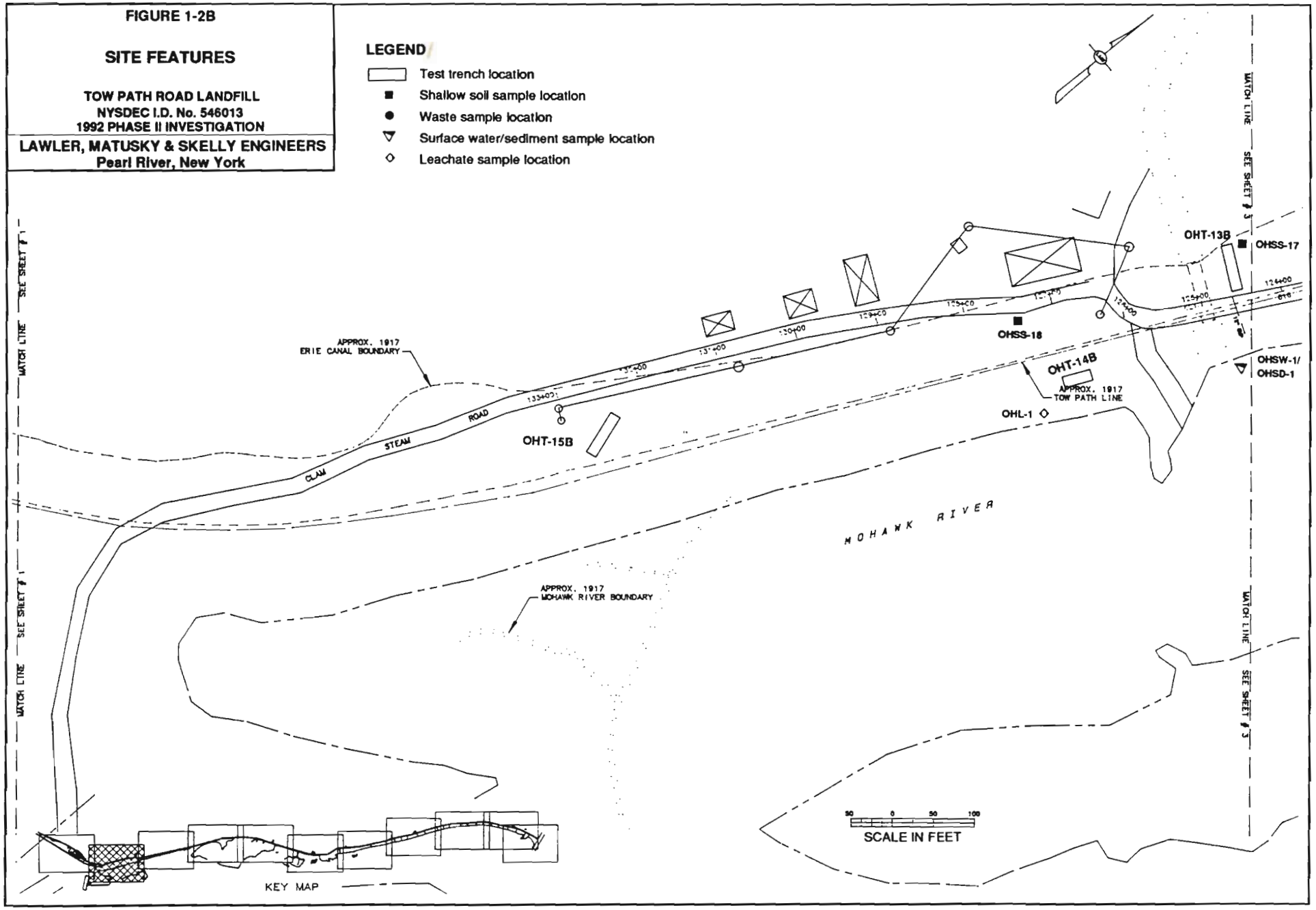


FIGURE 1-2C

SITE FEATURES

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

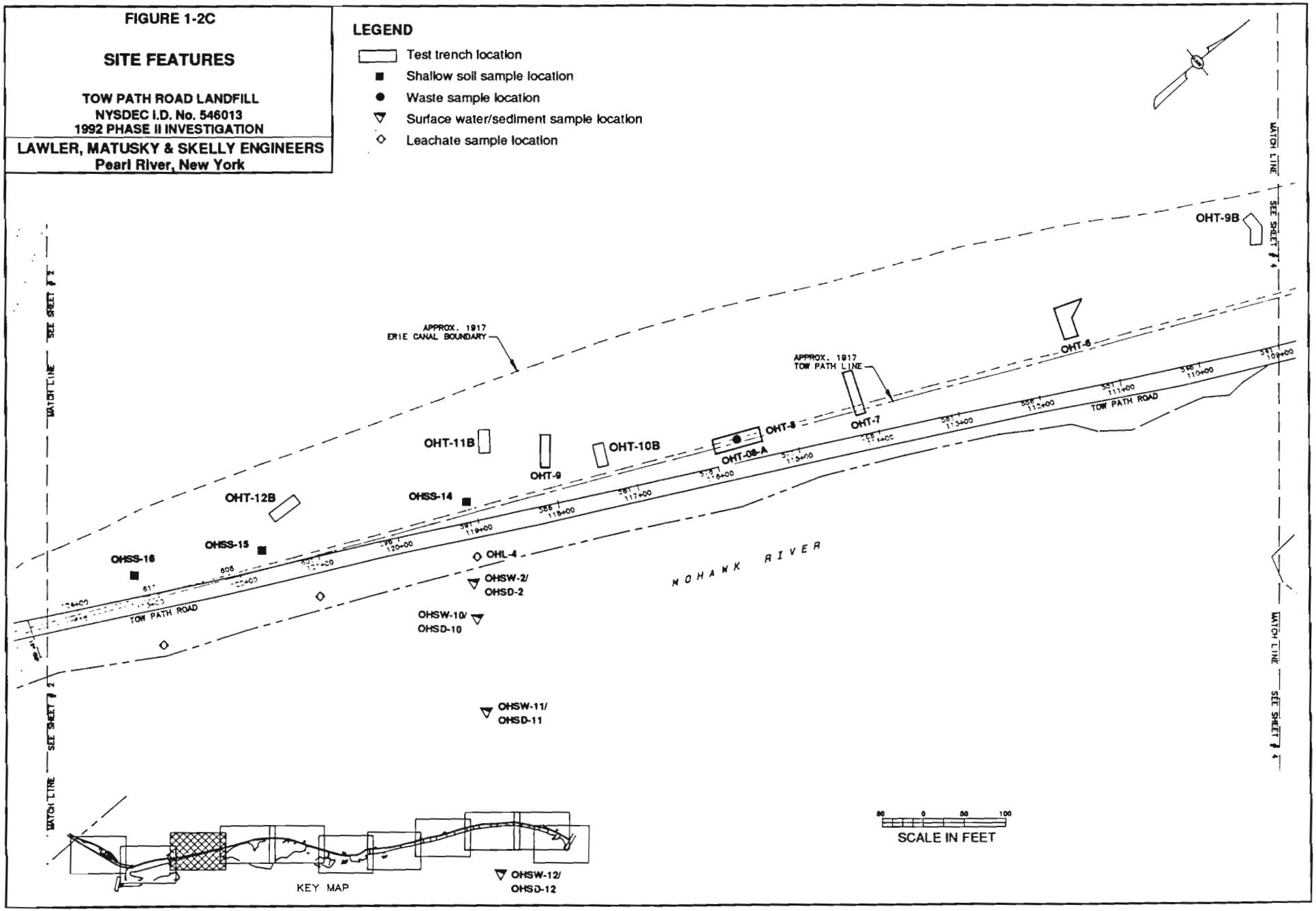
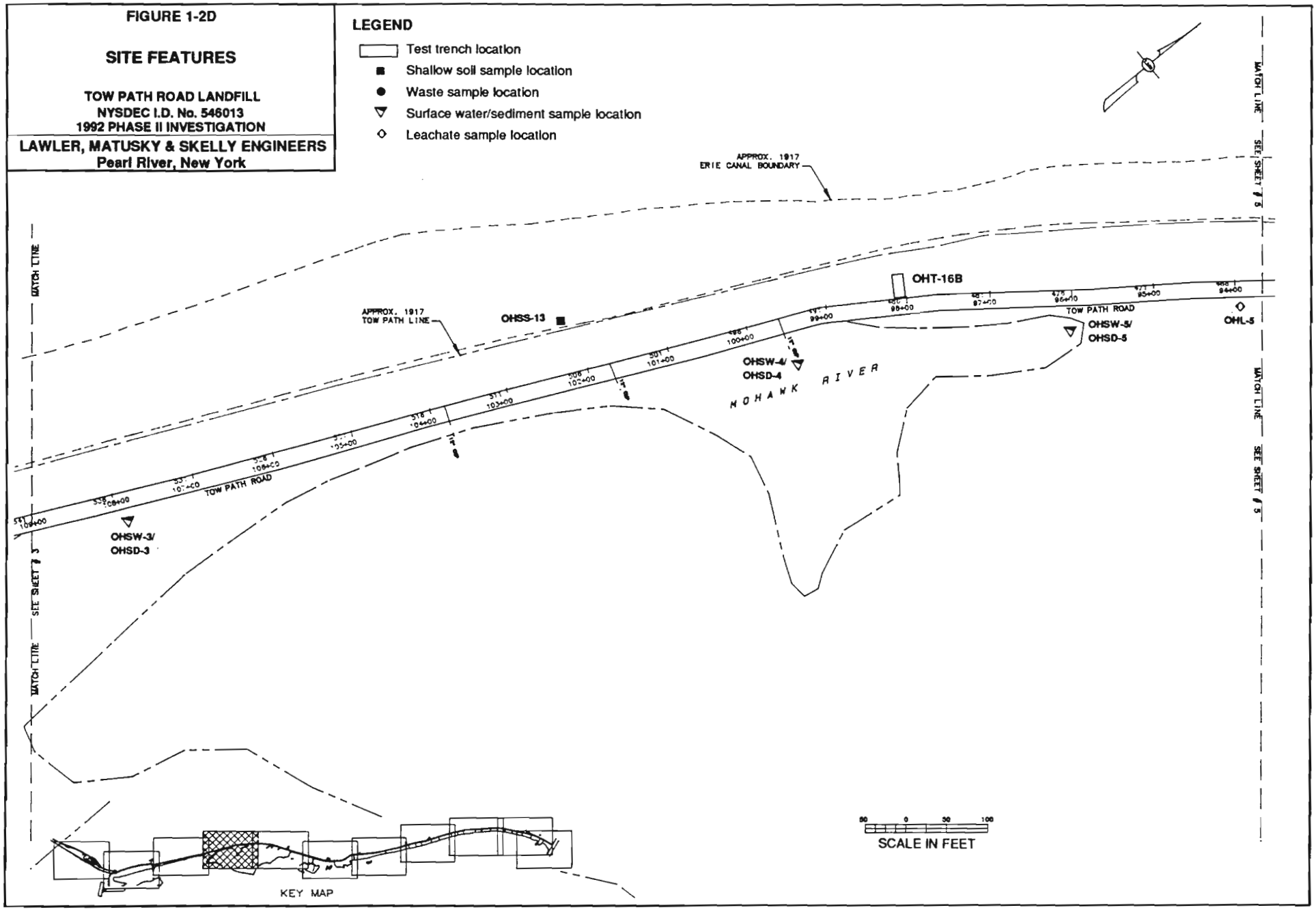


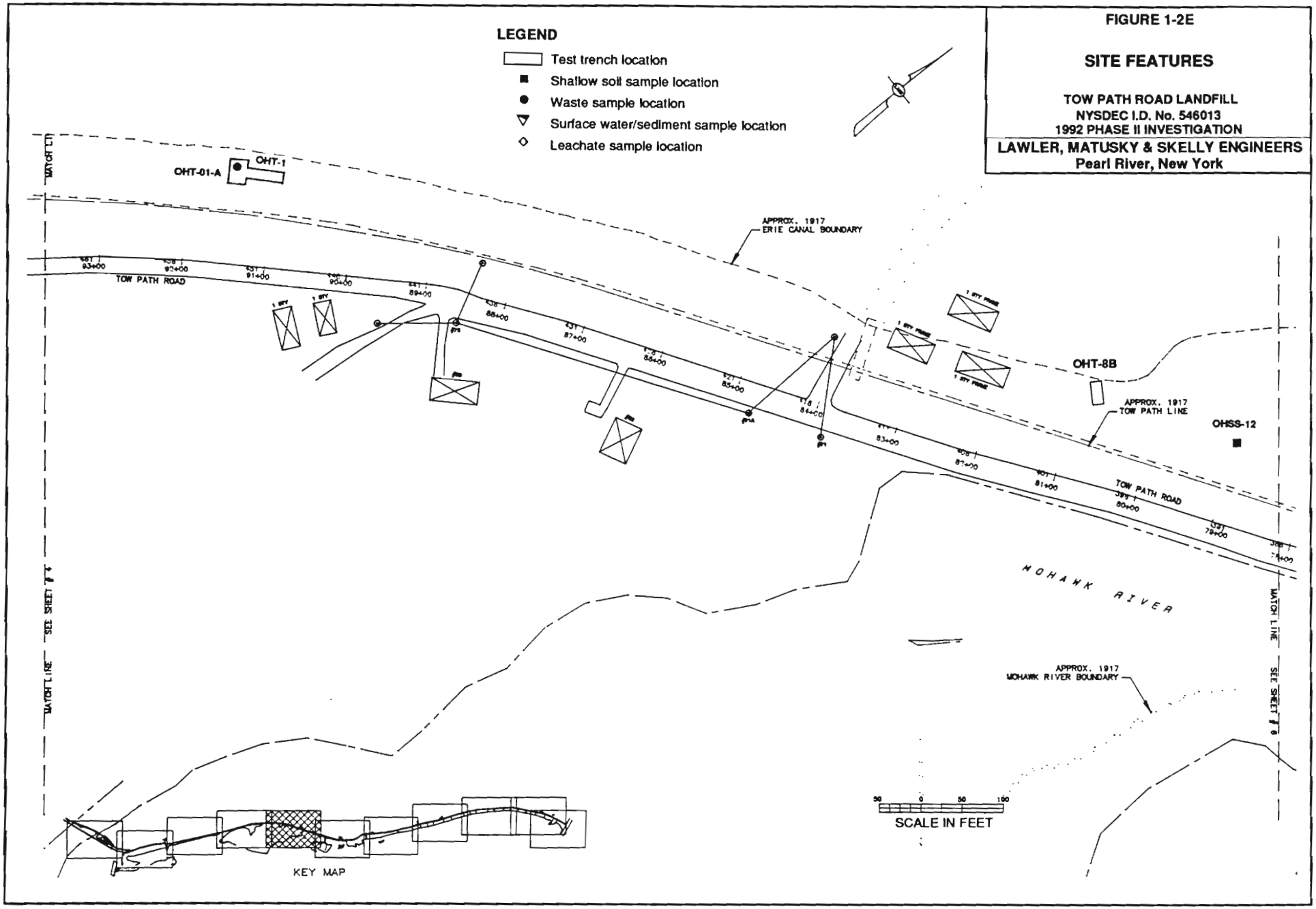
FIGURE 1-2D

SITE FEATURES

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York




LEGEND
Test trench location
Shallow soil sample location
Waste sample location
Surface water/sediment sample location
Leachate sample location
FIGURE 1-2E
SITE FEATURES
TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION
LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York
OHT-01-A
OHT-1
APPROX. 1917
ERIE CANAL BOUNDARY
TOW PATH ROAD
OHT-8B
APPROX. 1917
TOW PATH LINE
OHSS-12
MOHAWK RIVER
APPROX. 1917
MOHAWK RIVER BOUNDARY
MATCH LINE
SEE SHEET
SCALE IN FEET
KEY MAP

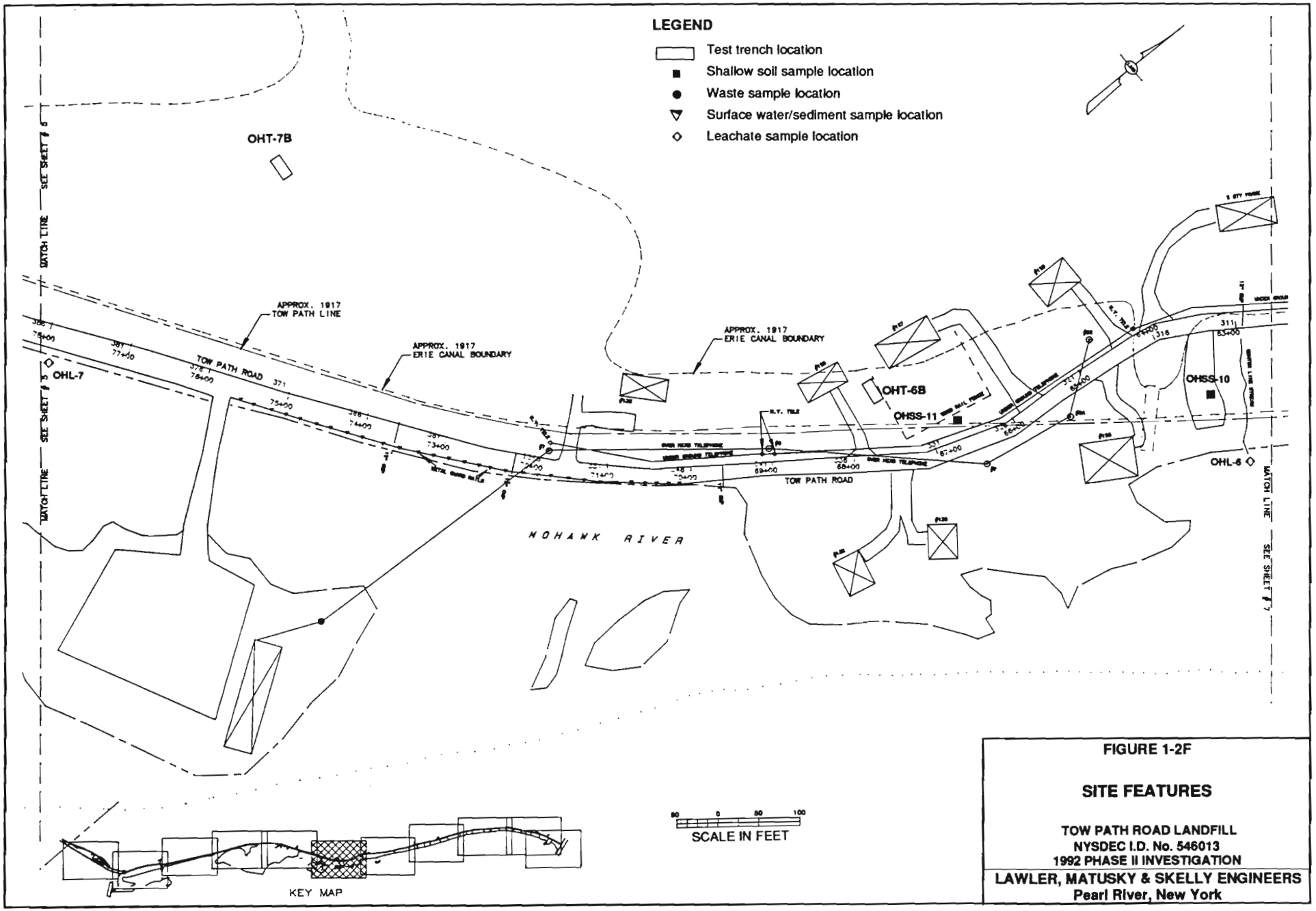


FIGURE 1-2F

SITE FEATURES

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

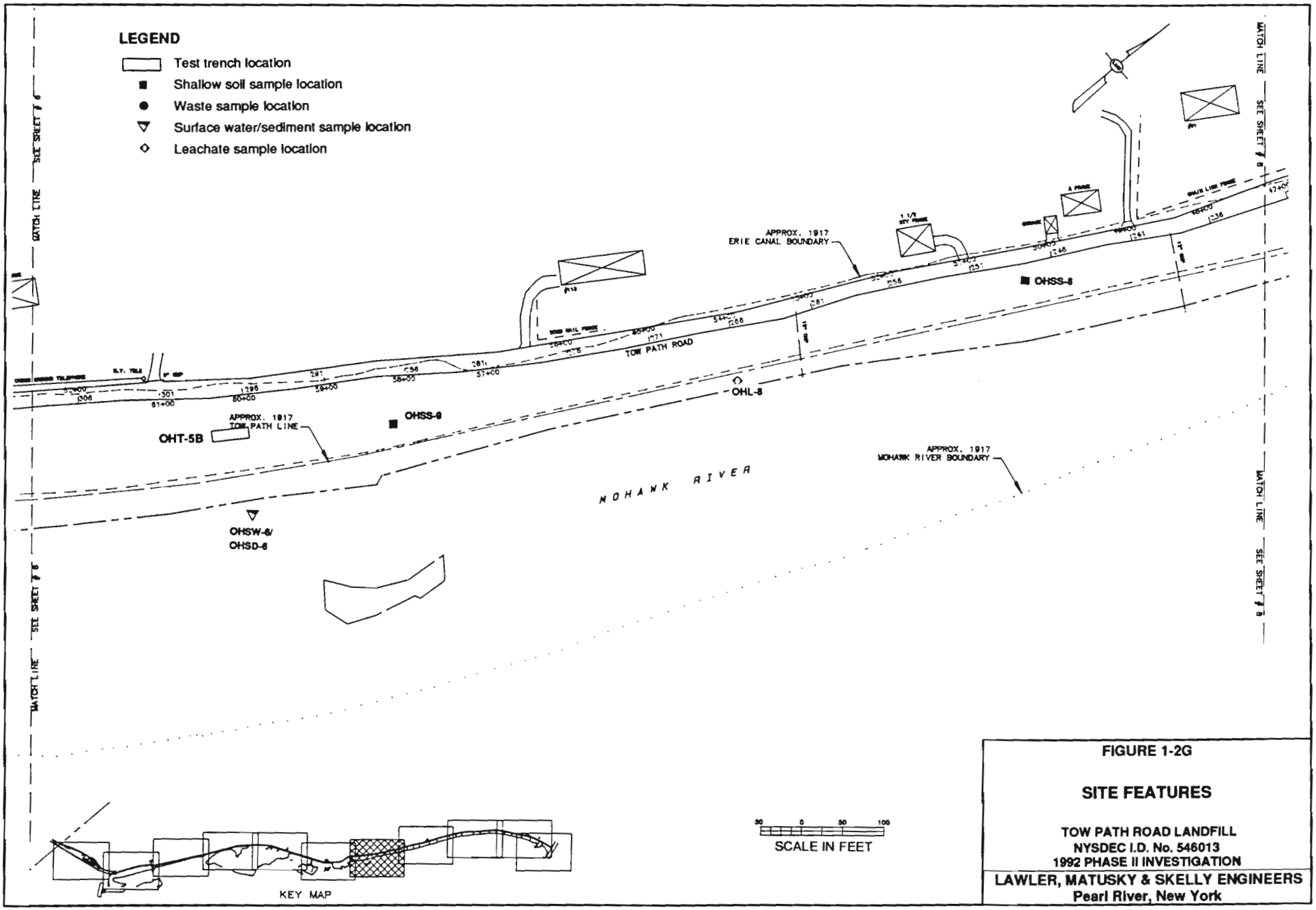


FIGURE 1-2G

SITE FEATURES

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

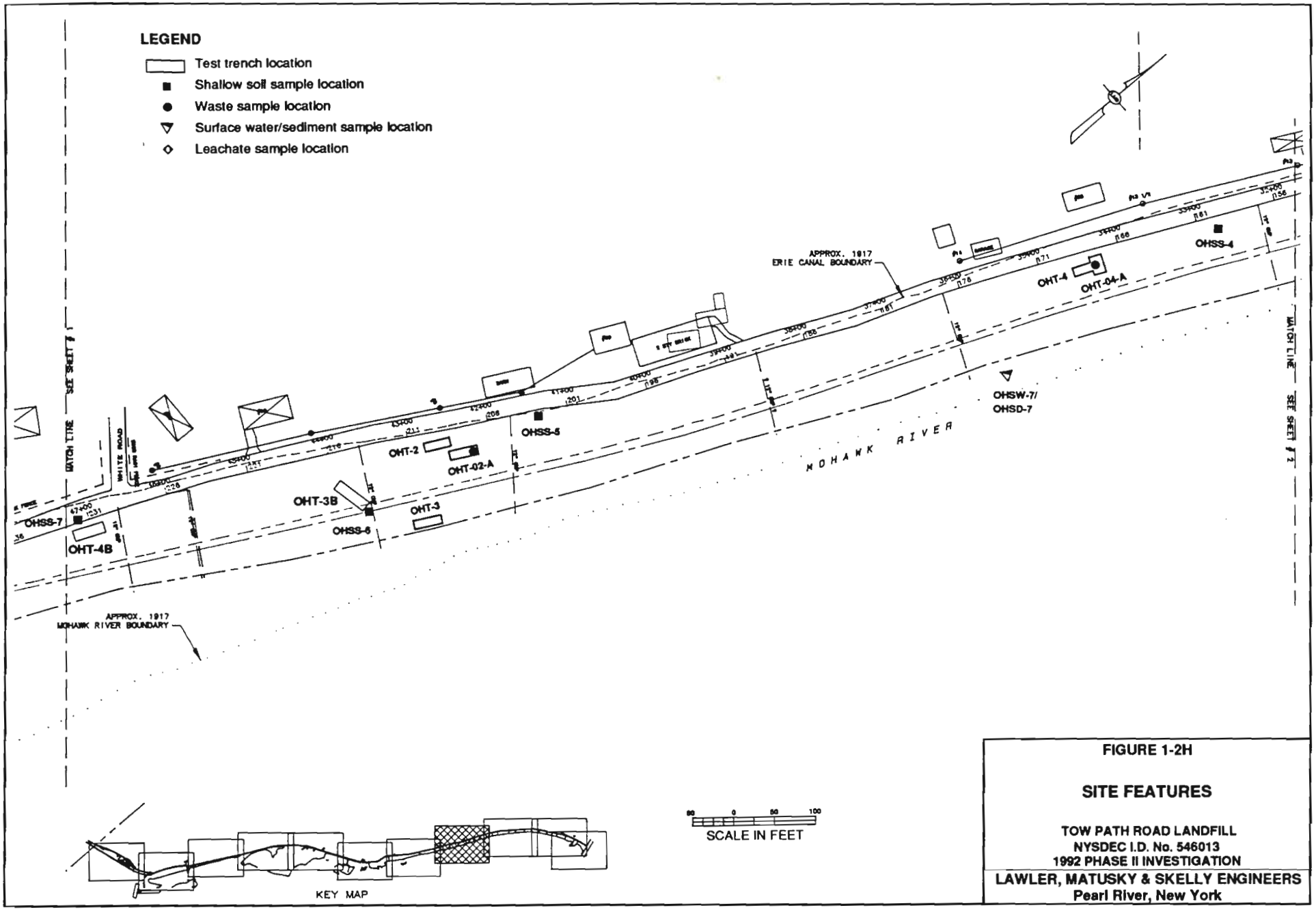


FIGURE 1-2H

SITE FEATURES

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

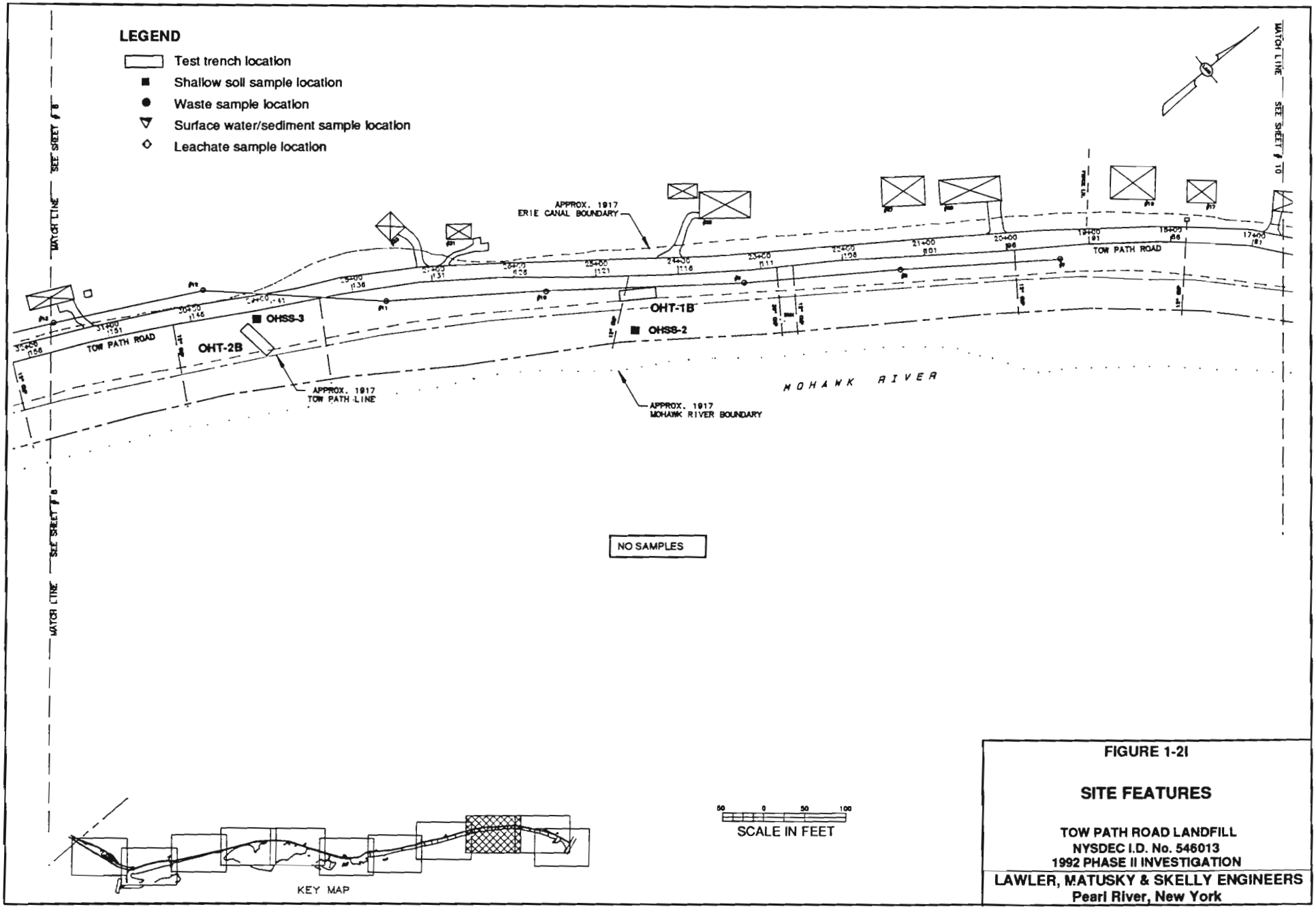


FIGURE 1-2I

SITE FEATURES

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

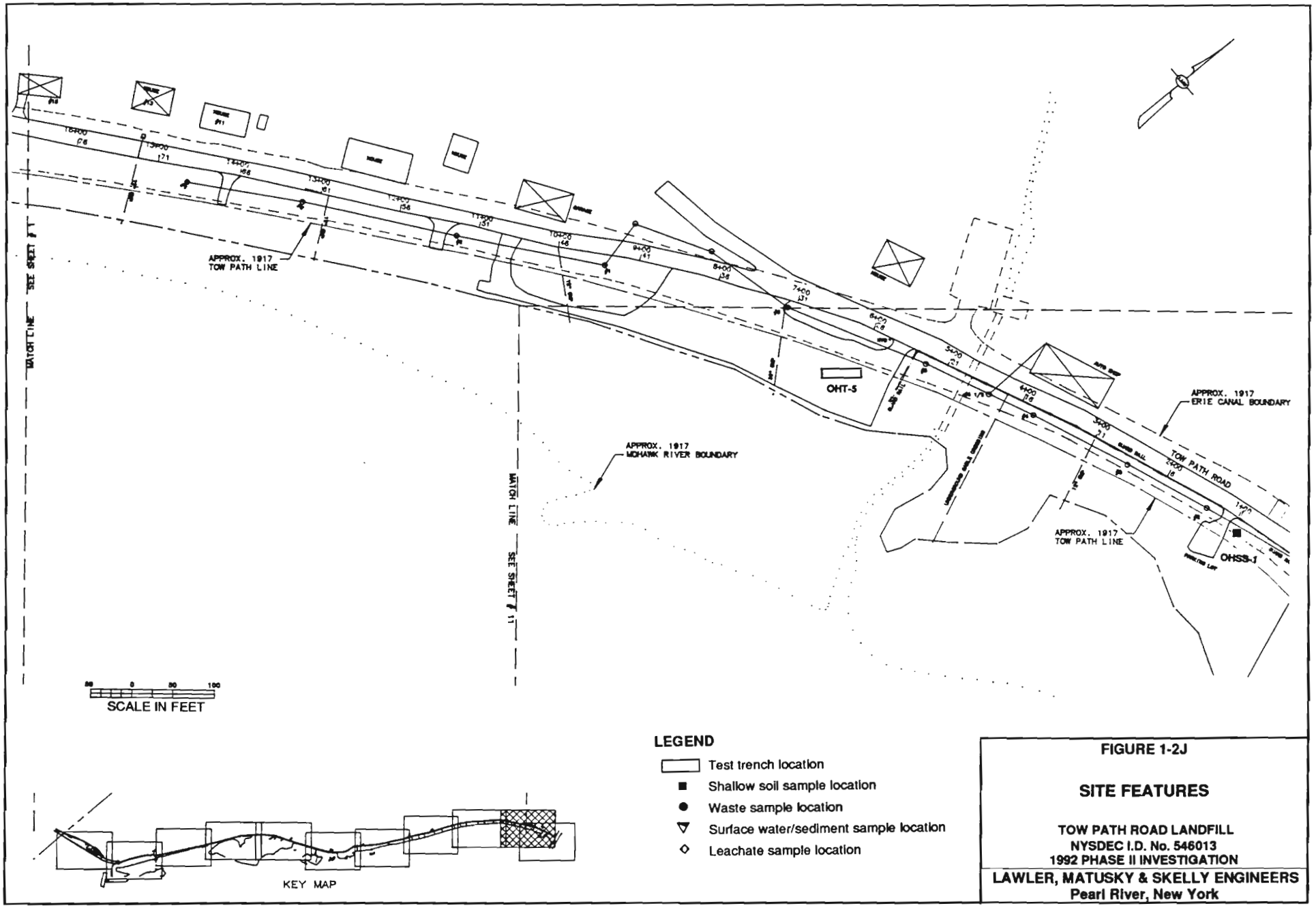


FIGURE 1-2J

SITE FEATURES

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

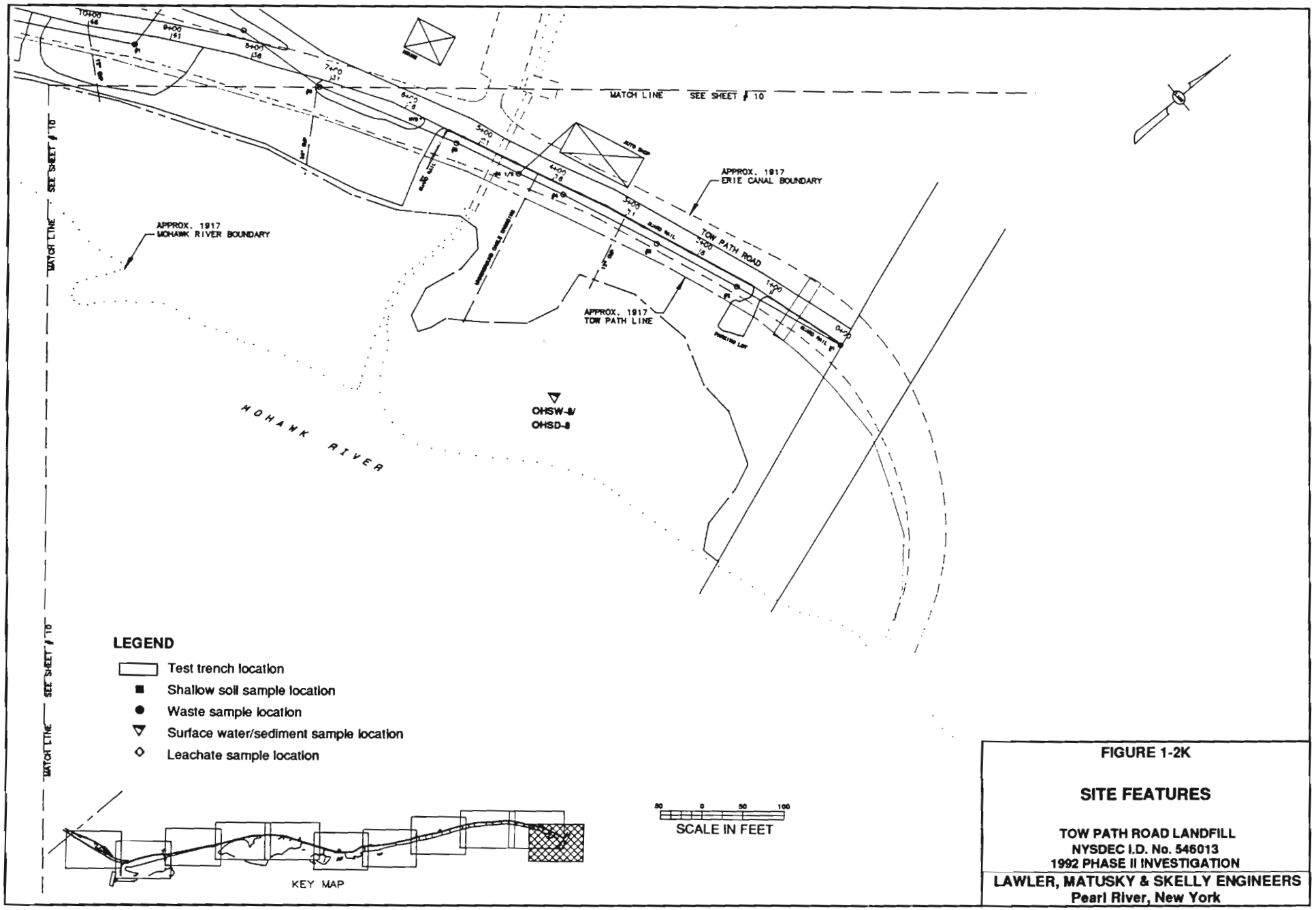


FIGURE 1-2K

SITE FEATURES

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

The sampling program found evidence of the disposal of nonmunicipal waste in the landfill. During the test trench operations four drums were found with hazardous waste in them or around them. One labeled as a General Electric drum contained waste high in toluene. No labeling was found on the other three drums, one of which contained a blue, paint-like waste. The other two drums contained a glue-like waste with high levels of toluene. Some of the other chemicals found in the waste included polychlorinated biphenyls (PCBs), benzene, chlorobenzene, lead, and mercury. The highest level of PCBs found on-site was lower than the concentration defined as a hazardous waste by NYSDEC. Samples from two of the drums tested using the toxicity characteristic leaching procedure (TCLP) were characterized as hazardous waste because they had levels exceeding U.S. Environmental Protection Agency (EPA) standards for lead and benzene.

The river water data indicated some violations of the surface water quality standards (Class A), primarily for aluminum, iron, manganese, mercury, and zinc. The sediments had elevated concentrations of the same metals. PCBs were detected at levels above the standard in several surface water samples collected by LMS and analyzed by the New York State Department of Health (NYSDOH) Wadsworth laboratory. Samples taken from the quiet sections of the stream bank tended to have higher concentrations of any contaminants than those in the faster-flowing sections. (The PCBs and mercury in the landfill are a possible source of the PCBs and mercury in the surface water or sediments.)

Eight leachate samples collected and analyzed during the Phase II investigation indicated high levels of iron and manganese but little organic contamination. The results indicate that the leachate is similar in composition to typical municipal landfill leachate.

A soil gas survey conducted over the entire site indicates that there are aromatic hydrocarbons and chlorinated solvents in the soil vapors in the landfill. Water samples taken from within the canal during the survey showed violations of the groundwater standard for aromatic hydrocarbons at several locations.

During this investigation NYSDOH sampled a number of residential water wells along the length of the site. There were no hazardous wastes in any of the samples tested. One private

well was found to be contaminated with fuel oil constituents resulting from a spill. This residence was provided with a carbon filter system to correct the problem.

The results of this study verify that the Tow Path Road Landfill is a hazardous waste landfill as indicated by (1) observations of local residents and landfill employees attesting to the fact that drummed industrial wastes were disposed of in the landfill, (2) response to the questionnaire by the Norton Company, which indicated that hazardous waste may have been disposed of at the site, and (3) the finding of several drums containing hazardous waste in the fill.

Tests conducted to date of the landfill, leachate, river water, and the sediments do not conclusively establish whether the landfill is causing a significant adverse impact to the groundwater or river. This investigation did indicate that in several trenches the canal was relatively dry through its depth and in some cases the canal bottom was on bedrock with little or no confining layer of silt or clay. In many locations the walls of the canal have been breached with drainage pipes. These two pathways provide the potential for impact to the bedrock aquifer or the Mohawk River. Approximately 40 private water wells along Tow Path Road are believed to tap the bedrock aquifer. Another route of potential human exposure is from the contaminated soil vapors in the landfill.

The test data show only the potential for significant impact, but no definitive impact. Tests of the homeowner wells in the landfill area show no impact from hazardous waste, and the surface water and sediment data on the Mohawk River show only minor, localized impacts. Also, there is a lack of conclusive hydrogeological data that would signify direct connection of the contaminated water in the canal with the bedrock groundwater or river water. Sampling of the air inside the residences also has not been conducted.

Additional sampling and studies are recommended to determine the significance of any potential impacts of the hazardous wastes found in the landfill.

The additional investigations can be grouped into three tasks.

1. *Human exposure assessment* will determine the potential or actual impact of the landfill on the public health. The following studies are being undertaken by NYSDOH:

- An expanded water well survey in the area near the landfill. Sampling and full chemical analysis of well water is planned. After initial sampling, annual monitoring should be conducted as necessary.

- Sampling of the air inside residences located on the fill or close to the areas with elevated concentrations of volatile compounds found in the soil vapor.

2. *Hydrogeological studies* will determine the relative connection between the landfill and the river and/or the groundwater. LMS recommends the following hydrogeological studies:

- A groundwater investigation, with installation of paired (overburden and bedrock) wells upgradient and downgradient of the landfill, construction of piezometers in and out of the fill, and/or sampling by Shelby tube to determine whether a confining layer exists. Fracture trace analyses of the bedrock may be useful to determine potential pathways of canal water through the bedrock.

- A topographical survey of the site, including elevation of the water in the canal, river, and bedrock wells, which would provide a better understanding of the site hydrogeology.

- A groundwater probe sampling of the water in the canal to provide better understanding of the distribution and levels of contaminants in these waters.

- A full property survey of the landfill to determine the location of the landfill in relation to the property boundaries.

3. *Aquatic assessment* will determine whether the landfill is impacting the aquatic biota in the river. LMS recommends the following studies of the aquatic biota:

- A two-step biomonitoring investigation. The initial step requires a literature search to determine species inhabiting the Mohawk River and the concentration of PCBs and mercury in the river and sediments. The initial step also includes the collection of 10-15 samples of up to three species for PCB and mercury analysis to determine preliminary statistics. Samples would be collected from an upstream (background) station and from the bay area next to the landfill. Based on the initial investigation, additional samples may be collected to calculate statistics on the differences between the upstream (or background) population and the downstream population. If the final sampling is deemed necessary, surface water and sediment samples from both sample locations will be collected and analyzed for PCBs and mercury; these samples will be collected at the same time as the biota samples.

- A seasonal leachate sampling program should also be done to ascertain the year-round distribution of contaminants entering the Mohawk River.

In addition to these additional studies, LMS recommends installation of a fence around the southern portion of the fill to prevent further dumping and to prevent injury (slip/trip) to personnel from exposure to surface debris.

CHAPTER 2

OBJECTIVES

Lawler, Matusky & Skelly Engineers (LMS), under contract to the New York State Department of Environmental Conservation (NYSDEC), conducted a Phase II investigation of the Tow Path Road Landfill located in Saratoga County, New York. The investigation was targeted to address specific concerns regarding past waste disposal practices and to provide additional information on the site to determine whether hazardous waste was disposed of on and released from the site. Specific objectives of the Phase II investigation are to collect essential field information to:

- Confirm the presence of hazardous waste at the site.
- Adequately assess whether contamination has been released from the site.
- Determine whether there is a significant threat to the environment or public health.
- Prepare a final Hazard Ranking Score (HRS), if directed to do so by NYSDEC.
- Make recommendations for possible future actions at the site.

* * *

The Tow Path Road Landfill Phase II investigation is discussed in detail in Chapters 3 and 4. This report includes the following appendices:

A - Test Trench Logs

B - Data Usability Summary

C - Pertinent Files or Records

CHAPTER 3

DESCRIPTION OF PHASE II INVESTIGATION

3.1 LITERATURE REVIEW

LMS completed an extensive literature review of the Tow Path Road Landfill site in October 1991. Relevant files maintained by the NYSDEC office in Albany and NYSDOH files in Glens Falls were examined for site-related information. Old maps of the canal and other information of historical significance were reviewed at the Cultural Education Center of the University of the State of New York. A survey map of the original Erie Canal, known as Clinton's Ditch, and survey maps of the enlarged Erie Canal were obtained from the New York State Department of Transportation (NYSDOT) to define where the waste had been placed. The Phase I report prepared by Wehran Engineering was also reviewed; all existing data collected by previous investigators were obtained and summarized.

Before work on the site commenced, local utility companies were informed of the proposed test pit locations so that underground lines could be marked.

3.2 SITE RECONNAISSANCE

Before field activities were initiated, a site reconnaissance was conducted on 10 and 11 October 1991 to:

- Mark locations for the geophysics survey.
- Monitor air at the site to determine the level of personnel protection required during future activities.
- Clear brush and other obstacles from the designated path for the geophysics survey.
- Locate potential leachate seeps for sampling.

Air monitoring was conducted using an HNU photoionization detector (PID), an organic vapor analyzer (OVA) flame ionization detector (FID), a radiation meter (dosimeter), and an MSA combustible gas indicator (CGI). Measurements were taken at upwind and downwind locations in the breathing zone, 4 to 6 ft above the ground (Ref. 1). Plate 1 at the back of this report shows the orientation of site photos taken during the sampling program (Ref. 2).

Based on the information gathered during the site reconnaissance, LMS prepared a site-specific health and safety plan (HASP) to be followed by all personnel during activities on the site (Ref. 3).

3.3 GEOPHYSICS SURVEY

LMS conducted a geophysics survey on the site to determine locations of magnetic anomalies that might indicate the presence of buried drums. The NYSDEC-prepared work plan for the Phase II investigation of the Tow Path Road Landfill included a magnetometry survey (Ref. 4) over the entire length of the former landfill, encompassing the former enlarged Erie Canal between the Route 9 bridge and a location approximately 500 ft northeast of the twin Interstate 87 bridges. The site is over 2.5 miles long and between 60 and 150 ft wide.

During the initial site reconnaissance a NYSDEC representative pointed out the location and relative width of the canal bed. The magnetometry survey was designed to provide complete coverage of the site to outline both small and large anomalies. The survey was performed using standard data evaluation methods and geophysical instrumentation, e.g., a proton procession magnetometer. A magnetometer measures the intensity of the earth's magnetic field at a given location. Variations in this field may be caused by iron oxides and ferrous metal in the native soil or fill material or changes in the ionosphere. If the equipment registers background ionosphere magnetism, any changes to those measurements may indicate the presence of ferrous metal below the surface. This change in field strength is translated as a signal within the magnetometer. The difference between the background signal and the actual reading is proportional to the mass of the metallic object. The field measurement can be affected by several conditions. If the buried object is corroded, its ability to generate a

field will be affected. The orientation of the object in relation to the surface will dictate the direction of the strongest influence within its field. The depth of the object is one of the most influential factors regarding signal strength. Total field measurements vary by 1 over the distance cubed; thus, the field response will decrease by a factor of 8 if the distance of the object from the magnetometer is doubled. The induced and permanent magnetism of an object will interact, either adding to or subtracting from the anomaly (Ref. 5).

The survey was conducted using parallel transects spaced 20 ft apart, with stations along each transect at 15-ft intervals; 667 lines were required to cover the length of the site. Each line originated at the edge of Tow Path Road and extended to the edge of the Mohawk River or inland to the reported end of the canal bed. It was necessary to divide the site into three sections as Tow Path Road actually crossed over the former canal bed in two locations and then traveled for some distance on that side of the canal.

Initially, a general base map was made of the entire site using an aerial photograph of the area. Landmarks measured during the geophysics survey were used to complete the map. This map and a 1921 map of the original enlarged Erie Canal were input into a CAD system, one on top of the other. This produced a site map showing current conditions as well as the outline of the canal bed. Magnetometry data were processed to provide field-strength contour maps of the entire site (Ref. 4). Contour intervals were increased to show the largest anomalies, those likely to contain the highest concentration of metallic debris. The processed contour grid maps and scales were located correctly on the base map to indicate specific areas of interest. Cultural interferences, i.e., overhead power lines, transformers, underground drainage conduits, telephone lines, mailboxes, road signs, and parked vehicles, were eliminated to prevent misinterpretation of the data caused by false highs from these locations. Surface anomalies consisting of fill-related material were also shown; these included standing leachate and exposed metallic refuse (drums, tanks, tires, car bodies). During the actual data collection, measurements were made hourly at a fixed base station to record periods of unsettled magnetic activity that would affect the value of individual station measurements.

Once the fully reduced geophysical contour map was set on the base map and all cultural interferences were removed, the anomalies likely to represent buried metallic objects were

identified. The locations of 20 identified anomalies showed strong indications of the presence of buried ferrous metal. Ten of the 20 were listed as prime excavation locations. Following a meeting with NYSDEC representatives, five test pit locations, covering as much of the site as possible, were chosen for excavation.

3.4 TEST TRENCHES (November 1991)

The NYSDEC work scope stipulated a maximum of three days for the test trench effort; five trenches were to be excavated to a maximum depth of 20 ft or to groundwater, whichever was encountered first.

Sterling Environmental, Inc., of Buffalo, New York, was contracted to conduct the excavation under LMS supervision. During a meeting with NYSDEC representatives on 11 November 1991, LMS listed the 20 possible locations where excavations could encounter ferrous metallic debris, including drums. The discussion included information acquired during NYSDEC's canvassing of local residents, who reported that several anomalous areas contained mostly automobile tires and household appliances. During the meeting LMS identified the top 10 areas where excavations could be conducted.

LMS and Sterling Environmental mobilized on-site with excavation equipment on 12 November 1991. Initial excavations were performed where depth to groundwater was expected to be relatively shallow. A tire-mounted backhoe with an approximate 12-ft reach was used to excavate the shallower trenches. Trenching at locations more than 10 ft above the river elevation required the use of a larger backhoe. In these areas a track-mounted Komatsu PC 700 backhoe with a 20-ft reach was used. After the surrounding ground surface was cleared of trees, brush, and debris, the trench was excavated in 0.5-ft intervals. The excavated material and the trench were scanned with a Foxboro OVA 108, an HNU PID 101, an MSA CGI 361, an organic vapor monitor (OVM) PID, and a dosimeter. Figures 1-2A through 1-2K show the locations of the test trenches excavated on the site.

After each trench was completed, the material was backfilled into the hole; if necessary, clean cover material was used to grade the surface evenly. The bucket and arm of the backhoe was decontaminated using a steam cleaner before the next trench was excavated.

Level D personnel protection was used by the Sterling Environmental/LMS work team. For both the tire- and track-mounted machines, the operator was protected from splash and vapor exposure by a sealed glass enclosure. Level B self-contained breathing apparatus (SCBA) was available on-site in the event that sustained unknown volatile organic or inorganic vapors were encountered. Appendix A contains the logs for the test trenches (Ref. 6).

3.4.1 **Test Trench 1 (OHT-1)**

Excavation of the first trench, OHT-1, began on 12 November 1991 at line 450 (Figure 1-2E), approximately 50 ft in from the edge of the paved roadway. It was extended parallel along the road to line 453, approximately 60 ft. The depth of the excavation was kept to a maximum of 5 ft as groundwater rapidly filled the pit to 4.5 ft below grade. Fill material consisted mainly of uncompacted household refuse containing a large amount of unbroken glass, plastic bottles, and metal cans. Mixed construction wastes, sheet metal, and tires were also observed. Virtually no deflection was noted on the OVA and no readings above background level were recorded on the remaining meters. Little or no capping material was found over the refuse. Given the number of years that the area has remained idle, any existing material may actually be an accumulation of decayed leaves or other material that has been naturally deposited on the surface. The trench was then lengthened in the direction of the roadway at line 454. Refuse material in this portion of the trench contained additional bulky metallic debris and construction material. A mass of white pulpy material was removed from the trench at 5 ft below grade, just under the saturated zone. The material and surrounding fill exhibited a moderate petroleum odor and there was an associated sheen on the water surface. OVA readings of 20-50 units were recorded. A single crushed and rusted drum was also removed from this section of the trench along with the bottoms of graduated cylinders and pieces of what appeared to be broken battery casings. A sample (OHT-1A) was collected from this material and the trench was backfilled and graded level with the surrounding cover.

3.4.2 **Test Trench 2 (OHT-2)**

The excavation of test trench OHT-2 was performed on 12 November 1991. The location of this trench began at line 207 (Figure 1-2H), approximately 35 ft out from the edge of the roadway. The excavation extended 28 ft, ending between lines 208 and 209 where the next section began 10 ft closer to the roadway and continued to line 209. Grassy cover with 6-8 in. of soil overlay the fill material. The CGI indicated intermittent methane vapors emanating from the excavation as it was deepened. Refuse material consisted mainly of household debris, with a single crushed drum removed from a depth of 4 ft. No sampleable contents were found in the drum. Water entered the excavation at a depth of 8 ft, and a strong, sweet, perfumelike odor was noted. Because of circulating wind patterns the source of the odor from the mixed waste could not be located. When the odor was noted, OVA readings ranged between 50 and 300 units with and without the methane filter. These readings were sporadic and registered for only a few seconds before they and the odor disappeared.

The second portion of the trench was opened closer to the roadway; little but household refuse was found here, with a very strong, septiclike odor. Accumulated gases from discharged sewage associated with the two homes directly upgradient across Tow Path Road might be the source of the septage odor. The leach fields were later found to be located very close to the fill area. Plant material and trees in the vicinity of the excavation were green, with no signs of deterioration. The trench was extended to a depth of 9 ft after groundwater was observed entering the trench at 8 ft below grade.

A sample (OHT-2A) was collected from the original area of the trench, adjacent to line 207, where the perfumelike odor was noted. This sample was collected from the entire depth of the excavation. The trench was backfilled after sample collection with clean cover material supplied by the Town of Halfmoon.

3.4.3 **Test Trench 3 (OHT-3)**

The location of OHT-3, near OHT-2 on line 212 adjacent to the riverbank (Figure 1-2H), was excavated because one half-buried drum and two corroded 55-gal containers had been found

on the surface. The excavation showed that the drums had been converted into buoys that were no longer used. Material under the containers consisted of clean brown sand and gravel. As no refuse was noted, no sample was collected.

3.4.4 **Test Trench 4 (OHT-4)**

Excavation at OHT-4 began on 13 November 1991. The trench extended from line 169 to line 162 (Figure 1-2H). The main body of the excavation was located approximately 20 ft from the edge of Tow Path Road.

Three feet of soil cover overlay the refuse material, an accumulation from several episodes of grading performed by the town following periodic settling of the fill. A single white drum in relatively good condition and labeled "Buckeye Detergent" was removed from the excavation at line 169. It was empty. The excavation was extended to line 167 through general refuse with moderate amounts of metal debris. At line 167 a crushed drum labeled "General Electric Waterford, New York, Silicone Products" was removed. A strong toluenelike odor emanated from the excavation; OVA deflections at the drum registered 200-1000 units with and without the methane filter. The rubbery contents of the container softened latex gloves and bonded to them upon contact. Upon removal, a pile of cardboard material beneath the drum also exhibited strong volatile odors similar to a toluene solvent. The surrounding waste and soil were sampled for analysis (OHT-4A). The excavation was extended around the drum location in a search for more containers; only mixed refuse was found, however. Groundwater was observed entering the excavation at 5 ft below grade. Following the collection of sample OHT-4A, the trench was backfilled and covered with the old material.

The drum containing the rubbery waste was wrapped in plastic and duct tape and placed in an overpack drum. It was decided near the end of the excavation project that the overpack would not be sampled and that it should be buried to prevent vandalism and possible disposal into the river. The NYSDEC oversight personnel allowed the sealed overpack drum to be buried just below the surface in trench OHT-7.

3.4.5 **Test Trench 5 (OHT-5)**

Trench 5 was excavated on 13 November 1991. The trench began at line 25 and extended in a northerly direction to line 27 at the midpoint of the river and roadway. This location was an open parking area with a sand and gravel surface (Figure 1-2J).

Four feet of clean sandy cover material was found above the fill layer. Refuse consisted mainly of mixed garbage and bottles. Methane was observed bubbling through water as it entered the trench. The trench was extended to a depth of 10 ft where a silty clay layer was encountered. Whether this was the lowest extent of fill is unknown; however, historical information suggests that the bottom of the canal was approximately 7 ft below the river level, indicating that the bottom had been encountered. No industrial-type waste was found and metal debris was minimal. No sample was collected from this trench at the direction of the NYSDEC oversight personnel.

3.4.6 **Test Trench 6 (OHT-6)**

Trench 6 was excavated on 13 November 1991. The site was located along line 584 near the midpoint of the roadway and the end of the magnetometer transect (Figure 1-2C). At that location a fairly intact drum was exposed. When the brush was cleared away from the surface, several drums partially protruded from the ground.

As the excavation was opened, five drums were unearthed immediately. Each was intact and filled with dry refuse. No meter readings above background were noted. A substantial amount of metallic debris was also encountered through the upper 10 ft of the excavation. An eyewitness interviewed by NYSDEC reported a gray gravel layer seen at 11 ft as a former roadbed constructed on the fill to allow trucks to dump farther into the fill zone. Refuse was encountered below the gravel roadbed and water entered the excavation at approximately 12.5 ft. Aside from sporadic methane, no readings were above background conditions. Other than the drum containers themselves, no industrial-type wastes were found; therefore, at the direction of the NYSDEC oversight personnel, no sample was collected. The trench was then backfilled.

3.4.7 **Test Trench 7 (OHT-7)**

Sterling Environmental arranged for a track-mounted backhoe to be used for the last trench excavations. Because these locations were on higher ground, a larger backhoe was needed to reach the groundwater table.

OHT-7 was located along line 567, beginning approximately 60 ft from the edge of the roadway and continuing toward the road (Figure 1-2C). The surface elevation of the site was approximately 8-10 ft above the roadway and 15-20 ft above the surface of the river.

Loose, uncompacted refuse that appeared to be mainly an accumulation of leaves and rotting vegetation was encountered under 6 to 8 in. of cover material.

Several drums were removed from the excavation between the surface and 6 ft below grade. There was no evidence of industrial waste, and most drums were filled with typical household refuse. At 7 ft a sweet, solvent-type odor emanated from the excavation. Meter readings were as follows: OVA, 1000+ with and without the methane filter; OVM, 32; and HNU, 10-15. The source of the odor could not be determined, although the excavation was extended to 16 ft. No other drums were found, and the excavation was terminated with water flowing in at the bottom of the trench (16 ft). No sample was collected at the direction of the on-site NYSDEC representative. The overpack container holding the remains of the crushed drum from OHT-4 was reburied at OHT-7, approximately 16 ft from the roadway along line 567.

3.4.8 **Test Trench 8 (OHT-8)**

Information obtained by NYSDEC through interviews with local residents prompted further review of the geophysics data on a prominent anomaly near the roadway. Drummed material was reportedly disposed of at the edge of the canal and was then buried under refuse. After the data were reviewed, an area parallel to the roadway between lines 575 and 576 was identified (Figure 1-2C). The area showed a relatively broad elevated anomaly. The excavation was made on 14 November 1991 parallel to Tow Path Road, approximately 20 ft away from the pavement. The ground surface of the excavation was approximately 7 ft above

the road and 15 ft above the river. Four drums were found just under the surface, mixed in with demolition material. Waste in the drums consisted of wood and carpentry-type construction waste. Meter readings recorded on head space within one container were as follows: HNU, 200; OVA, 200-300 with filter and 100-200 without filter; and OVM, 126.

Fifteen neatly stacked 30-gal drums, set in three rows of five each, were found along the edge of the excavation at 8 ft. Each was well corroded, with numerous holes, and contained varying amounts of gray-blue-brown and red gritlike material. Grain size ranged from silt to coarse sand. No odors or organic vapor readings were recorded from the containers. The organized manner of the drums' deposition indicated the possibility of a large-quantity generating source rather than several household sources. The excavation was extended to 18 ft through mixed refuse, and a large amount of metallic debris, demolition material, glass, and tires was uncovered. Water was found at various levels, mostly runoff previously trapped within the fill material. Samples from all drums were collected and thoroughly mixed to form the OHT-8A sample. Volatiles samples were collected directly from the drums without mixing in open air. The matrix spike/matrix spike duplicate (MS/MSD) sample was also collected from this material as the required quantity was easily obtainable and relatively uniform.

The excavation was backfilled to 8 ft, and the drums were redeposited in the open hole at roughly the depth from which they were removed. Because of their corroded state and the solid nature of the contents, it was unnecessary to overpack them. The remainder of the excavation was backfilled and graded off.

3.4.9 **Test Trench 9 (OHT-9)**

The final excavation, performed on 14 November 1991, was located along line 587 approximately 60 ft from the edge of the roadway (Figure 1-2C). Just beyond this point was a sharp 6- to 7-ft bank that consisted of clean fill that had been deposited as possible cover material but never graded.

Typical refuse - wood, tires, glass, and plastic - was seen to a depth of 18 ft. A 1968 newspaper found 3 ft below grade was removed in excellent condition. Scrap metal and steel

were removed from the lower portions of the excavation along with several tires. No drums or waste containers were found. No sample was collected at the instruction of NYSDEC and the excavation was backfilled and graded to the original elevation.

3.5 SOIL GAS SURVEY

A soil gas survey was conducted at the inactive Tow Path Road Landfill site between 3 and 21 August 1992. The purpose of the survey was to identify areas where concentrations of volatile organic compounds (VOCs) in the subsurface waste indicated that hazardous waste may be present. The results were later compared with the data collected from the previously conducted magnetometry study and used to locate test pits where waste was present.

The full length of the landfill (±2.5 miles) was investigated by a series of soil gas points installed in a set grid pattern. The grid basically consisted of two lines of points, approximately 30 ft apart, that extended the full length of the landfill. The points were 100 ft apart in each line, offset to establish approximately 50 x 30 ft grids. In areas where the landfill was known to be wider, additional lines (up to three) of evenly spaced points were added. A total of 413 temporary soil gas points was installed on-site (Figures 3-1A to 3-1J). Gas samples collected soon after point installation were analyzed on-site in a mobile laboratory.

Initial test holes were advanced 3 to 4 ft using a slam bar (a long steel rod with a movable weight attached to the top). The rod was then removed and the hole was checked for water. If water was encountered, the sampling point was installed at a shallower depth or below the water table to sample water.

The K-V system was used for the installation of temporary soil gas points. The system consists of 2.5-ft sections of 0.625-in. (O.D.) hollow stainless steel rods, a 0.5-ft section of 0.012-in. slotted screen, and a hardened drive point. All were connected with threaded, hardened, stainless steel nipples. The K-V assembly was then inserted into the hole and, if no water was encountered, driven an additional 1 to 2 ft. At the ground surface a soft clay seal was molded around the tube. This upper seal prevents the downward flow of ambient

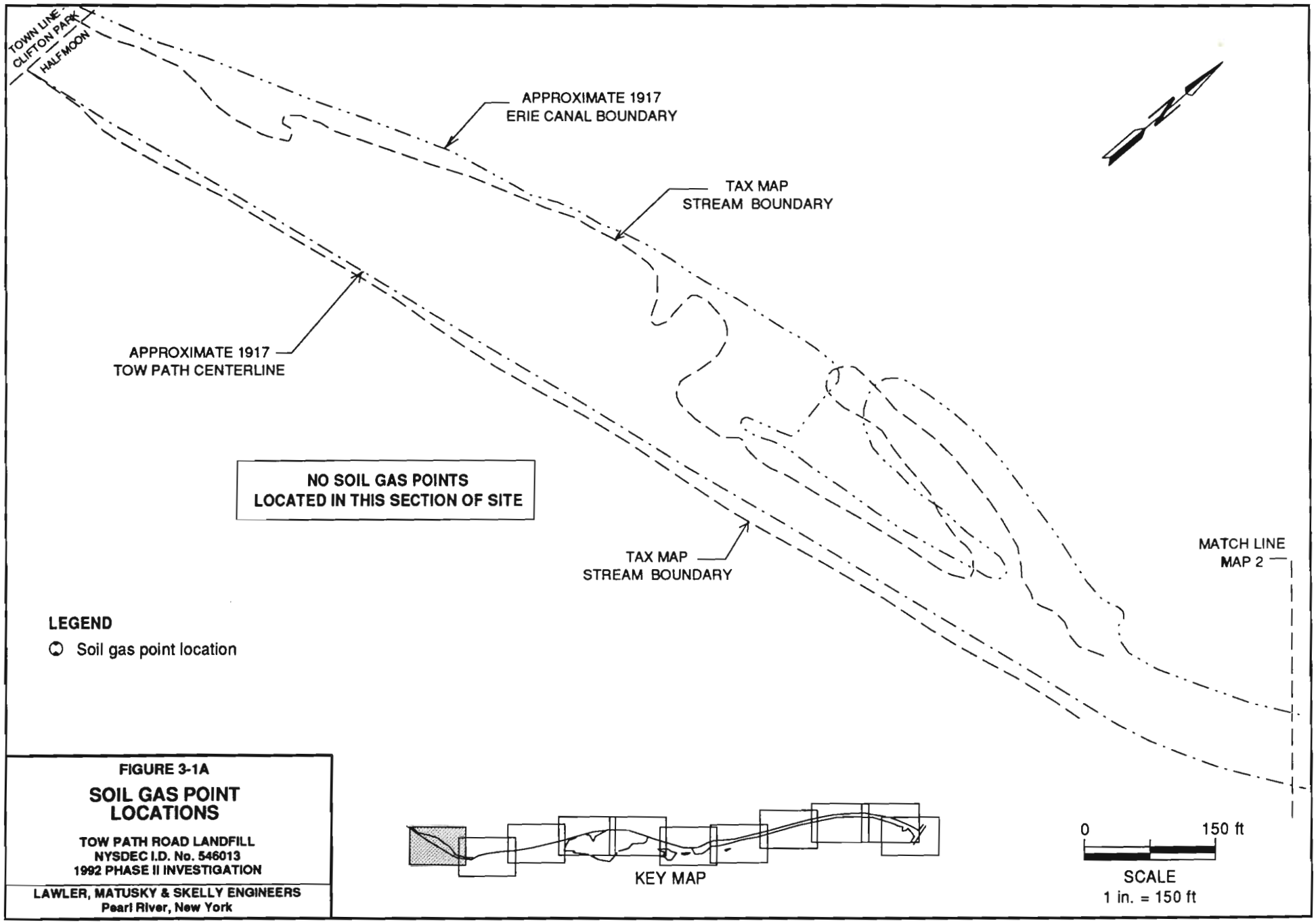


FIGURE 3-1A

SOIL GAS POINT LOCATIONS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

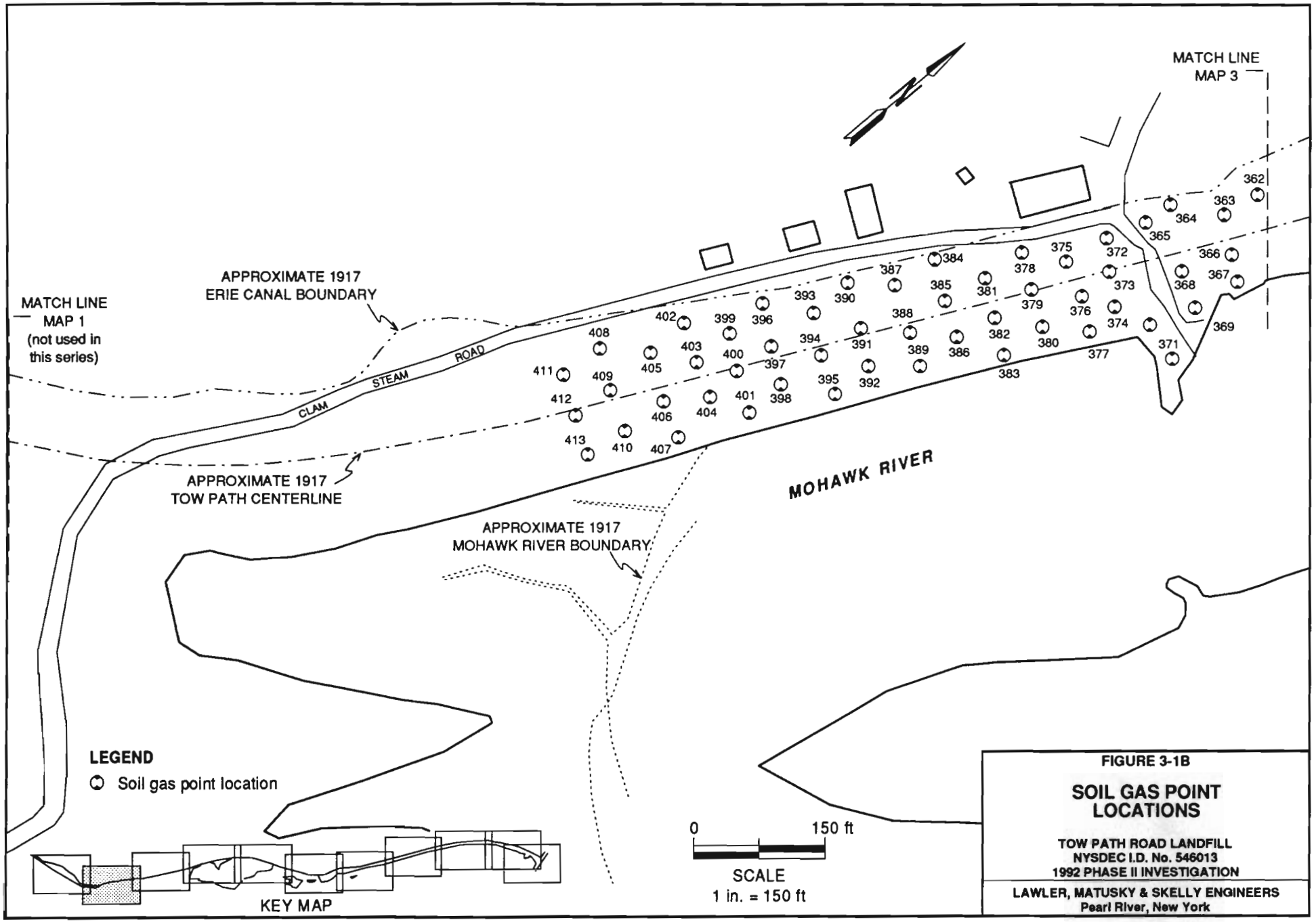


FIGURE 3-1B

SOIL GAS POINT LOCATIONS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

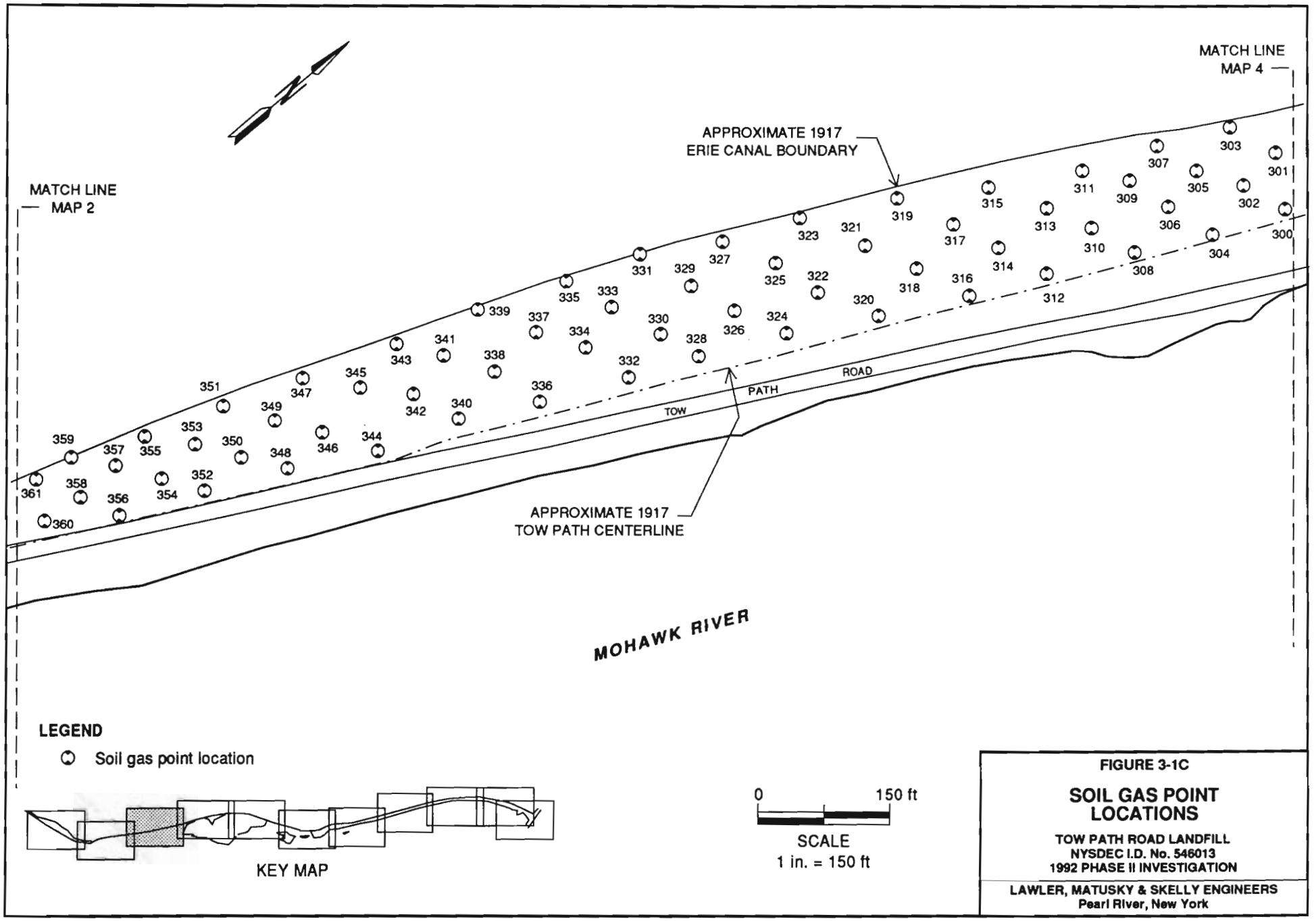


FIGURE 3-1C

SOIL GAS POINT LOCATIONS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

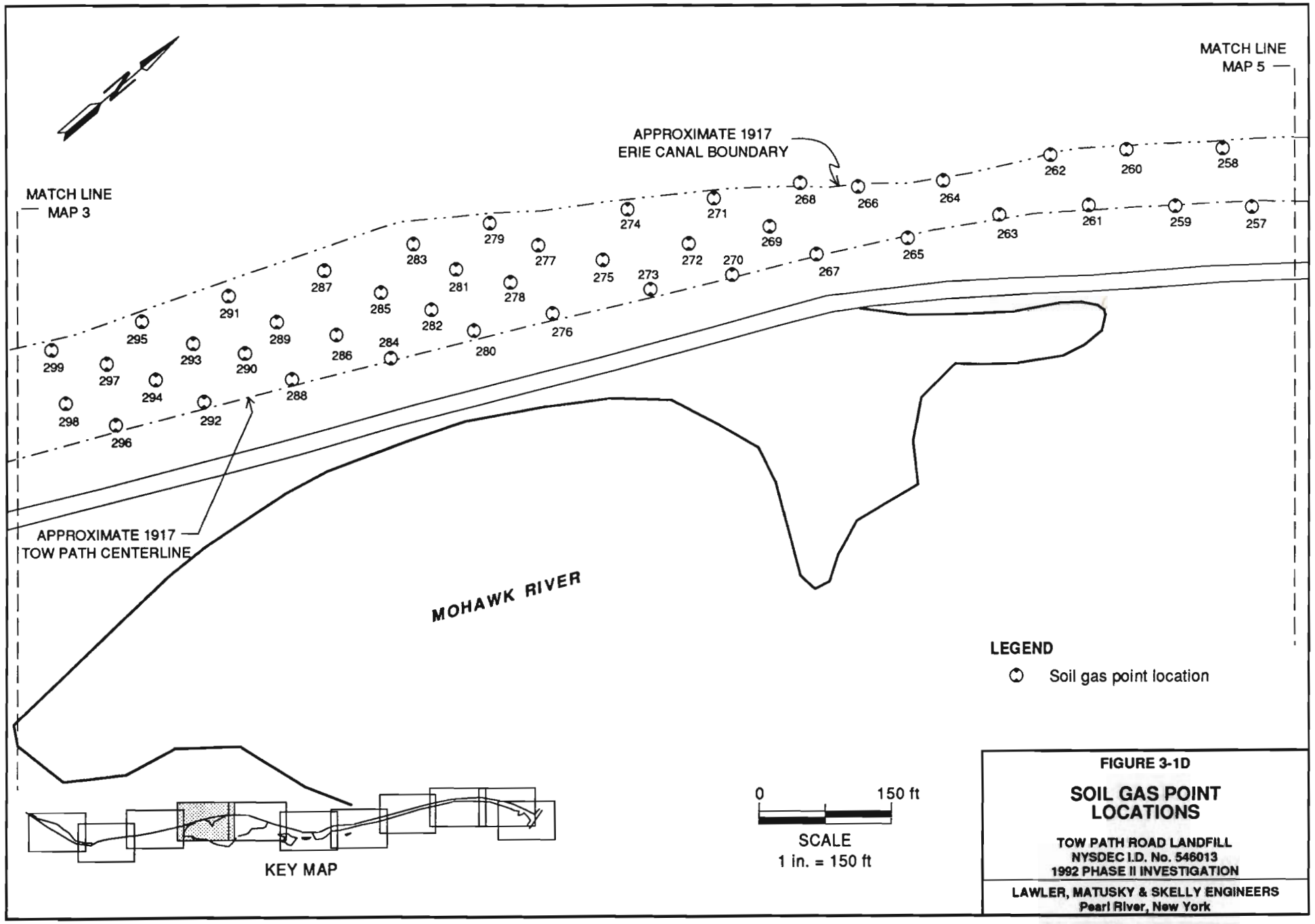
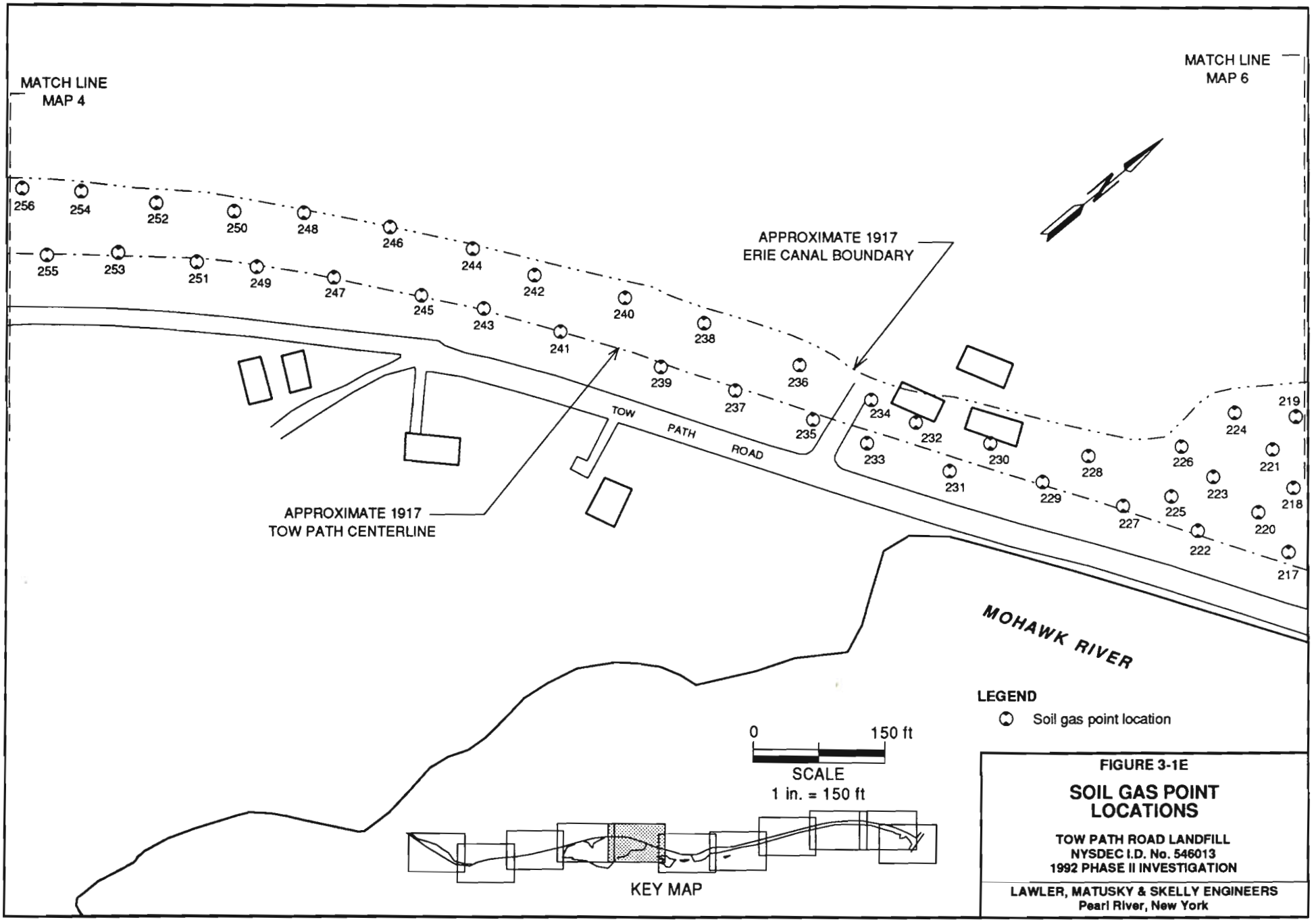


FIGURE 3-1D

SOIL GAS POINT LOCATIONS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York


MATCH LINE
MAP 4
MATCH LINE
MAP 6
256
254
252
250
248
246
244
242
240
238
236
234
232
230
228
226
224
222
220
218
216
255
253
251
249
247
245
243
241
239
237
235
233
231
229
227
225
223
221
219
217
APPROXIMATE 1917
ERIE CANAL BOUNDARY
APPROXIMATE 1917
TOW PATH CENTERLINE
TOW PATH ROAD
MOHAWK RIVER
LEGEND
Soil gas point location
0
150 ft
SCALE
1 in. = 150 ft
KEY MAP
FIGURE 3-1E
SOIL GAS POINT LOCATIONS
TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION
LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

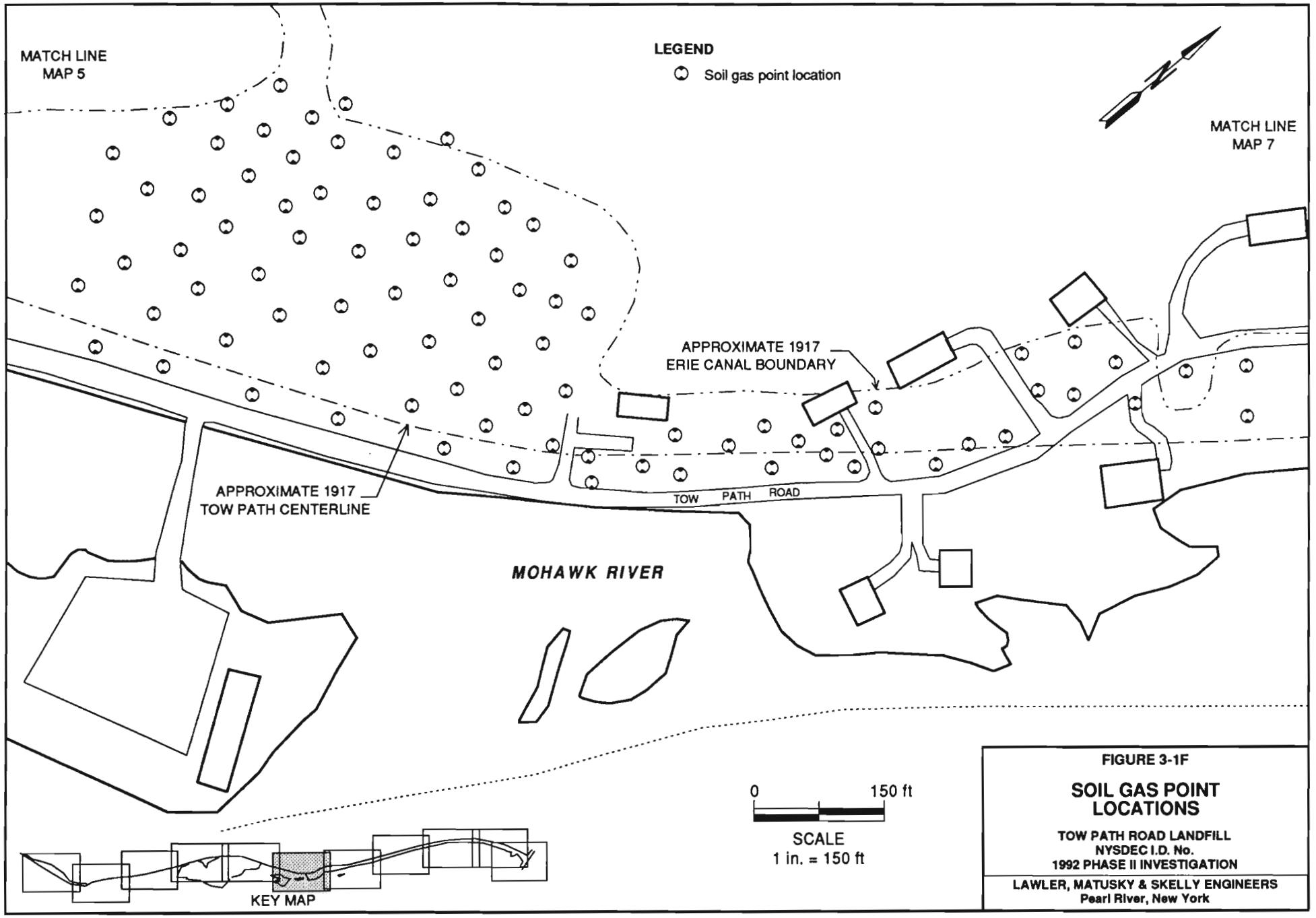


FIGURE 3-1F

SOIL GAS POINT LOCATIONS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No.
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

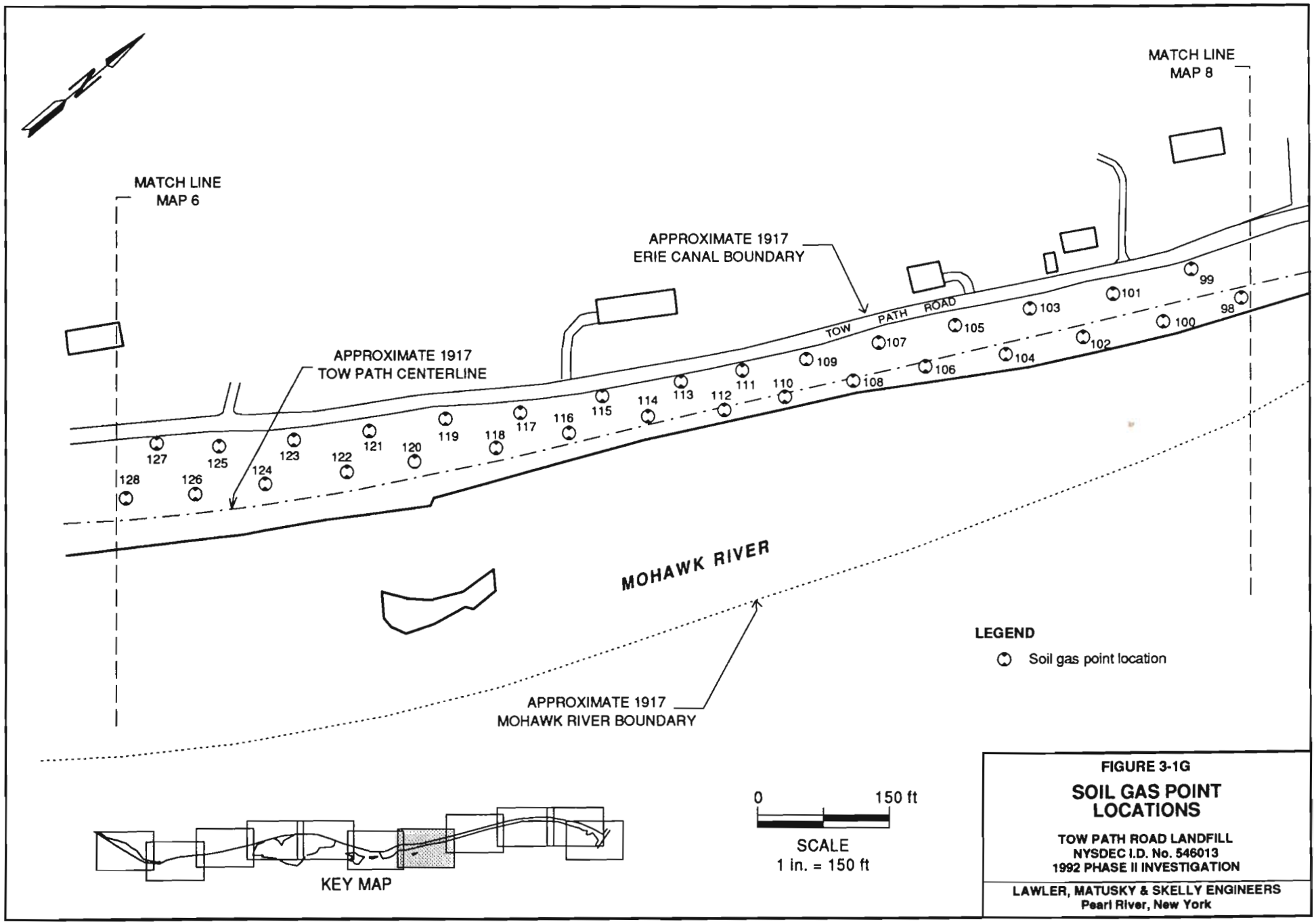


FIGURE 3-1G

SOIL GAS POINT LOCATIONS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

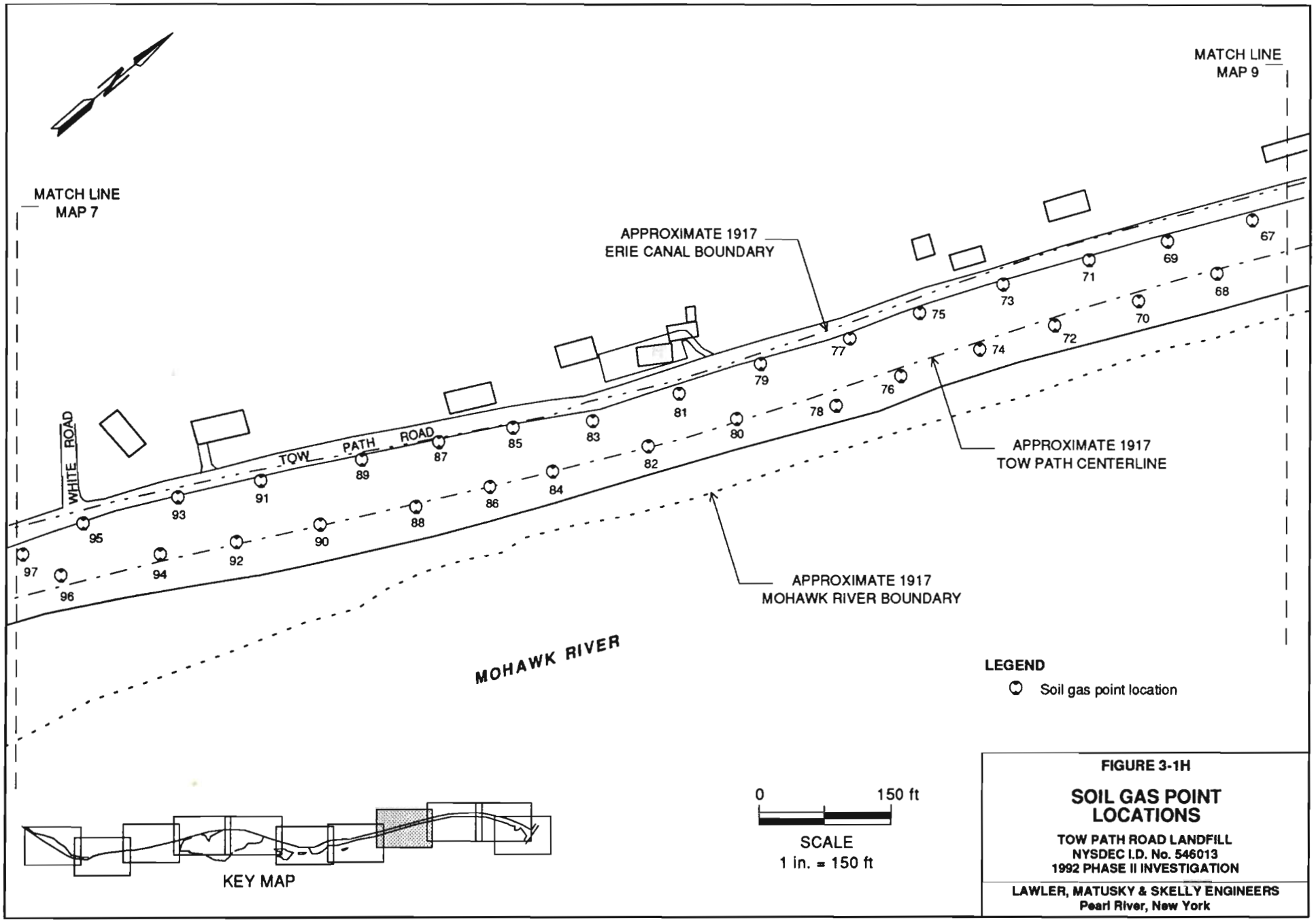


FIGURE 3-1H

SOIL GAS POINT LOCATIONS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

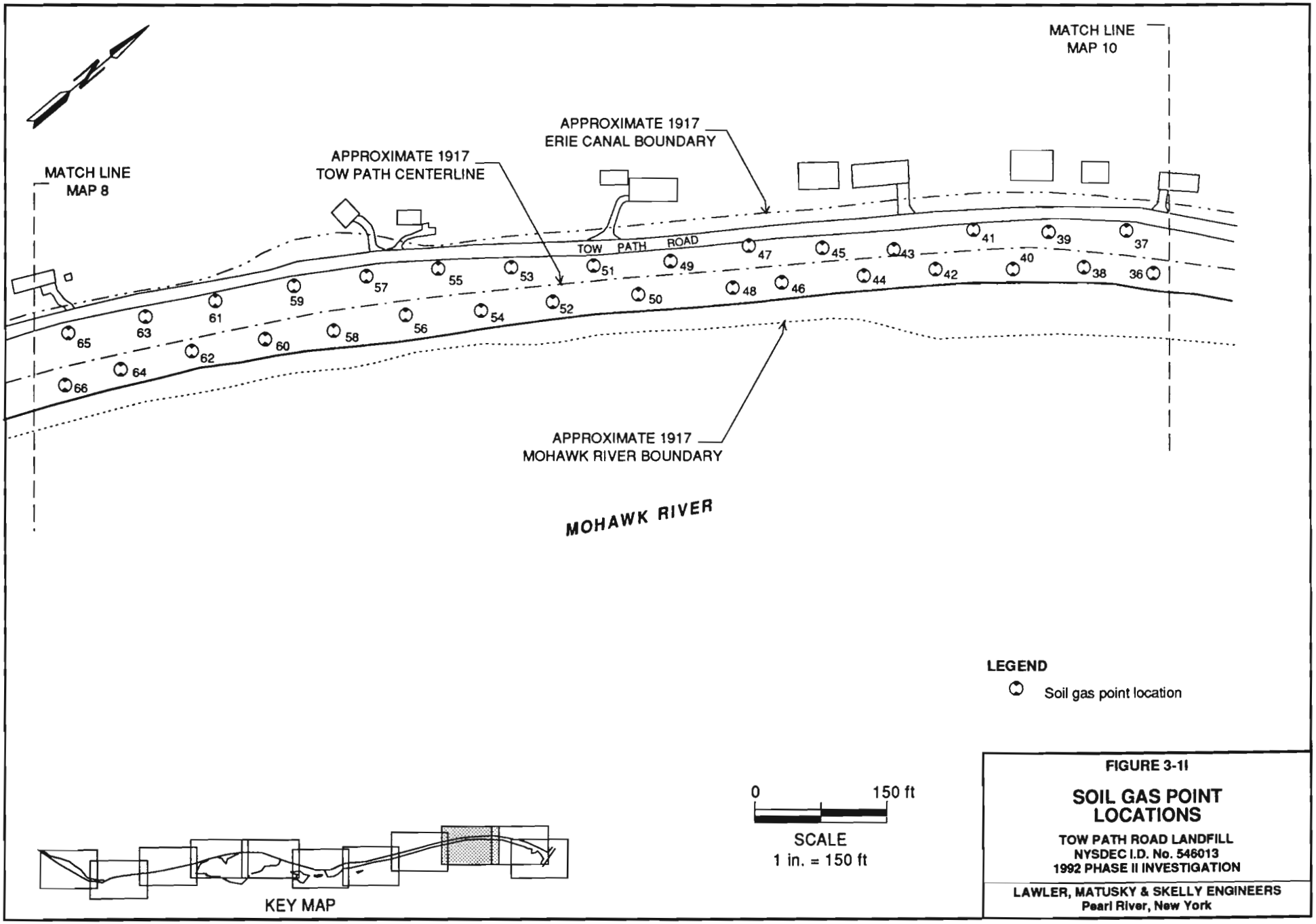


FIGURE 3-1I

SOIL GAS POINT LOCATIONS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

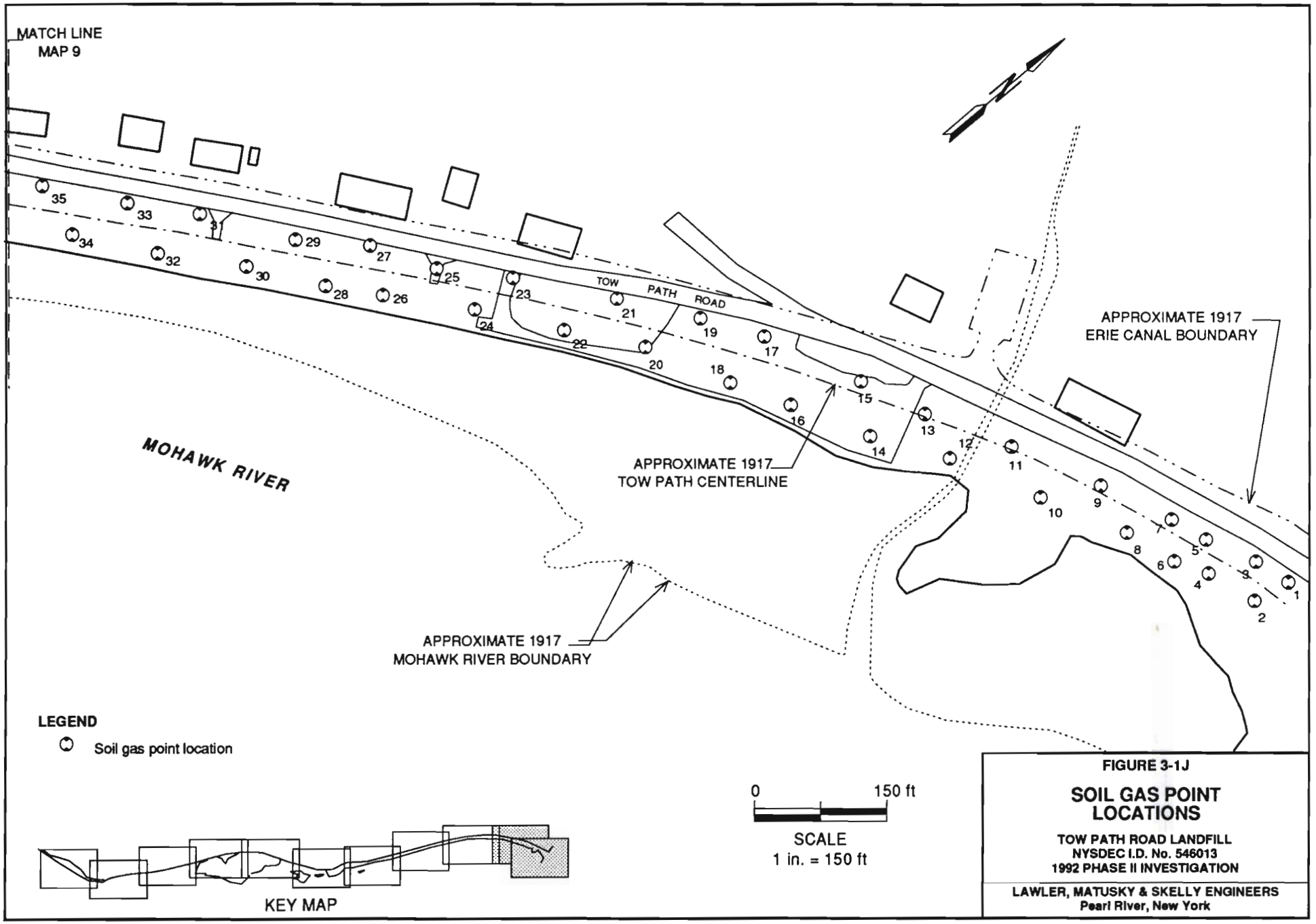


FIGURE 3-1J

SOIL GAS POINT LOCATIONS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

air during purging and sampling of the hole. A clay plug was also put over the top of the open stainless steel tube to prevent insects and debris from entering the tubing prior to sampling. The construction details of a typical soil gas point can be seen on Figure 3-2.

The hole was purged at a rate of 0.1 to 1.0 liters/min using a battery-powered vacuum pump for 1 to 2 min. When gas flow was confirmed, a sample was collected by pulling soil gas through a sampling system that contained Teflon septa. A side-port syringe was used to collect a gas sample from each septum as the gas was being purged. During sampling the flow rate was monitored to ensure that gas was being removed and a vacuum was not created.

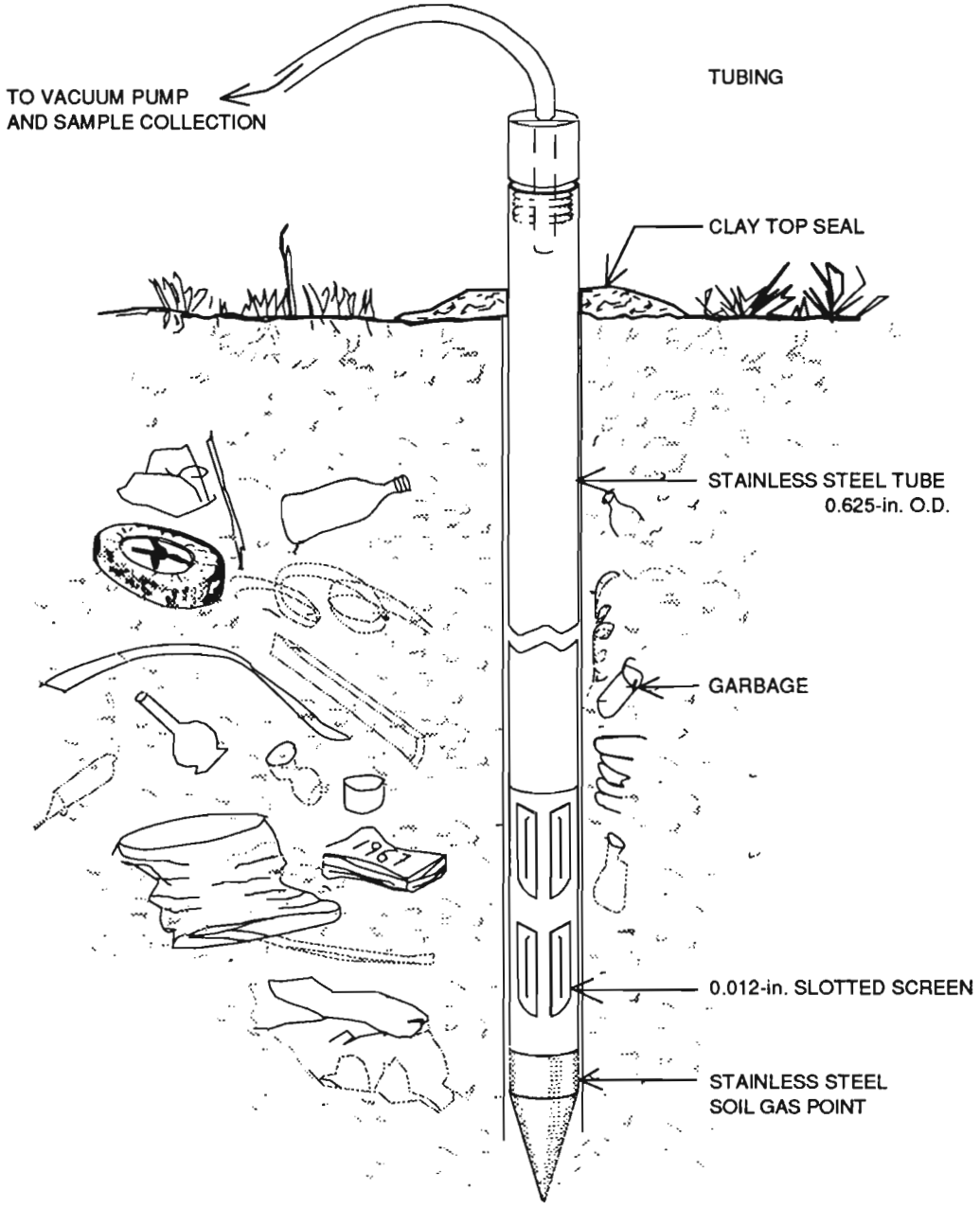
In areas where the groundwater table was shallow, a sample of water from the upper saturated zone was collected by inducing a vacuum and drawing the water into a 40-ml Teflon septum sample bottle. Samples were brought to the on-site laboratory located in an 8 by 24 ft office trailer operated by personnel from Tetra•K Testing, Westfield, Massachusetts. Analysis for VOCs was performed on gas and water samples using an HNU Model 421 gas chromatograph (GC).

In an effort to allow the laboratory time to analyze all the samples, two GCs were used to perform an average of 30 analyses each day. Results (Ref. 7) of the soil gas survey are discussed in Section 3.5.1.

Based on a preliminary review of the soil gas survey results, 18 shallow soil samples (1-4 ft) were also collected and analyzed on-site for PCBs. Samples were collected in areas where high concentrations of chlorobenzene were detected (chlorobenzene is considered a breakdown product and carrier of PCBs). The initial hole was dig with a posthole digger to the requisite depth and the sample was collected with a dedicated laboratory-cleaned stainless steel spoon.

3.5.1 **Soil Gas Results**

The 413 soil gas points installed and sampled during the project were installed throughout the three segments of the site where Tow Path Road divides the old landfill by crossing over it



NOT TO SCALE

FIGURE 3-2

TYPICAL SOIL GAS POINT

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

twice. The results are presented on Table 3-1 and summarized graphically on Figures 3-3A to 3-3J.

After the data were reviewed, the soil gas results were classified and contoured (Figures 3-3A through 3-3J) in two groups: aromatic hydrocarbons, including chlorobenzene, ethylbenzene, toluene, and total xylenes; and halogenated hydrocarbons, including carbon tetrachloride, 1,2-dichloroethylene, tetrachloroethylene, 1,1,1-trichloroethane, and trichloroethylene. Subsequently, each of the categories was divided into high concentration levels (>1000 $\mu g/m^3$) and low concentration levels (<1000 $\mu g/m^3$).

Twelve areas of high concentration levels of aromatic compounds were identified throughout the site (Table 3-2). Each covered an area consisting of three to six points (Figures 3-3A through 3-3J). Halogenated compounds were found in high concentrations in only two places, west of Areas 9 and 10 (Figure 3-3C).

Area 1 was south of line 41 (Figure 3-3J). Four soil gas points (OHSG-18, -19, -20, and -22) that showed high concentrations of aromatic compounds were identified at this area. The highest concentrations found were total xylenes, ranging from 3800 $\mu g/m^3$ at OSHG-18 to 8000 $\mu g/m^3$ at OHSG-19. Chlorobenzene ranged from 2100 $\mu g/m^3$ at OHSG-22 to 3300 $\mu g/m^3$ at OHSG-18 and -20.

Area 2, located east of Tow Path Road on the Mohawk River side, extended from approximately line 111 to line 131 (Figure 3-3I). This area, which contained six soil gas points (OHSG-49, -50, -51, -52, -53, and -55), showed elevated values of total xylenes (22,000 $\mu g/m^3$ at soil gas point OHSG-51) and chlorobenzene (11,000 $\mu g/m^3$ at OHSG-53). Based on these results, test trench OHT-1B was located at soil gas point OHSG-51 (Figure 1-2I).

Area 3, located east of Tow Path Road (Mohawk River side), extended from line 138 to line 148 (Figure 3-3I). Three soil gas points (OHSG-60, -61, and -62) covered the area and high levels of VOCs (in comparison to the other areas) were detected. The highest concentration values of benzene (3100 $\mu g/m^3$), toluene (3700 $\mu g/m^3$), and xylene (10,000 $\mu g/m^3$) were detected at soil gas point OHSG-60. Chlorobenzene was detected at 54,000 $\mu g/m^3$ at soil gas

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-1	OHSG-2	OHSG-3	OHSG-4	OHSG-5	OHSG-6 *	OHSG-7	OHSG-8	OHSG-9
VOLATILE ORGANICS (µg/m³)									
Benzene	ND	ND	250	ND	320	ND	2,000	ND	240
Chlorobenzene	ND	ND	4,200	ND	6,600	30	1,800	ND	ND
Tetrachloroethylene	ND	92	ND	43	ND	ND	ND	ND	ND
Toluene	ND	ND	520	ND	ND	ND	1,600	ND	280
Xylene (total)	ND	ND	3,800	ND	6,900	ND	ND	ND	ND
Trichloroethylene	ND	ND	20	ND	17	ND	ND	ND	ND

PARAMETER	OHSG-10 *	OHSG-11	OHSG-12 *	OHSG-13	OHSG-14	OHSG-15	OHSG-16	OHSG-17	OHSG-18
VOLATILE ORGANICS (µg/m³)									
Benzene	ND	ND	BQL	300	ND	ND	ND	ND	490
Chlorobenzene	ND	ND	30	720	ND	ND	ND	ND	3,300
Tetrachloroethylene	ND	ND	ND	ND	ND	19	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	92	ND
Xylene (total)	ND	ND	ND	ND	ND	ND	ND	ND	3,800

* - Water sample; units in µg/l.
ND - Not detected at analytical detection limit (Ref. 7).
BQL - Compound detected below minimum quantitation limit.

TABLE 3-1 (Page 2 of 21)

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-19	OHSG-20	OHSG-21 *	OHSG-22	OHSG-23 *	OHSG-24 *	OHSG-25 *	OHSG-26 *	OHSG-27
VOLATILE ORGANICS (µg/m³)									
Benzene	ND	650	ND	BQL	BQL	ND	ND	ND	ND
Chlorobenzene	ND	3,300	ND	2,100	39	53	16	12	ND
Xylene (total)	8,000	ND	ND	ND	ND	ND	ND	ND	ND

PARAMETER	OHSG-28	OHSG-29	OHSG-30 *	OHSG-31	OHSG-32	OHSG-33	OHSG-34	OHSG-35	OHSG-36
VOLATILE ORGANICS (µg/m³)									
Benzene	590	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	3,300	ND	28	ND	820	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	58	ND	ND	150	21	18

* - Water sample; units in µg/l.
ND - Not detected at analytical detection limit (Ref. 7).
BQL - Compound detected below minimum quantitation limit.

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-37 *	OHSG-38	OHSG-39	OHSG-40	OHSG-41	OHSG-42	OHSG-43	OHSG-44	OHSG-45
VOLATILE ORGANICS (µg/m³)									
Benzene	ND	510	ND	ND	ND	ND	220	ND	ND
Carbon tetrachloride	ND	ND	ND	37	ND	ND	ND	ND	ND
Chlorobenzene	ND	4,300	ND	ND	ND	ND	4,400	ND	ND
Tetrachloroethylene	ND	ND	ND	520	ND	48	ND	100	ND
Toluene	ND	650	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	130	ND	ND	17	ND	ND
Xylene (total)	ND	8,300	ND	ND	ND	ND	2,800	ND	ND

PARAMETER	OHSG-46	OHSG-47	OHSG-48	OHSG-49	OHSG-50	OHSG-51	OHSG-52	OHSG-53	OHSG-54
VOLATILE ORGANICS (µg/m³)									
Benzene	ND	ND	ND	720	ND	390	BLQ	450	ND
Chlorobenzene	ND	ND	ND	8,900	1,900	8,600	3,600	11,000	ND
Tetrachloroethylene	ND	ND	ND	ND	ND	ND	230	ND	51
Toluene	ND	ND	ND	ND	ND	ND	BQL	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	28	17	ND
Xylene (total)	ND	ND	ND	8,600	ND	22,000	1,100	ND	ND

* - Water sample; units in µg/l.
ND - Not detected at analytical detection limit (Ref. 7).
BQL - Compound detected below minimum quantitation limit.

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-55	OHSG-56	OHSG-57	OHSG-58	OHSG-59	OHSG-60	OHSG-61	OHSG-62	OHSG-63
VOLATILE ORGANICS (µg/m³)									
Benzene	570	ND	ND	ND	ND	3,100	3,000	990	ND
Chlorobenzene	16,000	ND	ND	ND	ND	8,900	54,000	9,800	ND
Tetrachloroethylene	ND	600	20	110	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	3,700	ND	3,200	ND
1,1,1-Trichloroethane	ND	270	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	61	ND	ND	ND	ND	ND	ND
Xylene (total)	ND	ND	ND	ND	ND	10,000	ND	5,300	ND

PARAMETER	OHSG-64 *	OHSG-65	OHSG-66	OHSG-67	OHSG-68	OHSG-69	OHSG-70 *	OHSG-71	OHSG-72 *
VOLATILE ORGANICS (µg/m³)									
Benzene	BQL	1,000	ND	730	2,400	960	BQL	1,900	42
Chlorobenzene	ND	7,200	ND	4,700	6,000	8,000	38	6,000	ND
Ethylbenzene	ND	ND	ND	1,300	ND	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	35	ND	160	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	7,300	ND	ND	ND	ND
Trichloroethylene	ND	ND	24	ND	110	ND	ND	41	ND
Xylene (total)	ND	8,800	ND	8,200	3,000	3,200	ND	3,200	ND

* - Water sample; units in µg/l.
ND - Not detected at analytical detection limit (Ref. 7).
BQL - Compound detected below minimum quantitation limit.

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-73 *	OHSG-74	OHSG-75 *	OHSG-76	OHSG-77	OHSG-78	OHSG-79 *	OHSG-80	OHSG-81
VOLATILE ORGANICS (µg/m³)									
Benzene	BQL	ND	6.5	ND	ND	ND	29	ND	570
Chlorobenzene	6.0	ND	22	ND	ND	ND	13	ND	2,500
Tetrachloroethylene	ND	37	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	13	ND	ND
Xylene (total)	ND	ND	ND	ND	ND	ND	150	ND	6,600

PARAMETER	OHSG-82	OHSG-83	OHSG-84 *	OHSG-85	OHSG-86	OHSG-87	OHSG-88	OHSG-89 *	OHSG-90
VOLATILE ORGANICS (µg/m³)									
Benzene	240	720	ND	3,900	ND	960	ND	BQL	470
Chlorobenzene	2,000	ND	ND	12,000	ND	ND	ND	46	25,000
Ethylbenzene	2,300	2,000	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	19	14	19	44	ND	45
Toluene	550	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	28	27	ND	ND	42
Xylene (total)	390	660	ND	ND	ND	ND	ND	ND	ND

* - Water sample; units in µg/l.
ND - Not detected at analytical detection limit (Ref. 7).
BQL - Compound detected below minimum quantitation limit.

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-91	OHSG-92	OHSG-93	OHSG-94	OHSG-95	OHSG-96	OHSG-97	OHSG-98	OHSG-99
VOLATILE ORGANICS (µg/m³)									
Benzene	670	ND	3,100	230	1,200	ND	380	ND	250
Chlorobenzene	3,600	ND	5,200	ND	ND	ND	12,000	ND	ND
Tetrachloroethylene	ND	51	ND	300	ND	300	ND	160	ND
Toluene	ND	330	ND	ND	710	ND	ND	ND	4,600
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	100	ND
Trichloroethylene	ND	38	ND	63	ND	ND	33	83	ND
Xylene (total)	8,100	ND	11,000	5,100	17,000	ND	4,500	ND	7,900

PARAMETER	OHSG-100 *	OHSG-101	OHSG-102 *	OHSG-103	OHSG-104 *	OHSG-105 *	OHSG-106	OHSG-107	OHSG-108
VOLATILE ORGANICS (µg/m³)									
Benzene	BQL	ND	BQL	610	BQL	BQL	ND	ND	300
Chlorobenzene	19	ND	200	4,400	150	350	ND	ND	3,700
Tetrachloroethylene	ND	17	ND	16	ND	ND	59	ND	ND
Toluene	ND	ND	ND	5,200	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	33	ND	ND	ND	ND	36
Xylene (total)	ND	ND	ND	4,000	ND	ND	ND	ND	ND

* - Water sample; units in µg/l.
ND - Not detected at analytical detection limit (Ref. 7).
BQL - Compound detected below minimum quantitation limit.

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-109	OHSG-110	OHSG-111	OHSG-112	OHSG-113	OHSG-114 *	OHSG-115	OHSG-116 *	OHSG-117
VOLATILE ORGANICS (µg/m³)									
Benzene	650	ND	380	ND	ND	ND	ND	13	ND
Chlorobenzene	4,200	ND	ND	ND	ND	73	ND	20	ND
Ethylbenzene	5,600	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	190	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	1,400	ND	ND	ND	ND	ND	ND
Trichloroethylene	33	ND	230	22	ND	ND	ND	ND	ND
Xylene (total)	5,400	ND	8,500	ND	ND	ND	ND	180	ND

PARAMETER	OHSG-118 *	OHSG-119 *	OHSG-120 *	OHSG-121	OHSG-122	OHSG-123	OHSG-124 *	OHSG-125	OHSG-126 *
VOLATILE ORGANICS (µg/m³)									
Benzene	ND	ND	8.2	ND	820	ND	ND	ND	31
Chlorobenzene	60	ND	62	ND	23,000	ND	22	ND	57
1,2-Dichloroethylene (total)	170	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	17	ND	29	ND	7,300	ND	ND	ND	ND
Tetrachloroethylene	24	ND	BQL	ND	ND	ND	ND	ND	ND
Trichloroethylene	17	ND	ND	ND	ND	ND	ND	25	ND
Xylene (total)	40	21	3,100	ND	12,000	ND	ND	ND	98

* - Water sample; units in µg/l.
ND - Not detected at analytical detection limit (Ref. 7).
BQL - Compound detected below minimum quantitation limit.

TABLE 3-1 (Page 8 of 21)

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-127 *	OHSG-128 *	OHSG-129	OHSG-130 *	OHSG-131	OHSG-132	OHSG-133	OHSG-134
VOLATILE ORGANICS (µg/m³)								
Benzene	ND	BQL	ND	BQL	ND	ND	ND	ND
Chlorobenzene	ND	9.0	ND	2,100	ND	2,300	3,100	ND
Ethylbenzene	ND	ND	ND	27	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	77	ND	ND	ND	ND	130
Xylene (total)	ND	ND	ND	430	ND	44,000	6,200	ND

PARAMETER	OHSG-135	OHSG-136	OHSG-137 *	OHSG-138 *	OHSG-139	OHSG-140	OHSG-141	OHSG-142 *
VOLATILE ORGANICS (µg/m³)								
Benzene	ND	ND	ND	BQL	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	76	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND	34	180	2,800	ND
Trichloroethylene	ND	ND	ND	ND	ND	100	96	ND

* - Water sample; units in µg/l.
ND - Not detected at analytical detection limit (Ref. 7).
BQL - Compound detected below minimum quantitation limit.

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-143 *	OHSG-144	OHSG-145	OHSG-146 *	OHSG-147	OHSG-148 *	OHSG-149 *	OHSG-150 *	OHSG-151
VOLATILE ORGANICS (µg/m³)									
Chlorobenzene	38	ND	ND	30	ND	32	11	ND	ND
Tetrachloroethylene	ND	180	450	ND	120	ND	ND	ND	18
Trichloroethylene	ND	21	30	ND	31	ND	ND	ND	ND

PARAMETER	OHSG-152 *	OHSG-153 *	OHSG-154 *	OHSG-155	OHSG-156	OHSG-157	OHSG-158 *	OHSG-159	OHSG-160
VOLATILE ORGANICS (µg/m³)									
Chlorobenzene	18	ND	ND	ND	ND	ND	8.7	ND	ND
Tetrachloroethylene	ND	ND	ND	ND	ND	ND	ND	34	30

PARAMETER	OHSG-161	OHSG-162	OHSG-163	OHSG-164 *	OHSG-165	OHSG-166 *	OHSG-167	OHSG-168 *	OHSG-169 *
VOLATILE ORGANICS (µg/m³)									
Chlorobenzene	ND	ND	ND	ND	ND	13	ND	21	15
Tetrachloroethylene	28	ND	ND	ND	ND	ND	ND	ND	ND

* - Water sample; units in µg/l.
ND - Not detected at analytical detection limit (Ref. 7).

TABLE 3-1 (Page 10 of 21)

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-170	OHSG-171 *	OHSG-172 *	OHSG-173	OHSG-174	OHSG-175 *	OHSG-176 *	OHSG-177 *	OHSG-178
VOLATILE ORGANICS (µg/m³)									
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	11	ND
Tetrachloroethylene	57	ND	ND	350	33	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	23	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	340	ND	ND	ND	ND

PARAMETER	OHSG-179	OHSG-180	OHSG-181	OHSG-182 *	OHSG-183 *	OHSG-184	OHSG-185 *	OHSG-186	OHSG-187
VOLATILE ORGANICS (µg/m³)									
Tetrachloroethylene	ND	35	40	ND	ND	ND	ND	62	61

PARAMETER	OHSG-188 *	OHSG-189	OHSG-190 *	OHSG-191	OHSG-192	OHSG-193	OHSG-194	OHSG-195 *	OHSG-196
VOLATILE ORGANICS (µg/m³)									
Tetrachloroethylene	ND	75	ND	120	55	23	160	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	220	ND	ND

* - Water sample; units in µg/l.
ND - Not detected at analytical detection limit (Ref. 7).

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-197	OHSG-198	OHSG-199 *	OHSG-200 *	OHSG-201	OHSG-202	OHSG-203	OHSG-204	OHSG-205
VOLATILE ORGANICS (µg/m³)									
Benzene	ND	ND	BQL	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	BQL	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	BQL	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	21	92	ND	ND	39	44	230	25	170
Toluene	ND	1,300	11	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	34	ND	ND	ND
Xylene (total)	ND	ND	25	ND	ND	ND	ND	ND	ND

PARAMETER	OHSG-206	OHSG-207	OHSG-208	OHSG-209	OHSG-210	OHSG-211	OHSG-212	OHSG-213	OHSG-214
VOLATILE ORGANICS (µg/m³)									
Benzene	ND	700	ND	ND	ND	ND	230	270	ND
Chlorobenzene	ND	8,200	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	2,000	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	170	37	200	26	620	67	110	26	28
Toluene	ND	490	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	21	31	43	ND
Xylene (total)	ND	5,300	ND	ND	ND	ND	ND	ND	ND

* - Water sample; units in µg/l.
ND - Not detected at analytical detection limit (Ref. 7).
BQL - Compound detected below minimum quantitation limit.

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-215	OHSG-216	OHSG-217 *	OHSG-218	OHSG-219	OHSG-220	OHSG-221	OHSG-222 *	OHSG-223
VOLATILE ORGANICS (µg/m³)									
Benzene	ND	ND	280	ND	ND	ND	ND	21	580
Chlorobenzene	ND	ND	25	ND	ND	ND	ND	50	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	3,400
Tetrachloroethylene	28	170	ND	53	300	ND	130	ND	63
Toluene	ND	ND	230	ND	ND	ND	ND	ND	ND
Trichloroethylene	25	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (total)	ND	ND	200	ND	ND	ND	ND	ND	5,300

PARAMETER	OHSG-224	OHSG-225	OHSG-226	OHSG-227 *	OHSG-228	OHSG-229	OHSG-230	OHSG-231	OHSG-232
VOLATILE ORGANICS (µg/m³)									
Acetone	ND	ND	ND	ND	ND	490	ND	ND	ND
Benzene	ND	ND	ND	24	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	28	ND	ND	ND	ND	ND
Tetrachloroethylene	660	140	46	ND	940	160	ND	370	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	36	ND	ND	ND	ND
Trichloroethylene	ND	ND	84	ND	24	ND	ND	ND	ND

* - Water sample; units in µg/l.
ND - Not detected at analytical detection limit (Ref. 7).

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-233	OHSG-234	OHSG-235	OHSG-236	OHSG-237	OHSG-238	OHSG-239	OHSG-240	OHSG-241
VOLATILE ORGANICS (µg/m³)									
Tetrachloroethylene	ND	ND	27	ND	ND	ND	ND	ND	34

PARAMETER	OHSG-242	OHSG-243	OHSG-244	OHSG-245	OHSG-246	OHSG-247	OHSG-248	OHSG-249	OHSG-250
VOLATILE ORGANICS (µg/m³)									
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	14	ND
Tetrachloroethylene	ND	24	ND	19	ND	ND	ND	200	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	34	ND

PARAMETER	OHSG-251	OHSG-252	OHSG-253 *	OHSG-254 *	OHSG-255	OHSG-256 *	OHSG-257 *	OHSG-258 *	OHSG-259
VOLATILE ORGANICS (µg/m³)									
Chlorobenzene	ND	ND	ND	ND	ND	ND	9.3	ND	ND

* - Water sample; units in µg/l.
ND - Not detected at analytical detection limit (Ref. 7).

TABLE 3-1 (Page 14 of 21)

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-260 *	OHSG-261 *	OHSG-262	OHSG-263 *	OHSG-264 *	OHSG-265 *	OHSG-266 *	OHSG-267 *	OHSG-268 *
VOLATILE ORGANICS (µg/m³)									
Chlorobenzene	18	15	ND	21	ND	35	ND	44	ND

PARAMETER	OHSG-269 *	OHSG-270 *	OHSG-271 *	OHSG-272	OHSG-273	OHSG-274	OHSG-275	OHSG-276	OHSG-277
VOLATILE ORGANICS (µg/m³)									
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	150
Chlorobenzene	7.0	37	ND	ND	ND	ND	ND	800	ND
Tetrachloroethylene	ND	ND	ND	ND	ND	170	49	29	950
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	8,700
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	310	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	37	32
Xylene (total)	ND	ND	ND	ND	ND	ND	ND	1,100	4,300

PARAMETER	OHSG-278	OHSG-279	OHSG-280	OHSG-281	OHSG-282	OHSG-283	OHSG-284	OHSG-285	OHSG-286
VOLATILE ORGANICS (µg/m³)									
Tetrachloroethylene	200	150	50	200	82	390	47	110	240
Trichloroethylene	ND	ND	29	ND	24	ND	ND	ND	ND

* - Water sample; units in µg/l.
ND - Not detected at analytical detection limit (Ref. 7).

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-287	OHSG-288	OHSG-289	OHSG-290	OHSG-291	OHSG-292	OHSG-293	OHSG-294	OHSG-295
VOLATILE ORGANICS (µg/m³)									
Benzene	ND	220	ND	260	ND	ND	ND	ND	ND
Chlorobenzene	ND	2,400	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	410	29	78	66	390	100	180	160	910
Trichloroethylene	ND	28	ND	ND	ND	ND	ND	ND	ND
Xylene (total)	ND	760	ND	ND	ND	ND	ND	ND	ND

PARAMETER	OHSG-296	OHSG-297	OHSG-298	OHSG-299	OHSG-300	OHSG-301	OHSG-302	OHSG-303	OHSG-304
VOLATILE ORGANICS (µg/m³)									
Benzene	ND	ND	310	ND	BQL	370	ND	ND	ND
Chlorobenzene	3,100	ND	ND	ND	1,800	13,000	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	2,400	ND	ND	ND
Tetrachloroethylene	60	190	ND	570	ND	ND	37	1,800	85
Trichloroethylene	ND	ND	ND	ND	ND	ND	26	89	ND
Xylene (total)	790	ND	4,400	ND	6,900	4,500	ND	ND	ND

ND - Not detected at analytical detection limit (Ref. 7).
BQL - Compound detected below minimum quantitation.

TABLE 3-1 (Page 16 of 21)

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-305	OHSG-306	OHSG-307	OHSG-308	OHSG-309	OHSG-310	OHSG-311	OHSG-312	OHSG-313
VOLATILE ORGANICS (µg/m³)									
1,2-Dichloroethylene (total)	ND	ND	ND	58	ND	ND	ND	ND	ND
Tetrachloroethylene	390	260	83	420	84	2,600	72	140	320
1,1,1-Trichloroethane	ND	ND	35	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	36	ND	ND	ND

PARAMETER	OHSG-314	OHSG-315	OHSG-316	OHSG-317	OHSG-318	OHSG-319	OHSG-320	OHSG-321	OHSG-322
VOLATILE ORGANICS (µg/m³)									
Tetrachloroethylene	68	130	260	360	43	48	69	100	130
1,1,1-Trichloroethane	ND	ND	ND	ND	64	ND	ND	ND	ND

ND - Not detected at analytical detection limit (Ref. 7).

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-323	OHSG-324	OHSG-325	OHSG-326	OHSG-327	OHSG-328	OHSG-329	OHSG-330	OHSG-331
VOLATILE ORGANICS (µg/m³)									
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	440	ND
Tetrachloroethylene	71	300	ND	110	140	150	24	ND	530
Toluene	ND	ND	ND	ND	ND	ND	ND	600	ND
1,1,1-Trichloroethane	ND	36	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	20	ND	ND	ND	120

PARAMETER	OHSG-332	OHSG-333	OHSG-334	OHSG-335	OHSG-336	OHSG-337	OHSG-338	OHSG-339	OHSG-340
VOLATILE ORGANICS (µg/m³)									
Benzene	620	ND	560	ND	BQL	ND	ND	ND	390
Chlorobenzene	1,400	ND	3,800	ND	ND	ND	ND	ND	10,000
Ethylbenzene	ND	ND	20,000	ND	ND	ND	ND	ND	3,400
Tetrachloroethylene	ND	180	ND	2,500	40	230	ND	1,000	ND
Toluene	630	ND	2,700	ND	1,100	ND	ND	ND	820
Trichloroethylene	ND	24	ND	310	160	58	ND	ND	ND
Xylene (total)	5,600	ND	88,000	ND	6,900	ND	ND	ND	23,000

ND - Not detected at analytical detection limit (Ref. 7).
BQL - Compound detected below minimum quantitation limit.

TABLE 3-1 (Page 18 of 21)

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-341	OHSG-342	OHSG-343	OHSG-344	OHSG-345	OHSG-346	OHSG-347	OHSG-348	OHSG-349
VOLATILE ORGANICS (µg/m³)									
Benzene	ND	ND	500	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	1,300	3,300
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	3,600
Tetrachloroethylene	2,400	120	160	ND	87	1,000	34	63	49,000
Toluene	1,100	ND	ND	110	ND	ND	ND	1,000	2,800
1,1,1-Trichloroethane	11	ND	ND	1,500	ND	ND	ND	ND	ND
Trichloroethylene	120	ND	ND	230	ND	35	ND	26	360
Xylene (total)	ND	ND	ND	2,300	ND	ND	ND	6,700	8,900

PARAMETER	OHSG-350	OHSG-351	OHSG-352	OHSG-353	OHSG-354	OHSG-355	OHSG-356	OHSG-357	OHSG-358
VOLATILE ORGANICS (µg/m³)									
Benzene	1,000	ND	1,600	ND	ND	ND	740	ND	ND
Chlorobenzene	36,000	ND	ND	ND	ND	ND	4,300	ND	ND
Ethylbenzene	ND	ND	5,000	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	730	34	54	1,400	430	230	130	110	63
Toluene	6,600	ND	2,100	ND	ND	ND	6,900	ND	ND
Trichloroethylene	28	ND	56	ND	ND	ND	76	ND	54
Xylene (total)	7,900	ND	20,000	ND	ND	DN	11,000	ND	ND

ND - Not detected at analytical detection limit (Ref. 7).
BQL - Compound detected below minimum quantitation limit.

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-359	OHSG-360	OHSG-361	OHSG-362	OHSG-363	OHSG-364	OHSG-365	OHSG-366	OHSG-367
VOLATILE ORGANICS (µg/m³)									
Benzene	ND	450	ND	580	2,600	ND	ND	1,500	340
Chlorobenzene	ND	ND	ND	13,000	4,400	ND	ND	4,000	1,200
Ethylbenzene	ND	ND	ND	33,000	ND	ND	ND	ND	ND
Tetrachloroethylene	920	ND	640	150	ND	390	39	23	420
Toluene	ND	24	ND	5,200	ND	ND	ND	ND	5,200
Trichloroethylene	ND	26	140	ND	ND	65	ND	31	84
Xylene (total)	ND	ND	1,600	64,000	16,000	ND	ND	8,700	ND

PARAMETER	OHSG-368	OHSG-369	OHSG-370	OHSG-371	OHSG-372	OHSG-373	OHSG-374	OHSG-375	OHSG-376
VOLATILE ORGANICS (µg/m³)									
Benzene	830	ND	ND	ND	ND	1,300	940	460	ND
Chlorobenzene	4,600	ND	ND	ND	1,900	1,900	4,900	ND	ND
Tetrachloroethylene	ND	190	ND	ND	ND	ND	ND	29	270
Toluene	ND	ND	ND	ND	ND	790	6,800	ND	1,100
Trichloroethylene	34	ND	ND	ND	ND	ND	ND	64	100
Xylene (total)	7,600	ND	ND	ND	ND	27,000	7,100	ND	ND

* - Water sample; units in µg/l.
ND - Not detected at analytical detection limit (Ref. 7).

TABLE 3-1 (Page 20 of 21)

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-377	OHSG-378	OHSG-379	OHSG-380	OHSG-381	OHSG-382	OHSG-383	OHSG-384	OHSG-385
VOLATILE ORGANICS (µg/m³)									
Benzene	ND	1,200	ND	460	ND	ND	1,500	ND	ND
Chlorobenzene	ND	13,000	ND	5,700	ND	ND	6,900	ND	ND
Tetrachloroethylene	ND	ND	ND	ND	47	130	ND	230	840
Toluene	ND	4,500	ND	2,600	800	ND	3,600	ND	ND
Trichloroethylene	ND	ND	ND	ND	32	ND	ND	ND	ND
Xylene (total)	ND	6,900	ND	700	ND	ND	1,400	ND	ND

PARAMETER	OHSG-386	OHSG-387	OHSG-388	OHSG-389	OHSG-390	OHSG-391	OHSG-392	OHSG-393	OHSG-394
VOLATILE ORGANICS (µg/m³)									
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	980	ND
Tetrachloroethylene	75	440	350	250	230	1,000	250	91	120

ND - Not detected at analytical detection limit (Ref. 7).

SOIL GAS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-395	OHSG-396	OHSG-397	OHSG-398	OHSG-399	OHSG-400	OHSG-401	OHSG-402	OHSG-403	OHSG-404
VOLATILE ORGANICS (µg/m³)										
Carbon tetrachloride	ND	ND	BQL	1,200	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	550	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	120	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	43	260	380	210	93	420	ND	610	120	540
Toluene	ND	ND	360	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	20	ND	ND	ND	ND	ND	ND	ND

3-13A21

PARAMETER	OHSG-405	OHSG-406	OHSG-407	OHSG-408	OHSG-409	OHSG-410	OHSG-411	OHSG-412	OHSG-413
VOLATILE ORGANICS (µg/m³)									
Chloroform	ND	ND	ND	ND	150	ND	ND	ND	ND
Tetrachloroethylene	130	230	55	560	950	130	420	1,300	24
Toluene	ND	410	ND	ND	ND	ND	ND	740	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	1,300	280	ND	70	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	250	ND

ND - Not detected at analytical detection limit (Ref. 7).

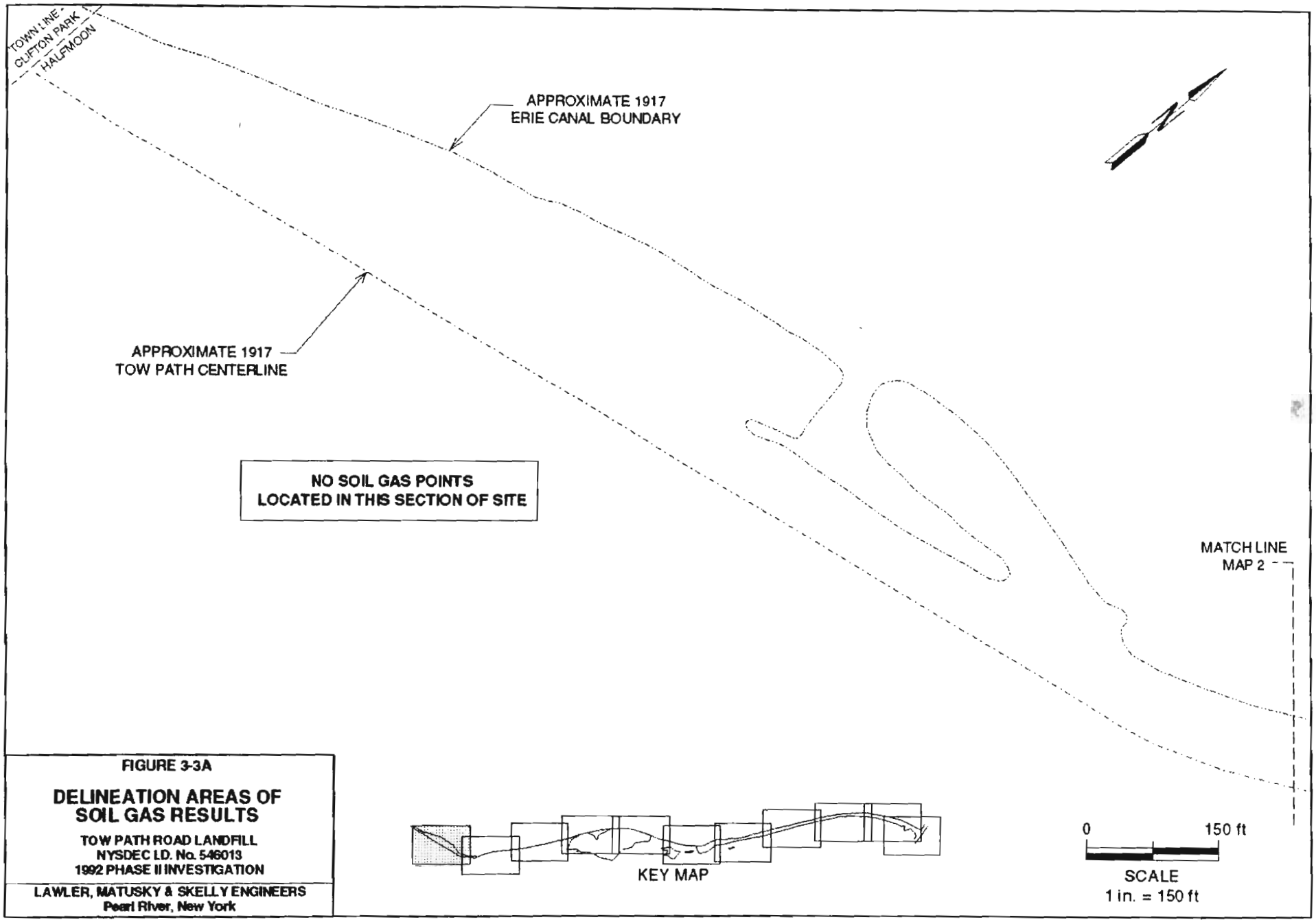


FIGURE 3-3A

DELINEATION AREAS OF SOIL GAS RESULTS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

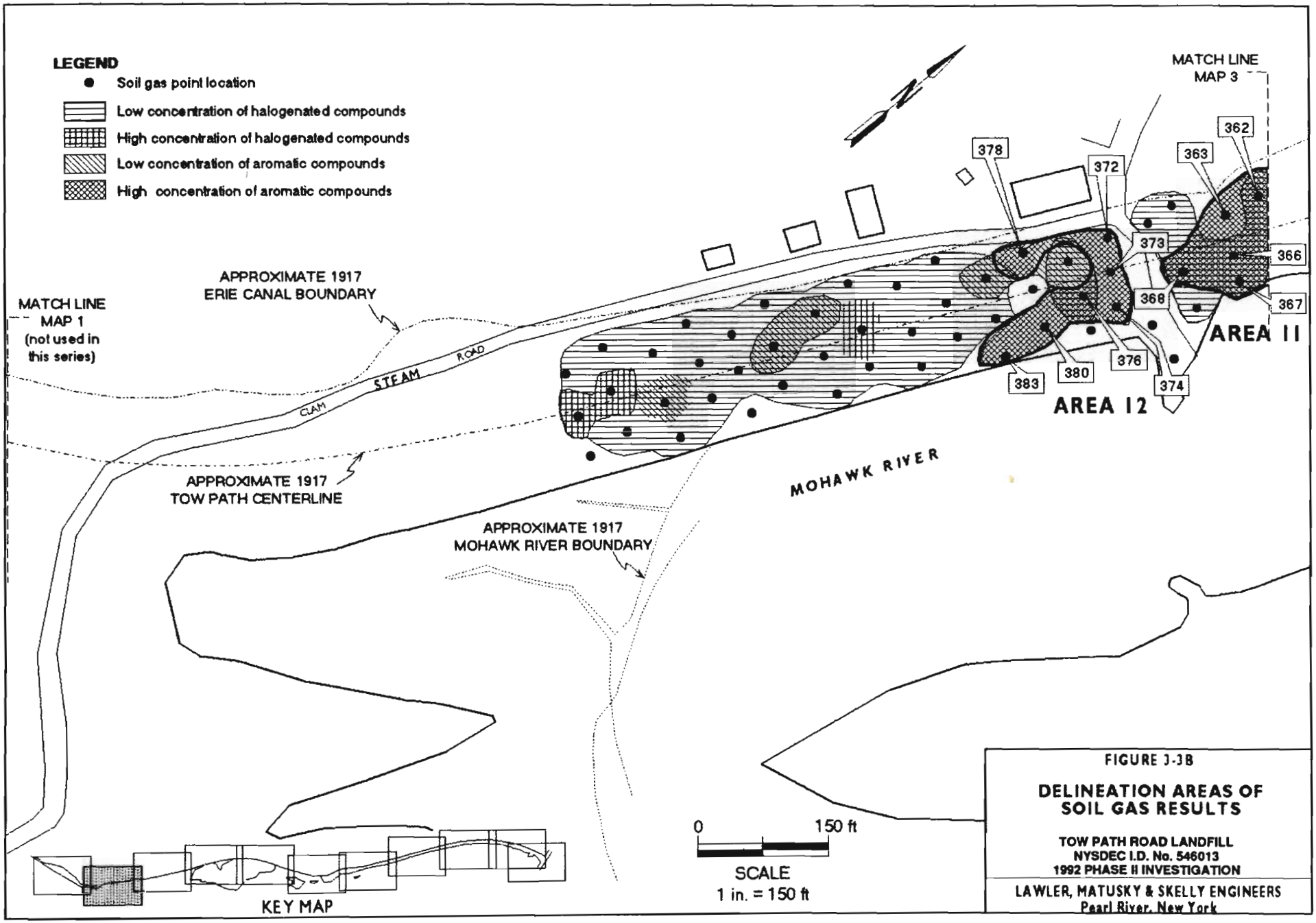


FIGURE 3-3B

DELINEATION AREAS OF SOIL GAS RESULTS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

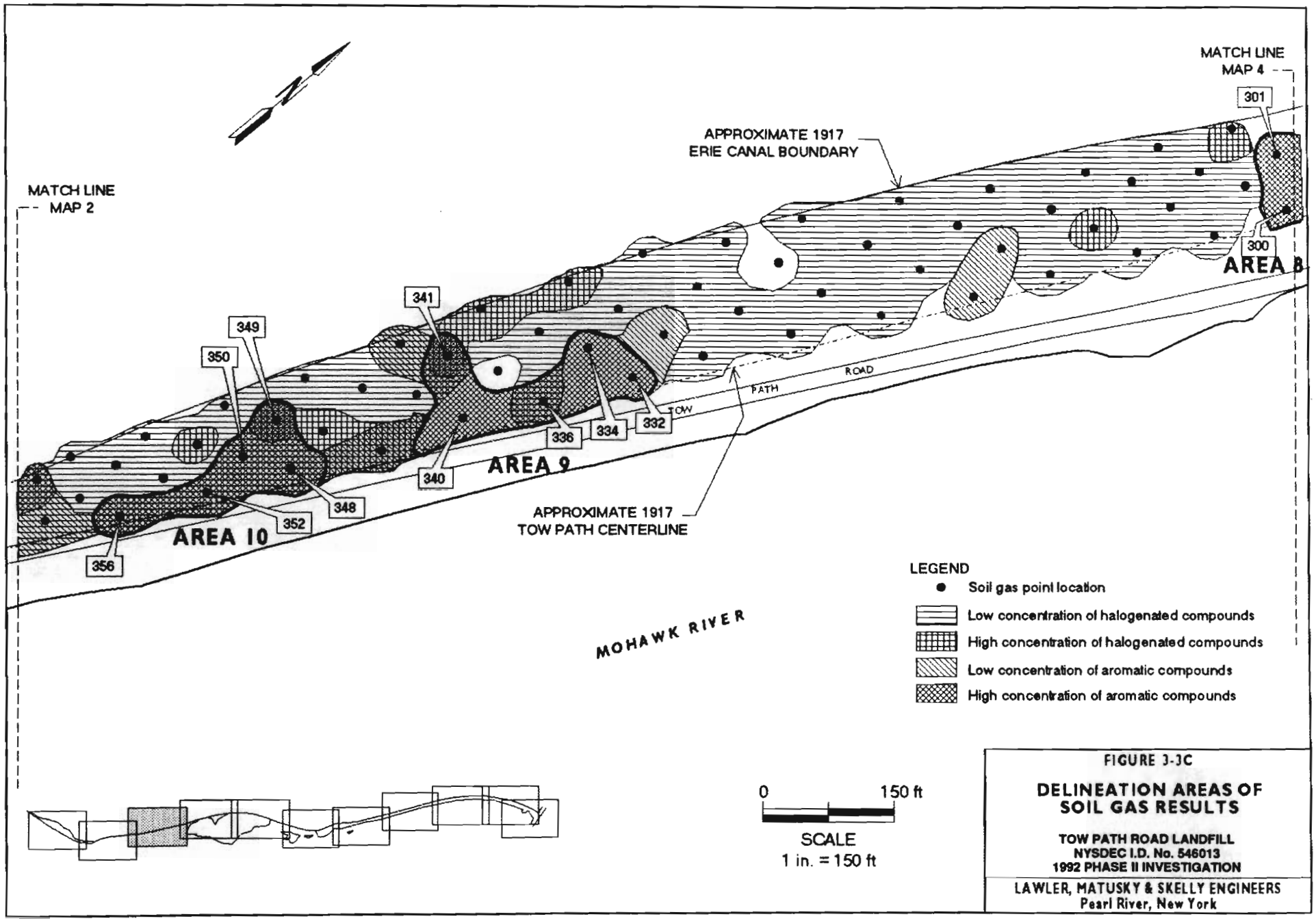


FIGURE 3-3C

DELINEATION AREAS OF SOIL GAS RESULTS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

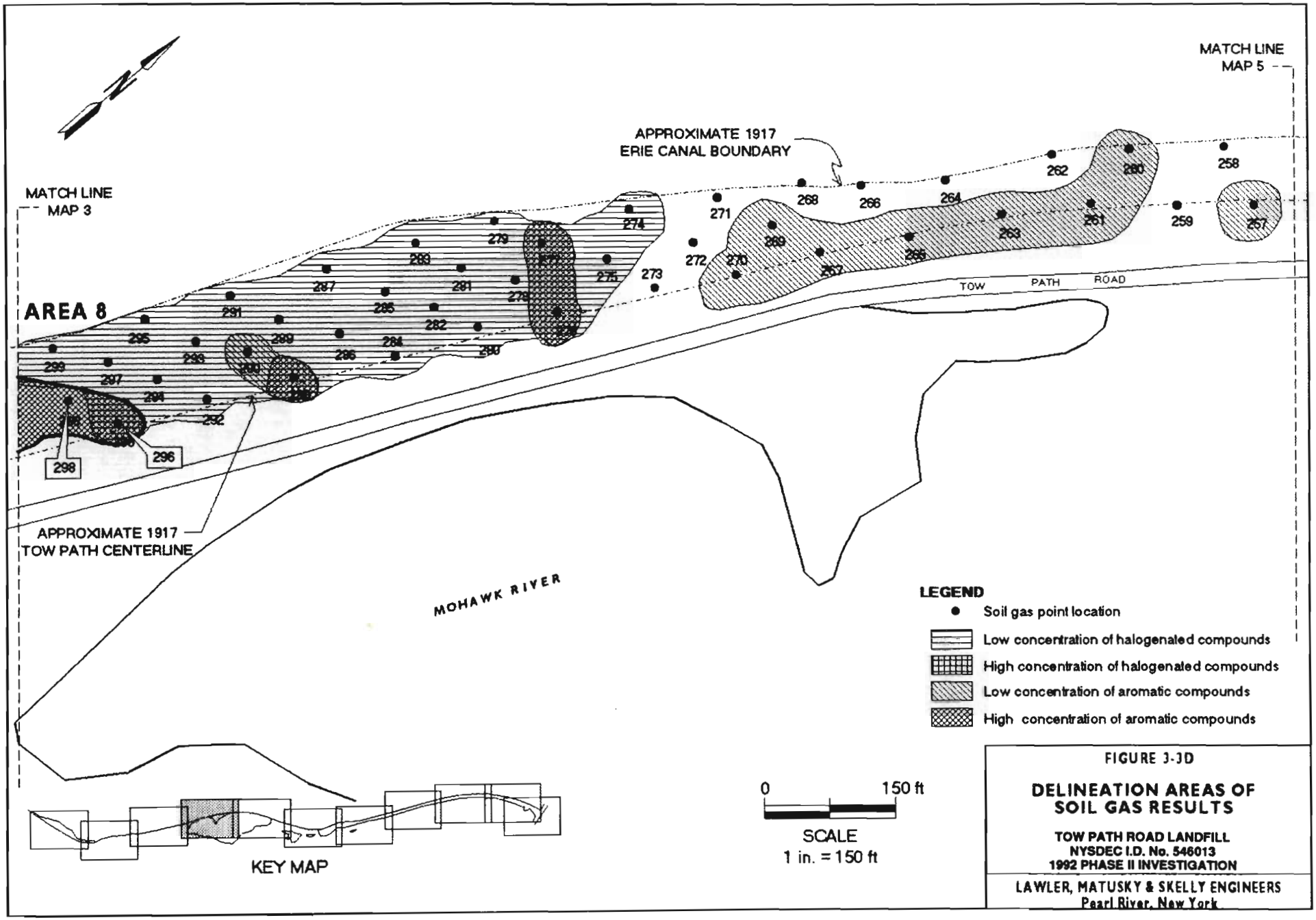


FIGURE 3-3D

DELINEATION AREAS OF SOIL GAS RESULTS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

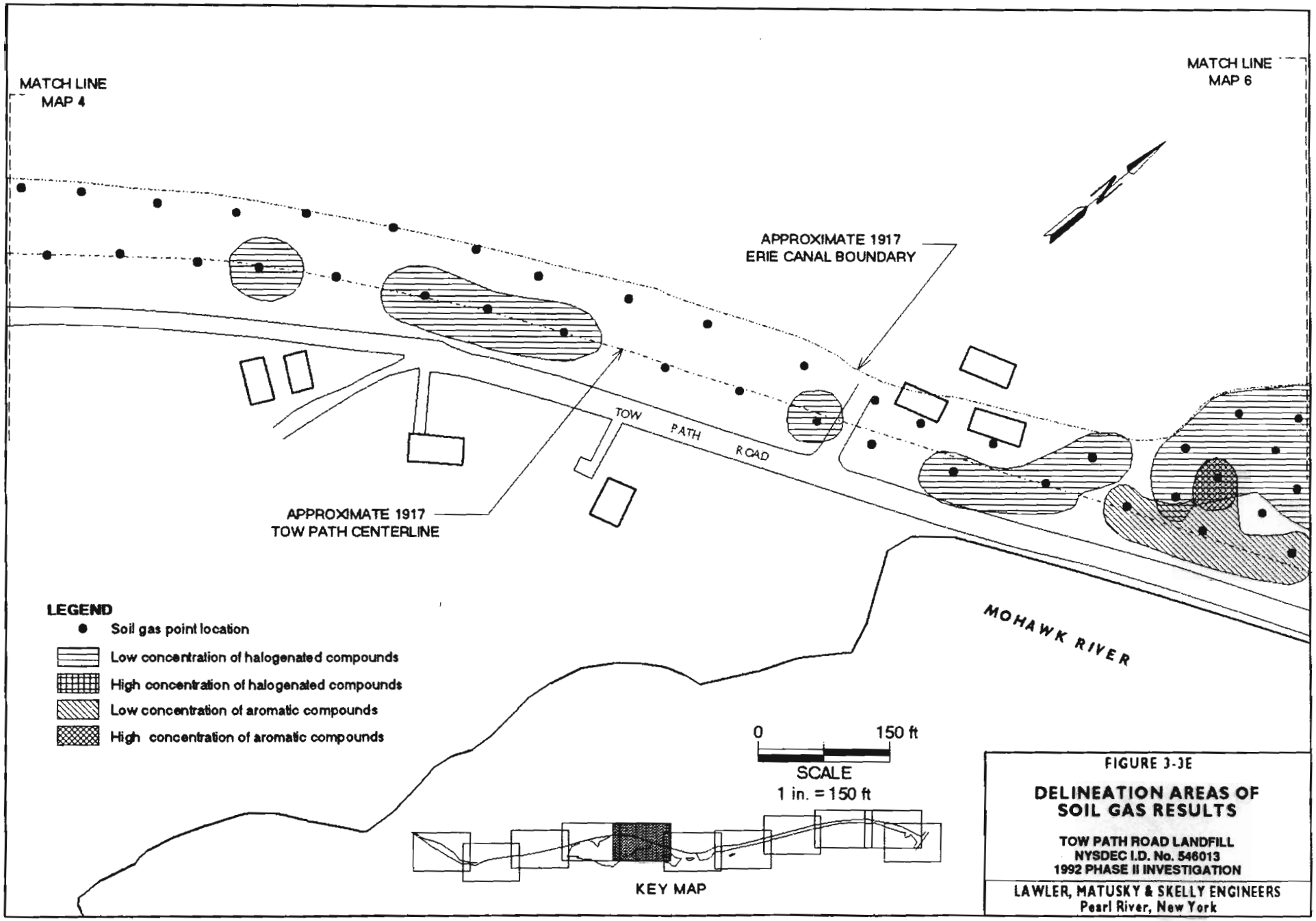


FIGURE 3-3E

DELINEATION AREAS OF SOIL GAS RESULTS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

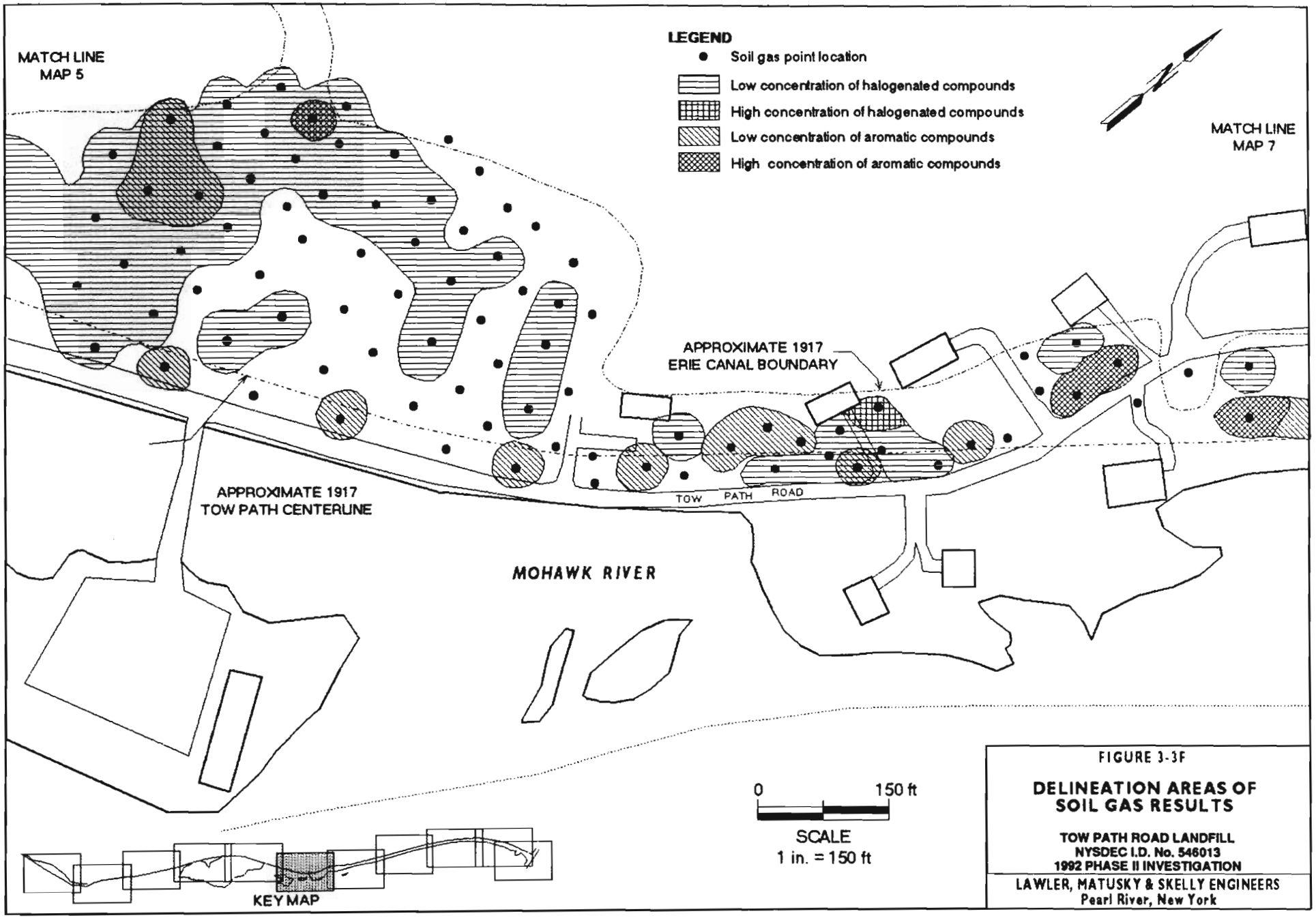


FIGURE 3-3F

DELINEATION AREAS OF SOIL GAS RESULTS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

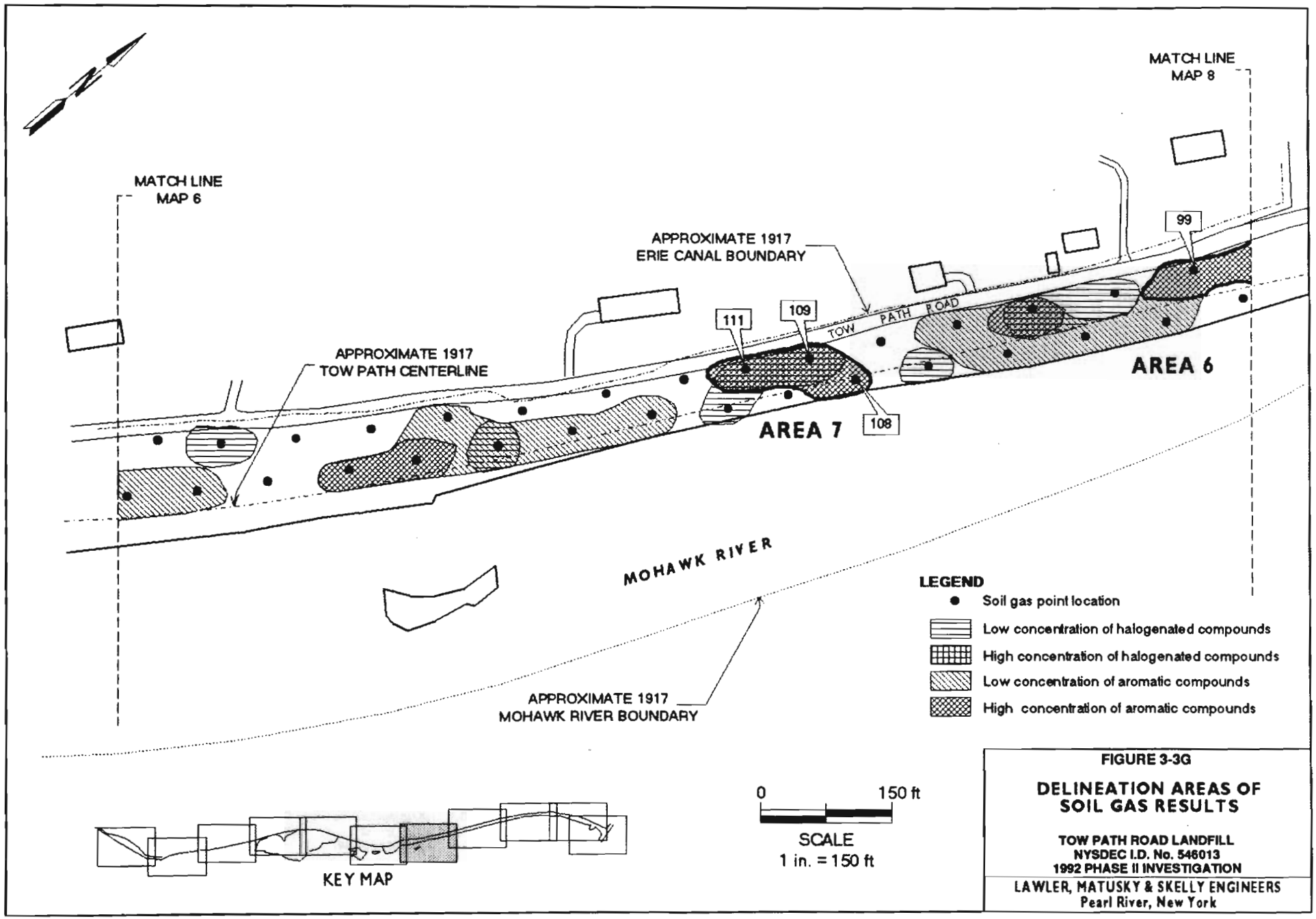


FIGURE 3-3G

DELINEATION AREAS OF SOIL GAS RESULTS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

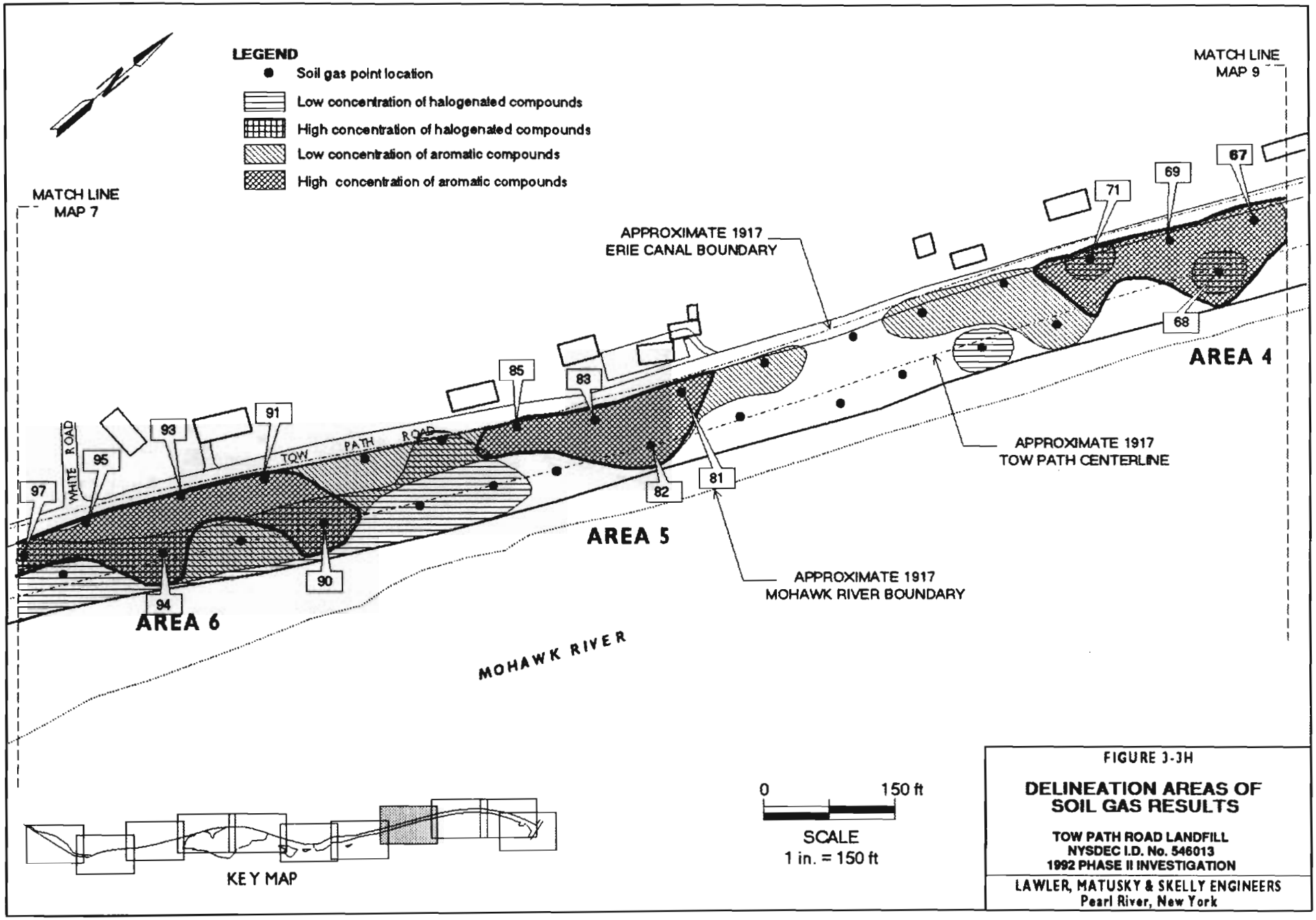


FIGURE 3-3H

DELINEATION AREAS OF SOIL GAS RESULTS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

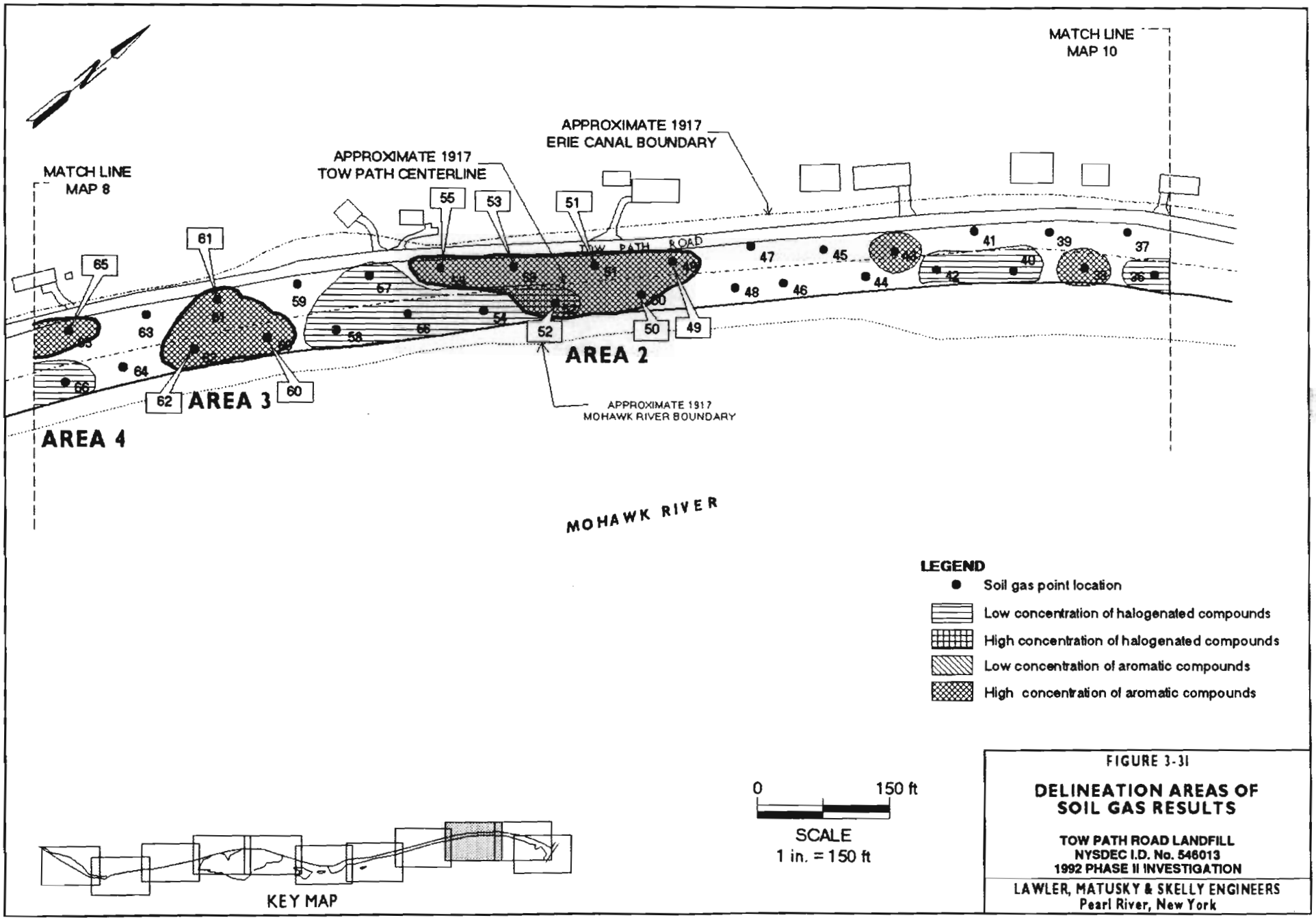


FIGURE 3-31

DELINEATION AREAS OF SOIL GAS RESULTS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

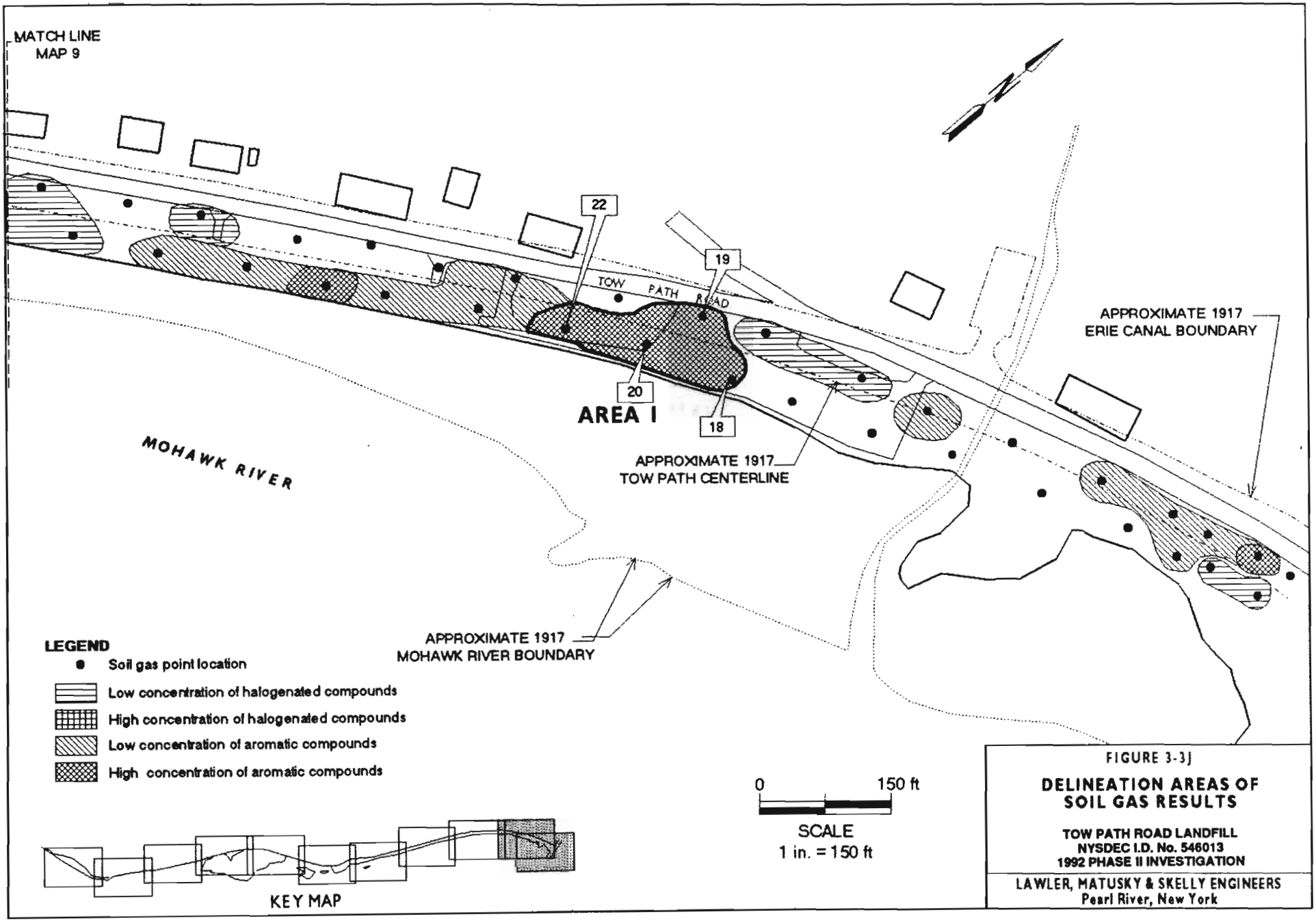


FIGURE 3-3J

DELINEATION AREAS OF SOIL GAS RESULTS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

TABLE-3-2 (Page 1 of 2)

DISTRIBUTION OF AROMATIC COMPOUNDS IN SOIL GAS

Tow Path Road Landfill NYSDEC I.D. No. 546013

AREAS	SOIL GAS POINTS	CORRESPONDING FIGURE	AROMATIC COMPOUND CONCENTRATIONS					TOTAL VOCs
			BENZENE	CHLOROBENZENE	ETHYLBENZENE	TOLUENE	XYLENE (total)	
Area 1	18	3-3I	490	3,300	ND	ND	3,800	7,590
	19		ND	ND	ND	ND	8,000	8,000
	20		650	3,300	ND	ND	ND	3,950
	22		ND	2,100	ND	ND	ND	2,100
Area 2	49	3-3H	720	8,900	ND	ND	8,600	18,220
	50		ND	1,900	ND	ND	ND	1,900
	51		390	8,600	ND	ND	22,000	30,990
	52		ND	3,600	ND	ND	1,100	4,700
	53		450	11,000	ND	ND	ND	11,450
	55		570	16,000	ND	ND	ND	16,570
Area 3	60	3-3H	3,100	8,900	ND	3,700	10,000	25,700
	61		3,000	54,000	ND	ND	ND	57,000
	62		990	9,900	ND	3,200	5,300	19,390
Area 4	65	3-3G,H	1,000	7,200	ND	ND	8,800	17,000
	67		730	4,700	1,300	ND	8,200	14,930
	68		2,400	6,000	ND	7,300	3,000	18,700
	69		960	8,000	ND	ND	3,200	12,160
	71		1,900	6,000	ND	ND	3,200	11,100
Area 5	81	3-3G	570	2,500	ND	ND	6,600	9,670
	82		240	2,000	2,300	550	390	5,480
	83		720	ND	2,000	ND	660	3,380
	85		3,900	12,000	ND	ND	ND	15,900
Area 6	90	3-3F,G	470	25,000	ND	ND	ND	25,470
	91		670	3,600	ND	ND	8,100	12,370
	93		3,100	5,200	ND	ND	11,000	19,300
	94		230	ND	ND	ND	5,100	5,330
	95		1,200	ND	ND	710	17,000	18,910
	97		380	12,000	ND	ND	4,500	16,880
	99		250	ND	ND	4,600	7,900	12,750

ND - Not detected at analytical detection limit (Ref. 7).

Table 3-2 (Page 2 of 2)

DISTRIBUTION OF AROMATIC COMPOUNDS IN SOIL GAS

Tow Path Road Landfill NYSDEC I.D. No. 546013

AREAS	SOIL GAS POINTS	CORRESPONDING FIGURE	AROMATIC COMPOUND CONCENTRATIONS					TOTAL VOCs
			BENZENE	CHLOROBENZENE	ETHYLBENZENE	TOLUENE	XYLENE (total)	
Area 7	108	3-3F	300	3,700	ND	ND	ND	4,000
	109		650	4,200	5,600	ND	5,400	15,850
	111		380	ND	ND	1,400	8,500	10,280
Area 8	296	3-3B,C	ND	3,100	ND	ND	790	3,890
	298		310	ND	ND	ND	4,400	4,710
	300		ND	1,800	ND	ND	6,900	8,700
	301		370	13,000	2,400	ND	4,500	20,270
Area 9	332	3-3B	620	14,000	ND	630	5,600	20,850
	334		560	3,800	20,000	2,700	88,000	115,060
	336		ND	ND	ND	1,100	6,900	8,000
	340		390	10,000	3,400	820	23,000	37,610
	341		ND	ND	ND	110	ND	110
Area 10	348	3-3B	ND	1,300	ND	1,000	6,700	9,000
	349		ND	3,300	3,600	2,800	8,900	18,600
	350		1,000	36,000	ND	6,600	7,900	51,500
	352		1,600	ND	5,000	2,100	20,000	28,700
	356		740	4,300	ND	6,900	11,000	22,940
Area 11	361	3-3A,B	ND	ND	ND	ND	1,600	1,600
	362		580	1,300	33,000	5,200	64,000	104,080
	363		2,600	4,400	ND	ND	16,000	23,000
	366		1,500	4,000	ND	ND	8,700	14,200
	367		340	1,200	ND	5,200	ND	6,740
	368		830	4,600	ND	ND	7,600	13,030
Area 12	372	3-3A	ND	1,900	ND	ND	ND	1,900
	373		1,300	1,900	ND	790	27,000	30,990
	374		940	4,900	ND	6,800	7,100	19,740
	376		ND	ND	ND	1,100	ND	1,100
	378		1,200	13,000	ND	4,500	6,900	25,600
	380		460	5,700	ND	2,600	700	9,460
	383		1,500	6,900	ND	3,600	1,400	13,400

ND - Not detected at analytical detection limit (Ref. 7).

point OHSG-61. The results were used to place test trench OHT-2B at point OHSG-61, with a shift toward soil gas point OHSG-60 (Figure 1-2I).

Area 4, located approximately 100 ft south of Area 3, extended between lines 151 and 167 (Figures 3-3H and 3-3I). This area contained five soil gas points (OHSG-65, -67, -68, -69, and -71). Total xylenes detected in Area 4 ranged from 3000 $\mu g/m^3$ at OHSG-68 to 8800 $\mu g/m^3$ at point OHSG-65. The highest value of chlorobenzene (8000 $\mu g/m^3$) was detected at soil gas point OHSG-69; however, the highest levels of benzene (2400 $\mu g/m^3$) and toluene (7300 $\mu g/m^3$) were detected at OHSG-68. No test trench location was selected at Area 4 because the concentration of aromatic compounds detected at this area was lower than at the other identified areas.

Areas 5 and 6, approximately 250 ft south of Area 4, extended east of Tow Path Road between lines 191 and 238. These areas contained high concentrations of aromatic compounds detected at soil gas points OHSG-81, -82, -83, and -85 (Area 5) and OHSG-90, -91, -93, -94, -95, -97, and -99 (Area 6) and were connected by a low concentration area of VOCs (Figures 3-3G and 3-3H). Relatively high values of benzene were detected at Areas 5 and 6, ranging from 3900 $\mu g/m^3$ at OHSG-85 to 3100 at OHSG-94. Chlorobenzene was detected as high as 12,000 $\mu g/m^3$ at OHSG-85 in Area 5 and 25,000 $\mu g/m^3$ at OHSG-80 in Area 6. Ethylbenzene was detected only in Area 5, with moderate values of 2300 and 2000 $\mu g/m^3$ at soil gas points OHSG-82 and -83, respectively. Total xylenes were also found at a high concentration of 6600 $\mu g/m^3$ at OHSG-81 in Area 5 and 17,000 $\mu g/m^3$ at OHSG-95 in Area 6. Based on these results, test trenches OHT-3B and -4B were located at Area 6. OHT-3B, located at soil gas point OHSG-90, extended toward the location of soil gas point OHSG-91; OHT-4B, at soil gas point OHSG-95, extended toward point OHSG-97 (Figure 1-2H).

Area 7, located approximately 350 ft south of Area 6, extended from line 258 to line 270 (Figure 3-3G). This small area was covered by only three soil gas points (OHSG-108, -109, and -111). Aromatic compounds detected at this area consisted of benzene (ranging from 300 $\mu g/m^3$ at OHSG-108 to 650 $\mu g/m^3$ at OHSG-109), chlorobenzene (high value of 4200 $\mu g/m^3$ found at point OHSG-109), and ethylbenzene detected in one soil gas point, OHSG-109

(value of 5600 $\mu g/m^3$). Toluene was detected only at OHSG-111, at 1400 $\mu g/m^3$; xylene was as high as 8500 $\mu g/m^3$ at OHSG-111. Trichloroethylene was detected at a low level, 33 $\mu g/m^3$, at OHSG-109 and at 230 $\mu g/m^3$ at OHSG-111. No test trench was located at Area 7.

The location of soil gas points OHSG-120 and -122 was not selected as one of the high concentration areas of aromatic compounds because it contained only two soil gas points (Figure 3-3G), and one of them, OHSG-120, was a water sample. Soil gas points OHSG-120 and -122 showed high values of aromatic compounds (total xylenes of 3100 $\mu g/l$ at OHSG-120 and 12,000 $\mu g/m^3$ at OHSG-122; benzene at 820 $\mu g/m^3$, chlorobenzene at 23,000 $\mu g/m^3$, and ethylbenzene at 7300 $\mu g/m^3$ at OHSG-122). Based on the results of soil gas points OHSG-120 and -122, and the results of the previous magnetometry survey data, test trench OHT-5B was located at soil gas point OHSG-122 and shifted toward OHSG-123 (Figure 1-2G).

As part of NYSDEC's response to public concern about the possibility of contaminated drinking water, the NYSDEC representative recommended placing a test trench, OHT-6B, in the vicinity of the residence at 125 Tow Path Road (Canal Road). None of the soil gas points installed around this residence detected high concentrations of VOCs except soil gas point OHSG-141, where relatively high values of tetrachloroethylene (2800 $\mu g/m^3$) and low values of trichloroethylene (96 $\mu g/m^3$) were detected. Soil gas point OHSG-141 was located approximately 3 ft south of the south property line (Figure 3-3F). Based on the soil gas results and the recommendation of the NYSDEC representative, test trench OHT-6B was located at soil gas point OHSG-141 (Figure 1-2F).

More than 70 soil gas points were installed where the old Erie Canal reached its maximum width of approximately 400 ft (Figures 3-3E and 3-3F). The results from the sample points installed across this area showed low concentrations of VOCs, especially halogenated compounds, except at two locations (OHSG-198 and -207) where high values of benzene, chlorobenzene, ethylbenzene, toluene, and total xylenes were detected in sample point OHSG-207 at concentrations of 700, 8200, 2000, 490, and 5500 $\mu g/m^3$, respectively. Toluene was detected only at sample point OHSG-198, at a concentration of 1300 $\mu g/m^3$. No areas of high level concentrations of aromatic compounds were identified at this location. Because

of the quantity of soil gas points installed in this wide portion of the canal, test trench OHT-7B was located at soil gas point OHSG-207, where high values of VOCs were detected (Figure 1-2F).

Some of the test trenches were excavated at locations where halogenated compounds were found in high concentrations. Soil gas point OHSG-228, located approximately 150 ft west of Tow Path Road (along line 401) (Figure 3-3E), showed relatively moderate concentrations of tetrachloroethylene (940 $\mu g/m^3$) in comparison to the surrounding area. Trichloroethylene and 1,1,1-trichloroethane were also detected at low values of 24 and 36 $\mu g/m^3$, respectively. Based on the results of the soil gas data and the magnetometry data review, test trench OHT-8B was located at sample point OHSG-228 (Figure 1-2E).

Area 8, located west of Tow Path Road, extended from approximately line 532 to line 545 (Figures 3-3C and 3-3D). The results of the samples collected from the four soil gas points (OHSG-296, -298, -300, and -301) installed at this location showed high levels of aromatic compounds: benzene as high as 370 $\mu g/m^3$ at point OHSG-301, chlorobenzene from 1800 $\mu g/m^3$ at point OHSG-300 to 13,000 $\mu g/m^3$ at point OHSG-301, ethylbenzene at 2400 $\mu g/m^3$ at point OHSG-302, and total xylenes from 790 $\mu g/m^3$ at OHSG-296 to 6900 $\mu g/m^3$ at OHSG-300. In addition, low concentrations of halogenated compounds (tetrachloroethylene and trichloroethylene) were detected at points OHSG-299 (tetrachloroethylene at 570 $\mu g/m^3$) and OHSG-301 (tetrachloroethylene at 37 $\mu g/m^3$ and trichloroethylene 26 $\mu g/m^3$). After the data were reviewed, test trench OHT-9B was located at soil gas point OHSG-303 and shifted toward point OHSG-303, where relatively high concentrations of tetrachloroethylene (1800 $\mu g/m^3$) were detected (Figure 1-2C).

Areas 9, 10, and 11, located approximately 700 ft south of Area 8, extended between lines 578 and 624 (Figures 3-3B and 3-3C). These three areas were connected by areas of lower concentrations of aromatic compounds. The results of five soil gas points (OHSG-332, -334, -336, -340, and -341) installed at Area 9 showed high levels of chlorobenzene (from 10,000 $\mu g/m^3$ at OHSG-340 to 14,000 $\mu g/m^3$ at OHSG-332), ethylbenzene (from 3400 $\mu g/m^3$ at OHSG-340 to 20,000 $\mu g/m^3$ at OHSG-334), toluene (from 110 $\mu g/m^3$ at OHSG-341 to 2700 $\mu g/m^3$ at OHSG-334), and total xylenes (from 5600 $\mu g/m^3$ at OHSG-332 to 88,000 $\mu g/m^3$ at

OHSG-334). A moderate concentration of tetrachloroethylene (2400 $\mu g/m^3$) was also detected at point OHSG-341. Based on the results of the soil gas data, test trenches OHT-10B and -11B were located at soil gas points OHSG-334 and -341, respectively (Figure 1-2C).

Area 10 showed high levels of aromatic compounds at soil gas points OHSG-348, -349, -350, -351, and -352. These aromatic compounds consisted of benzene (1600 $\mu g/m^3$ at OHSG-352), chlorobenzene (as high as 36,000 $\mu g/m^3$ at OHSG-350), ethylbenzene (3600 to 5000 $\mu g/m^3$), toluene (2100 to 6600 $\mu g/m^3$), and total xylenes (6700 to 20,000 $\mu g/m^3$). High concentrations of tetrachloroethylene (49,000 $\mu g/m^3$) were also found at soil gas point OHSG-349. Based on the results from Area 10, test trench OHT-12B was located between soil gas points OHSG-349 and -350 (Figure 1-2C).

The results from Area 11 indicated that high levels of aromatic compounds were present at soil gas points OHSG-361, -362, -363, -366, -367, and -368, including benzene (450 to 2600 $\mu g/m^3$), chlorobenzene (ND to 10,000 $\mu g/m^3$ at point OHSG-362), ethylbenzene (ND to 33,000 $\mu g/m^3$ at point OHSG-362), toluene (ND to 5200 $\mu g/m^3$), and total xylenes (ND to 64,000 $\mu g/m^3$ at point OHSG-362). Low concentrations of tetrachloroethylene (39 to 640 $\mu g/m^3$) were also detected, along with trichloroethylene (ND to 140 $\mu g/m^3$). After the data were reviewed, test trench OHT-13B was located at soil gas point OHSG-362 (Figure 1-2B).

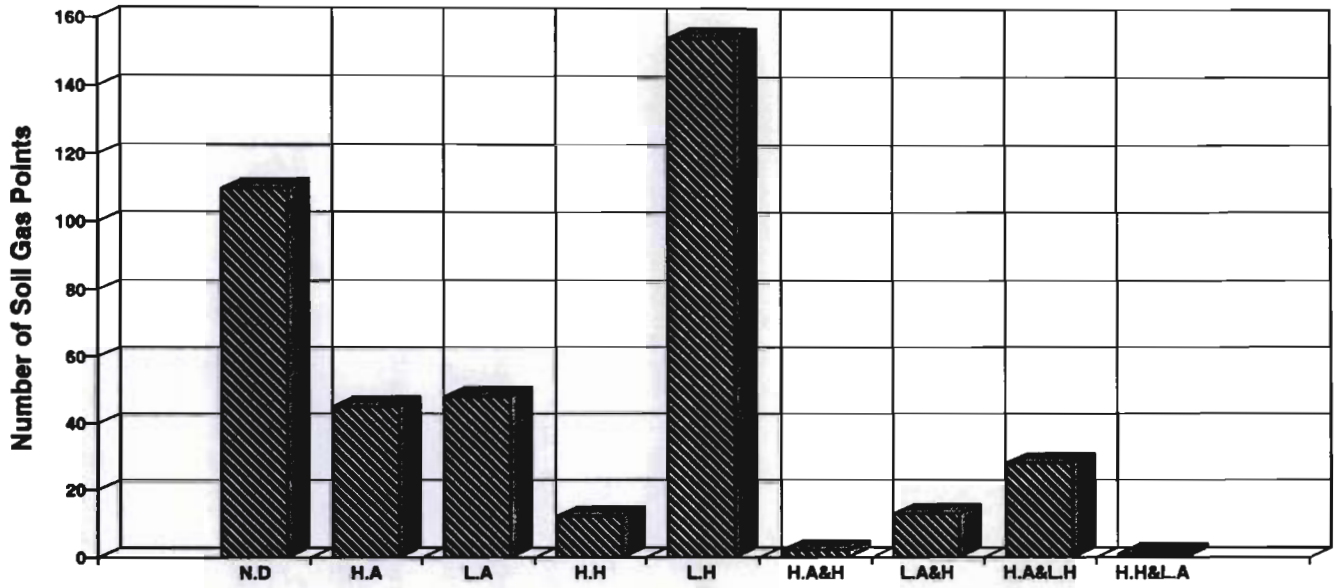
Area 12 is located opposite Clam Steam Tavern, approximately 1100 ft north of the Interstate 87 bridge (Figure 3-3B). Seven soil gas points (OHSG-372, -373, -374, -376, -378, -380, and -383) installed in this area showed high concentration values of aromatic compounds. The highest concentrations of benzene (1500 $\mu g/m^3$), chlorobenzene (13,000 $\mu g/m^3$), toluene (6800 $\mu g/m^3$), and total xylenes (27,000 $\mu g/m^3$) were found at soil gas points OHSG-383, -378, -374, and -373, respectively. Low concentrations of tetrachloroethylene (ND to 130 $\mu g/m^3$) were also detected in this area along with trichloroethylene. The results were used to locate test trench OHT-14B at soil gas point OHSG-376, extending toward point OHSG-380 (Figure 1-2B).

Relatively high values of halogenated compounds were detected at soil gas points OHSG-409 and -412. The results from point OHSG-409 indicated the presence of tetrachloroethylene (950 $\mu g/m^3$) and 1,1,1-trichloroethane (1300 $\mu g/m^3$). Also, a low concentration of chloroform (150 $\mu g/m^3$) was detected at point OHSG-409. Soil gas point OHSG-412 showed elevated values of tetrachloroethylene (1300 $\mu g/m^3$) and trichloroethylene (250 $\mu g/m^3$) as well as low concentrations of toluene (740 $\mu g/m^3$). Based on these results, test trench OHT-15B was located between soil gas points OHSG-409 and -412 (Figure 1-2B).

The NYSDEC representative recommended that an additional test trench, OHT-16B (Figure 1-2D), be excavated at the location of soil gas point OHSG-265; this point was located along line 488, west of Tow Path Road (Figure 3-3D). The location was selected based on the results of a surface water sample collected in December 1991 from a nearby area where PCBs had been detected. Only low levels of chlorobenzene (35 $\mu g/m^3$) were detected at soil gas point OHSG-265.

The soil gas data were subject to spatial variation statistical analysis and are shown on Figure 3-4. The results of these analyses showed that more than 25% (110 points) of the total soil gas points (413 points) did not detect any VOCs above the analytical detection limit (ND). Seventy-six points detected high levels of aromatic compounds; these points were divided into three categories: (1) samples with high aromatic compounds only (45 points), (2) samples with high levels of aromatic compounds and low concentrations of halogenated compounds (28 points), and (3) samples with high aromatic and halogenated compounds (two points). The analyses also showed that the high concentration levels of halogenated compounds (tetrachloroethylene, trichloroethylene, and 1,1,1,-trichloroethylene) were detected at only 13 soil gas points and were associated with low levels of aromatic compounds only at one soil gas point.

The analyses showed low levels of halogenated compounds that were not associated with any aromatic compounds at more than 37% (154 points) of the soil gas points. In addition, only 13 soil gas points detected low concentrations of aromatic and halogenated compounds.



* ND: Not detected at analytical detection limit.
* H.A: Samples with high concentrations of Aromatic compounds only (>1000 $\mu g/m^3$)
* L.A: Samples with low concentrations of Aromatic compounds only (<1000 $\mu g/m^3$)
* H.H: Samples with high concentrations of Halogenated compounds only (>1000 $\mu g/m^3$)
* L.H: Samples with low concentrations of Halogenated compounds only (<1000 $\mu g/m^3$)
* H.A&H: Samples with high concentrations of Aromatic & Halogenated compounds (>1000 $\mu g/m^3$)
*L.A&H: Samples with low concentrations of Aromatic & Halogenated compounds (<1000 $\mu g/m^3$)
*H.A&L.H: Samples with high concentrations of Aromatic compounds & low concentrations of Halogenated compounds (>1000 $\mu g/m^3$)
*H.H&L.A: Samples with high concentrations of Halogenated compounds & low concentrations of Aromatic compounds (>1000 $\mu g/m^3$)

FIGURE 3-4

STATISTICAL ANALYSIS OF SOIL GAS DATA

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

3.6 TEST TRENCHES (September 1992)

Intrusive sample collection was to be performed by installing test trenches at specific locations throughout the landfill. LMS proposed to install 16 trenches whose locations would be finalized after review of any available information, including the soil gas data, results of the previously performed geophysics survey, test trench sample data, and surface water sampling results.

The soil gas survey identified 12 areas with high concentrations of VOCs, specifically, aromatic compounds in the fill (Section 3.5.1). The data from the 1991 magnetometry survey were then reviewed in these specific areas to determine the areas most likely to contain both contaminants and ferrous metals. Ten test trenches were excavated at eight of the 12 identified areas. Although the remaining four areas contained several points close together that detected aromatic compounds, test trenches were not dug because the detected concentrations were lower than those at the other areas. Test trenches were also excavated in several locations based on various criteria, including an extremely high concentration of VOCs at a single isolated point. The results of previous surface water sampling that indicated possible contaminated leachate near the residence of a local landowner were also used to locate a test trench.

During the development of the work plan for the trenches, it was proposed that at least two would be extended to the base of the fill material, into the canal bottom.

Sterling Environmental was contracted to conduct the excavations under LMS supervision. This second phase of excavations was conducted similarly to the 1991 excavations. Prior to excavation, LMS submitted the results of the soil gas survey and proposed sample locations to NYSDEC for final approval.

LMS and Sterling Environmental mobilized on-site with excavation equipment on 22 September 1992. It was proposed that some trenches be excavated to the bottom of the canal. The deeper test pits would be installed in an effort to sample the lower areas of the canal for settled contamination and to determine whether drums are present at these depths.

Some of the trench locations had to be cleared of trees, brush, and debris. Each trench ranged from 22 to 75 ft and each was excavated in 0.5-ft lifts. As material was removed it was scanned with a Foxboro OVA 128 (FID), an HNU 101 (PID), an MSA 361 (CGI), a Photovac model MicroTIP HL-2000 (PID), and a dosimeter. A soil/waste sample was collected from each trench and analyzed for the full target compound list (TCL) and target analyte list (TAL), toxicity characteristic leaching procedure (TCLP) metals and organics, and hazardous waste characteristics. Individual samples were also collected from drums found inside some trenches. Table 3-3 summarizes the samples collected and the reasons for the test trench excavation at that location. Appendix A contains the test trench logs (Ref. 8). When necessary, individual uncovered drums were overpacked after sampling and put back in the trench at their original location. After each trench was completed, the waste material was replaced in the hole and clean cover material was used to evenly grade the surface. The finished surface of each trench was compacted and reseeded to restore its original condition. A steam cleaner with potable water was used to decontaminate the bucket and arm of the backhoe before each trench was excavated.

The health and safety plan (Ref. 3) was revised based on the previous excavation project and the results of the soil gas survey. Level D personal protection was used by the Sterling Environmental/LMS work team during the excavation. Level B escape packs and self-contained breathing apparatus (SCBA) were available during the excavation should unforeseen circumstances call for an upgrade.

3.6.1 **Test Trench 1B (OHT-1B)**

The excavation of test trench OHT-1B was performed on 22 September 1992. The location of this trench began at line 117 (Figure 1-2I), approximately 20 ft out from the edge of Tow Path Road. The excavation extended 43 ft, ending at line 119. A 2-ft layer of brown silty sand just below the grassy cover was found over fill material. Fill material consisted mainly of household debris, woods, tires, and junk. Water was measured at 5 ft below grade; a sheen was noted on the water surface. The OVA readings ranged from 70 to 300 units from fill material taken 5 ft below grade. Natural material of silty sand was encountered 9-11 ft below grade; the bottom of the canal is believed to be at 9 ft below grade, sloping to the east to a

TABLE 3-3

SELECTION OF TEST TRENCH LOCATIONS

Tow Path Road Landfill NYSDEC I.D. No. 546013

LOCATION	TEST TRENCHES	SAMPLE DESIGNATION	COMMENTS
Area 1	No excavation	No sample	Moderate to low concentrations of aromatic volatiles
Area 2	OHT-1B	OHTB-1 (10-11 ft)	Relatively high concentrations of aromatic volatiles
Area 3	OHT-2B	OHTB-2 (11-12 ft)	High concentrations of chlorobenzene and xylene
Area 4	No excavation	No sample	Moderate concentrations of aromatic volatiles
Area 5	No excavation	No sample	Moderate concentrations of aromatic volatiles
Area 6	OHT-3B and -4B	OHTB-3 (10-11 ft); OHTB-4 (12-13 ft)	High concentrations of chlorobenzene and xylene
Area 7	No excavation	No sample	Moderate concentrations of aromatic volatiles
Bet. 7 and 8	OHT-5B	OHTB-5 (10-11 ft)	High concentrations of chlorobenzene and xylene at soil gas point OHSG-122
Bet. 7 and 8	OHT-6B	OHTB-6 (6 ft)	Location recommended by NYSDEC representative
Bet. 7 and 8	OHT-7B	OHTB-7 (8 ft)	Location at former canal reached maximum width
Bet. 7 and 8	OHT-8B	OHTB-8 (4-5 ft)	Relatively high concentration of tetrachloroethylene at point OHSG-228
Bet. 7 and 8	OHT-16B	OHTB-16 (6 ft)	Location near SW sample detected PCBs
Area 8	OHT-9B	OHTB-9 (12 ft); OHTB-9 (14 ft); OHTB-9-D1*	High concentrations of chlorobenzene, ethylbenzene, and xylene at points OHSG-296, -300, and -301
Area 9	OHT-10B and -11B	OHTB-10 (12 ft); OHTB-11 (16 ft)	Soil gas points OHSG-332, -334, and -340 detected high concentrations of chlorobenzene, toluene, and xylene
Area 10	OHT-12B	OHTB-12 (16 ft)	Soil gas detected high concentrations of chlorobenzene, ethylbenzene, toluene, and xylene
Area 11	OHT-13B	OHTB-13 (16-17 ft); OHTB-13 MS/MSD	High concentrations of aromatic compounds detected at points OHSG-362, -363, -366, -367, and -368
Area 12	OHT-14B	OHTB-14 (17 ft); OHTB-14-D1	Relatively high concentrations of benzene, chlorobenzene, toluene, and xylene detected at Area 12
S. of Area 12	OHT-15B	OHTB-15 (14 ft); OHTB-15-D1	Relatively high concentrations of tetrachloroethylene detected at soil gas point OHSG-409

*D: Suffix on sample designates drum sample.

depth of 11 ft at the eastern end of the trench. Soil sample OHTB-1 was collected from the interface fill/soil (10-11 ft) interval at the eastern end of the trench and was submitted for laboratory analysis for full TCL, TCLP metals, and hazardous waste characteristics. The trench was backfilled after sample collection and clean cover material supplied by the Town of Halfmoon was used for final grading. The finished surface was seeded to prevent erosion.

3.6.2 **Test Trench 2B (OHT-2B)**

Trench 2B was located along line 143 and extended 29 ft to the east (Figure 1-2H). One foot of silty sand cover material was found above the fill layer. Refuse consisted mainly of mixed household garbage, metal (water tanks), and bottles. OVA readings ranged from 0 to 50 units both with and without the charcoal filter. One empty 10-gal metal drum was found at a depth of 5 ft and OVA readings of up to 800 units were recorded from head space in the drum. Groundwater was encountered at 5.5 ft below grade and a sheen was noted on the water surface at the southeast end of the trench. The actual source of the sheen could not be located. Soil sample OHTB-2 was collected from silty clay material below the fill material at a depth of 11 to 12 ft and submitted for analysis.

3.6.3 **Test Trench 3B (OHT-3B)**

The excavation at OHT-3B was performed on 23 September 1992. The trench extended from line 214 to line 216 (Figure 1-2H), with the west end located approximately 40 ft from the edge of Tow Path Road.

A thin (6-8 in.) grassy cover overlies the fill material. A typical garbage odor emanated from the excavation as it was deepened. Fill material contained household waste mixed with brown fill material. A 1-ft layer of gray silty clay was recovered 3 ft below grade. This layer was most likely used as backfill around a drainage pipe located 5 ft below grade. The pipe traverses the landfill and discharges into the river.

The trench was extended to the bottom of the fill, which was measured at a depth of 12 ft below grade and extended to a total length of 40 ft. A soil sample, OHTB-3, was collected from the interface between the garbage and the bottom material, which was sandy.

No drums were found at test trench OHT-3B. The OVA readings ranged from background to 200 units during the excavation. The Photovac readings (1 to 10 units) were compatible with the OVA readings, but at a lower range.

3.6.4 Test Trench 4B (OHT-4B)

The excavation of test trench OHT-4B began on 23 September 1992 at line 230, approximately 15 ft east of the edge of Tow Path Road (Figure 1-2H). It was extended parallel to the road for 43 ft. Fill materials - household debris, tires, wood, and junk - were encountered at a depth of 2 ft, under a layer of brown silty sand cover. Fill material was situated as multilayers or lifts interbedded with gray silty sand. Groundwater was encountered 10 ft below grade. An empty, crushed 35-gal drum was found near the water table. No meter readings above background were recorded. Sample OHTB-4 was collected in the southeast end of the trench from the gray silty clay canal material found at 12 ft, just below the garbage. After collection of the sample, the trench was backfilled and clean cover material was used to grade the surface.

3.6.5 Test Trench 5B (OHT-5B)

Trench OHT-5B was excavated on 23 September 1992 beginning at line 296 and extending parallel to the road to line 299 (Figure 1-2G). The total length of the excavation was 47 ft.

A thin (0.5-ft) grass and cover layer was found overlying the fill material. Refuse was mainly mixed garbage, with a large percentage of household metal and refrigerator parts. Groundwater was first encountered at 6 ft below grade. What appeared to be methane gas was observed bubbling through water as it entered the trench, and a typical garbage odor was noted from the excavation. No drums were found and no above-background readings were recorded. The trench was extended to a depth of 12 ft below grade. A waste sample,

OHTB-5, was collected from the east end of the trench at a depth of 10 to 11 ft from silty sand and clay canal material. What was believed to be bedrock was encountered at a depth of 12 ft. The waste material was backfilled into the hole and the finished surface was graded and seeded.

3.6.6 **Test Trench 6B (OHT-6B)**

Test trench OHT-6B was excavated on 23 September 1992. The trench was located along line 333, immediately south of the private residence and approximately 100 ft west of Tow Path Road (Figure 1-2F). The general location of trench OHT-6B was selected by NYSDEC oversight personnel based on the reports of methane in drinking water at the residence. The specific excavation was located based on soil gas results. A thin (0.5-ft) layer of brown silty sand and grass was found over the fill material. Fill material consisting of household waste and bottles was found to a depth of 6 ft below grade. The waste released a light garbage-type odor when exposed. Four feet of grayish-yellow silty clay material with some roots was encountered below the fill. Meter readings did not record any value above background. Bedrock was encountered at a depth of 10 ft below grade. No groundwater was encountered during excavation because the location is near the canal bank, where the canal depth is low. The bottom of the trench was also approximately 10 ft higher in elevation than the water surface at the downgradient Mohawk River location. Soil sample OHTB-6, which consisted of gray silty clay, was collected just below the fill at 6 ft below grade to detect any contaminants that may have leaked to the bottom of the canal. The fill material was backfilled and the surface was graded and seeded.

3.6.7 **Test Trench 7B (OHT-7B)**

Trench OHT-7B was excavated on 23 September 1992. The trench began at line 378, approximately 250 ft northeast of Tow Path Road, and extended 45 ft in an easterly direction to line 376. Although the previous soil gas results indicated that most of the surrounding area contained low concentrations of VOCs, a trench was located here to represent this part of the site where the canal was its widest (Figure 1-2F).

One foot of brown silty sand cover material was encountered at the surface. Refuse consisting of bottles, tires, wood, paper, and plastic was mixed with gray silty clay. Methane or other gases were observed bubbling through water as it entered the trench and at 5 ft below grade. Sheen and a strong, sweet, aromatic odor were noticed at the east end of the trench. The PID instruments recorded elevated concentrations (>2500 Photovac units and 400 HNU units). The source of the contamination was not found; however, it was believed to come from absorbent material and cotton found above the water table.

Refuse was uncovered to a depth of 8 ft, after which gray silty sand with some clay and roots was excavated. These materials are believed to be the bottom canal sediments.

Soil sample OHTB-7 was collected from the interface fill material/bottom canal sediments at a depth of 8 ft below grade. After collection of the sample, the excavated material was backfilled into the trench and the final surface was graded and compacted.

3.6.8 **Test Trench 8B (OHT-8B)**

Trench OHT-8B was completed on 24 September 1992. The location chosen began on line 400, approximately 120 ft northwest of Tow Path Road (Figure 1-2E). The area was wooded and cleared trees had to be removed before the excavation. The overall test trench was opened in a southeasterly direction.

Dry fill material was recovered below 1 ft of top soil and fine sand. The fill material was 1.5 ft thick above the natural materials at the northwest end of the trench and gradually increased to 4 ft over the 50-ft length of the trench at the southeast end.

The trench was excavated to a depth of 4 ft, where dry, compacted, greenish-yellow silty clay was encountered. The thickness of garbage and the slope direction of the bottom sediments indicate that this area was very close to the northwest bank of the former canal. No readings above background were recorded, and sample OHTB-8 was collected from a depth of 6 ft below grade. Fill material was backfilled and the surface was graded.

3.6.9 **Test Trench 9B (OHT-9B)**

Trench OHT-9B was excavated on 24 September 1992. The location of this trench began at line 543 and extended 50 ft toward line 541; the excavation was then extended 15 ft along line 541 to the southeast (Figure 1-2C).

No significant layer of cover material was found; fill material found on the surface was mixed with brown silty sand. Refuse consisted of typical debris, including plastic, tires, bottles, metal, cans, glass, water tanks, and wood. Bedrock was encountered at 12 ft below grade, with a thin (0.5-ft) layer of gray clay overlying the bedrock. No groundwater was found in the excavation down to the 12-ft depth. No signs of contamination were noticed during excavation of the first portion.

The second portion of the trench extended 25 ft to the east. Fill material at this location was also found on the surface, mixed with silty sand. The excavation was extended to a total depth of 14 ft below grade through blackened garbage. A crushed empty drum labeled "General Electric Waterford, New York, Silicone Products" was found at a depth of 5 ft below grade. A second partially crushed drum with no label was found near the first one. This latter drum contained a glue-like material and a sample (OHTB-9-D1) was collected for analysis. PID readings from the drum were recorded at over 2500 Photovac units. Groundwater was observed entering the excavation at 13 ft below grade. Sample OHTB-9 (12 ft) composed of waste collected above the water table at 12 ft below grade was submitted for analysis. The excavation was extended to a depth of 14 ft where it is believed that bedrock was encountered.

Under the direction of NYSDEC oversight personnel, the excavation continued along line 541 toward the Mohawk River. Along this section the trench was extended to 15 ft below grade. Refuse consisted of similar household debris, including bottles and metal. Silty clay material was encountered at 14.5 ft below grade. Under NYSDEC direction a third sample, OHTB-9 (14 ft), consisting of soil, was collected from the interface of the canal material and submitted only for TCL PCB analysis.

The two drums found in trench OHT-9B were placed in a single overpack drum and reburied at their original location. All remaining fill material was backfilled and the trench was covered with the old soil/fill material. Clean cover material was not used since the wooded area had none to very thin cover material.

3.6.10 **Test Trench 10B (OHT-10B)**

Trench OHT-10B was excavated on 24 September 1992 along line 582, approximately 60 ft west of Tow Path Road (Figure 1-2C).

Refuse found under a thin layer (0.8 ft) of silty cover material contained garbage mixed with bottles, metal, plastic, and paper. This fill extended to a depth of 12 ft. The excavation extended along line 582 for a distance of 37 ft. A partially crushed yellow-green drum was found in the middle of the trench at 5 ft below grade. This drum contained pale orange solid plastic material that resembled dry silicone. No meter readings were recorded above background from the trench. A PID reading from the drum was recorded at 1525 units. Two additional empty crushed drums were found at a depth of 3 ft near the east end of the trench.

Canal sediments consisting of silty clay were encountered at a depth of 12 ft, just below the fill. Soil sample OHTB-10 was collected from a depth of 12 ft at the interface of the fill and sediments. No groundwater was noted in the excavation; the ground surface of the excavation was approximately 20 ft above the river. The excavated trench was backfilled and the surface was compacted and graded.

3.6.11 **Test Trench 11B (OHT-11B)**

Trench OHT-11B was excavated on 24 September 1992 along line 590, approximately 100 ft west of the edge of Tow Path Road (Figure 1-2C).

No cover material was observed on the surface; fill material mixed with brown silty sand was noted on the surface, however. Refuse consisting of household debris, bottles, and metal extended to a depth of 16 ft below grade. A newspaper in readable condition dated 1967 was

found at 7 ft. No groundwater was encountered above 16 ft. Sediments consisting of fine silty sand and clay and rock fragments were encountered at 17 ft. The excavation was then extended 22 ft east, toward Tow Path Road. A soil sample (OHTB-11) was collected from the underlying sediments at 16 ft. No contamination was noted, and only low meter deflections were recorded. The removed material was backfilled and the surface was graded.

3.6.12 **Test Trench 12B (OHT-12B)**

Trench OHT-12B was excavated on 25 September 1992. The trench began at line 602 and extended 30 ft in a southerly direction to line 604. This location was selected based on the high concentrations of VOCs detected during the soil gas survey (Figure 1-2C).

A lift layer of brown soil cover was found over the refuse. Fill material consisted of household debris, bottles, and metal. A layer of gray sand was encountered at a depth of 8 ft below grade. The sand layer thickened from 1.5 to 4 ft in the northerly direction. A second lift of fill material similar to the first was found below the sand and extended to 16 ft below grade. Silty clay sediments were recovered just below the fill, indicating that the bottom of the old Erie Canal was 16 ft below grade. Further excavation encountered bedrock at a depth of 17 ft. No groundwater was observed during trench excavation and no above background readings were recorded. Soil sample OHTB-12 was collected and submitted for analysis from the interface of the fill and silty clay at a depth of 16 ft. After the sample was collected, the removed material was backfilled.

3.6.13 **Test Trench 13B (OHT-13B)**

Trench OHT-13B was excavated on 25 September 1992 along line 618, approximately 90 ft west of Tow Path Road, beginning at what is believed to be the west side of the old Erie Canal and extending for 70 ft toward the road (Figure 1-2B).

A thin layer of topsoil (0-5 ft) covered the upper part of the fill material, which consisted of garbage, wood, and tires to a depth of 8 ft. Rock was encountered at 8 ft below grade at this end of the trench; 15 ft from the west end of the trench the bottom of the canal dropped to

a total depth of 13 ft. This may indicate that the trench was started at the outer edge of the canal and continued into the main channel. A crushed drum with General Electric markings was removed from a depth of 5 ft. The drum contained solid white material; its label identified it as silicone, but no sample was taken to verify it. As the trench was extended farther, the canal bottom dropped to 16 ft below grade. Groundwater entered the trench at a depth of 14 ft. Fill material extended below the water to a depth of 16 ft at that part of the site. During the excavation 2 ft of black gravel material was recovered at 2 ft below grade, extending laterally to 35 ft. The excavation was extended east (toward Tow Path Road) another 20 ft for a total length of 70 ft, enabling the bottom of the old Erie Canal to be identified and traced. The bottom was lifted up at the eastern end of the trench to a depth of 10 ft below grade. A soil sample (OHTB-13) was collected from silty clay material near the center of the canal at a depth of 16-17 ft; a matrix spike/matrix spike duplicate (MS/MSD) sample was collected at the same location. The length (70 ft) of trench OHT-13B helped to determine the depth of the canal center (17-ft maximum) and its width at this location. When digging was completed, the fill material was backfilled and the finished surface was graded level.

3.6.14 **Test Trench 14B (OHT-14B)**

Trench 14B was excavated on 28 September 1992 opposite the Clam Steam Tavern, approximately 90 ft east of Tow Path Road (Figure 1-2B). This area was the alternate location as the one originally selected was adjacent to septic fields connected to the tavern.

Excavation began at the southern end and extended 42 ft to the north. Grassy cover and 2 ft of brown silty sand material was found at the surface overlying the fill material. Refuse consisted of paper, plastic, bottles, tires, and wood. Groundwater entered the trench at a depth of 10 ft. A small amount of what was believed to be methane bubbled on the water surface and low OVA measurements (50 units) were recorded from the open excavation.

A crushed 55-gal drum partially filled with blue paintlike waste was found at the middle of the trench, at a depth of 12 ft below grade. A waste sample, OHTB-14-D1, was collected from the drum for analysis. The excavation was extended around the drum location, which

exposed only mixed refuse to a depth of 17 ft. Silty clay was encountered below the fill (canal bottom).

A soil sample (OHTB-14) was collected from the fill/clay boundary and submitted for analysis. The drum containing the paintlike waste was overpacked and buried at its original location. The trench was backfilled and covered with the old material; the finished surface was then graded with clean cover material and seeded.

3.6.15 Test Trench 15B (OHT-15B)

Trench OHT-15B was excavated on 29 September 1992 approximately 550 ft southwest of trench OHT-14B and 25 ft east of the edge of Tow Path Road. The trench extended 25 ft in a southerly direction (Figure 1-2B).

Grassy cover and 1 ft of brown silty sand was observed above 3 ft of black gravel and rock fragments. The gravel layer is believed to be the remnants of an old roadbed. Fill material found just below the gravel contained paper, plastic, bottles, and junk. The overall thickness of the fill increased in the southeast direction. A crushed blue 55-gal drum was found in the middle of the trench at a depth of 12 ft. The 55-gal drum was less than 10% filled with viscous yellow glue-type waste. OVA readings from the drum registered from 300 to 500 units both with and without the methane filter. A waste sample from the drum (OHTB-15-D1) was sampled for analysis. A second empty crushed drum with no identification was found 5 ft south of the initial location. No above background readings were recorded from this container. During the excavation silty clay and bedrock material (indicative of the bottom of the canal) were recovered from below the fill material. The depth of the surface of the canal bed varied from 3 to 15 ft at the south end of the trench. A soil sample (OHTB-15) was also collected from the silty material located just below the fill.

No groundwater was encountered during the excavation of trench OHT-15B. The sampled drum was overpacked and placed 6 ft below the ground. The empty drum was simply redeposited in the excavation. All removed material was backfilled and the finished surface was graded and seeded.

3.6.16 **Test Trench 16B (OHT-16B)**

Trench OHT-16B, excavated on 29 September 1992, was added by NYSDEC personnel for the purpose of collecting further information about PCBs that were detected in a surface water sample (OHSW-5) collected in 1991. The sample location of OHSW-5 was approximately 200 ft northwest of the trench. The trench, which was located along line 98, approximately 10 ft west of the edge of the paved roadway, was extended 14 ft to the west (Figure 1-2D).

Fill material was encountered at the surface, intermixed with brown silty clay. Groundwater, found at a very shallow depth (1 ft below grade), had a slight sheen on its surface. Ground surface elevation was approximately 8 ft higher than the water surface of the Mohawk River.

The refuse consisted of paper, bottles, plastic, and wood. Bottom canal sediments consisted of silty sand at 6 ft below grade. No readings were recorded above background. A soil sample (OHTB-16) was collected from the interface fill/silty sand material.

During backfilling of the trench, groundwater overflowed the excavation boundary. For safety reasons the trench was surrounded with caution flags to allow time for groundwater levels to subside. The backfilled trench was not topped off with clean cover material because the entire surrounding area consisted of exposed landfill material.

3.7 **SAMPLING**

LMS sampled the surface water and respective sediment from 12 locations in the Mohawk River between 4 and 6 December 1991. Leachate was collected concurrently from eight locations originating from the landfill and flowing into the river. All sample locations and methods were discussed with and approved by NYSDEC personnel before sampling proceeded.

Sampling analysis consisted of TCL VOCs and semivolatile organic compounds, pesticides/PCBs, and metals and cyanide in accordance with EPA Statement of Work (SOW)

protocol. The surface water and leachate samples were also analyzed for chemical oxygen demand (COD), total suspended solids (TSS), total dissolved solids (TDS), pH, and specific conductance. In addition, surface water samples were analyzed for total and dissolved low-level PCBs. Split samples of the surface water were sent to NYSDOH's Wadsworth Laboratory for low-level PCB analysis.

3.7.1 **Surface Water and Sediment Sampling**

All surface water/sediment locations selected by LMS followed work plan recommendations and were approved by a NYSDEC representative before sampling commenced (see Figures 1-2A through 1-2K for locations). The 12 surface water/sediment locations (OHSW/OHSD-1 through -12) were sampled according to NYSDEC protocols; samples were submitted to NYTEST Environmental, Inc. (NEI), of Port Washington, New York, and Aquatec Inc. of South Burlington, Vermont, for analysis. NEI performed the full TCL analysis and COD, TSS, TDS, pH, and specific conductance analyses. Aquatec performed the low-level PCB analyses for the surface water samples. Split samples of the surface water were sent by NYSDEC to the NYSDOH laboratory.

The surface water samples were collected directly into the sample containers or with dedicated Teflon bailers or Teflon dip buckets. The sediment samples were collected with dedicated stainless steel spoons. Temperature, pH, specific conductance, and turbidity were measured at each surface water location (Table 3-4). Samples were placed in precleaned bottles/vials provided by Aquatec and NEI. All sample containers were labeled with the site name, job number, sample I.D., date/time, and parameters for analysis. Preservatives were added in the field where applicable. Sample containers were then packed in iced coolers to maintain a temperature of 4°C and shipped under chain-of-custody protocol via overnight courier to NEI and Aquatec for analysis (Ref. 9).

Surface water/sediment locations OHSW/OHSD-1 through -8 were collected from the Mohawk River at the shore or just offshore where the river borders the landfill area. The upgradient surface water/sediment location, OHSW/OHSD-9, is situated just upriver from the I-87 twin bridges at the shoreline. OHSW/OHSD-10, -11, and -12 samples were collected

TABLE 3-4

SURFACE WATER AND LEACHATE CHEMISTRY

Tow Path Road NYSDEC I.D. No. 546013

SURFACE WATER I.D.	TEMPERATURE (°C)	pH (Units)	SPECIFIC CODUCTANCE (μmhos/cm @ 25°C)	TURBIDITY (NTU)
OHSW-1	1.8	7.5	343	15
OHSW-2	2.4	7.1	571	16
OHSW-3	1.5	7.1	521	31
OHSW-4	2.2	7.2	525	50
OHSW-5	1.8	7.1	635	35
OHSW-6	0.6	7.7	334	12
OHSW-7	0.3	8.0	317	9
OHSW-8	0.4	8.0	431	6
OHSW-9	2.4	8.0	293	6
OHSW-10	1.3	7.3	342	6
OHSW-11	1.4	7.5	316	5
OHSW-12	0.8	7.4	325	6

LEACHATE I.D.	FLOW (liter/min)	TEMPERATURE (°C)	pH UNITS	SPECIFIC CONDUCTANCE (μmhos/cm @ 25°C)	TURBIDITY (NTU)
OHL-1	2.5	11.6	6.9	1460	160
OHL-2	0.5	6.5	6.8	992	20
OHL-3	4.5	10.9	6.6	1364	6
OHL-4	1.5	8.0	6.9	804	12
OHL-5	2.0	4.9	6.6	815	30
OHL-6	4.3	3.6	7.2	1119	84
OHL-7	~40	7.4	6.9	829	31
OHL-8	1.8	4.4	7.1	875	30

from the river along a transect out from OHSW/OHSD-2 to determine whether there is a contamination gradient originating at the shoreline and extending out into the river.

3.7.2 **Leachate Sampling**

Leachate samples were collected between 4 and 6 December 1991. The eight sample locations (OHL-1 through -8) selected by LMS followed work plan and NYSDEC personnel recommendations (see Figures 1-2A through 1-2K for locations). The leachate seeps originated from the landfill area and flowed into the Mohawk River. LMS personnel observed a number of additional leachate seeps that were not included in this sampling event. Holes were dug where the leachate emerged to allow it to collect, and a dedicated stainless steel tube was used to direct the flow out of the hole. This facilitated sample collection into the sample containers without the introduction of sediment and precipitate. Temperature, pH, specific conductance, and turbidity were measured at each sample location. The crew also measured flow rates from each of the leachate seeps (Table 3-4). The procedures used for labeling, preserving, custody, and shipping of the leachate samples are the same as those described for the surface water/sediment samples (Ref. 10).

3.8 **AIR MONITORING**

Air monitoring was conducted during the site inspection and during test trench digging activities. None of the HNU, OVA, dosimeter, or CGI readings in the breathing zone were above background levels. During the site inspection several above-background CGI readings were recorded in holes dug in the ground or from leachate seeps. During the test trench digging several readings above background registered on the HNU, OVA, and OVM, but these were from drums or waste found in drums (Ref. 11).

CHAPTER 4

SITE ASSESSMENT

4.1 SITE HISTORY

The Tow Path Road Landfill site is located along the northern side of the Mohawk River between the Route 9 bridge and the two I-87 bridges in the southeastern portion of Saratoga County. The site is approximately 2.5 miles long and varies in width from about 40 ft to 400 ft.

The Erie Canal was originally constructed in the 1820s to permit navigation from Albany to Buffalo. The original canal, called Clinton's Ditch, was approximately 40 ft wide (Ref. 12). This canal was later abandoned and a new one, the enlarged (70 ft wide) Erie Canal, was constructed in the 1840s. The enlarged Erie Canal was in use until 1922, when the Barge Canal was built in the Mohawk River. After construction of the Barge Canal, the enlarged Erie Canal was abandoned; its remnants in the study area became the Tow Path Road Landfill. Figures 4-1A through 4-1K show the original outline of the enlarged canal as it was surveyed in 1917. As can be seen, the engineers who designed and constructed the canal took advantage of the natural topography, with the northern boundary of the canal being formed by ridges and other formations in this area. Consequently, the canal was significantly wider in some sections than the design value of 70 ft, particularly at the western end of this area.

The abandoned canal remained relatively unchanged until the 1960s, when a local resident backed into the canal with his vehicle and drowned. The area was becoming increasingly developed and summer cottages were constructed along the Mohawk River at Crescent Beach. A 1964 map of the Barge Canal shows the abandoned Erie Canal between the I-87 and Route 9 bridges (Appendix C, Ref. 13). The Town of Halfmoon decided to fill in the remnants of the canal to prevent future drownings. In 1962 the town contracted with Aetna Corporation to operate the site as a municipal landfill. On 18 November 1965 Aetna was directed by the NYSDOH District Office in Glens Falls to close out the site by 15 December 1965 (Ref. 14). On 10 February 1966 a Health Commissioner's Order served on the Town

TOWN LINE OF CLIFTON PARK

HALF MOON

APPROX. 1917
ERIE CANAL BOUNDARY

MATCH LINE SEE SHEET # 2

APPROX. 1917
ERIE CANAL BOUNDARY

MATCH LINE SEE SHEET # 2

LEGEND

Cd	Cadmium
CB	Chlorobenzene
Fe	Iron
Mn	Manganese
Hg	Mercury
Zn	Zinc
Al	Aluminum
MC	Methylene chloride
CD	Carbon disulfide
Benz	Benzene
Pb	Lead
1,4-DCB	1,4-Dichlorobenzene
Cu	Copper
PAEs	Phthalate acid esters
PAHs	Polynuclear aromatic hydrocarbons
Cr	Chromium
DBF	Dibenzofuran
Naph	Naphthalene and naphthalene-like substances
4-MP	4-Methylphenol
EB	Ethylbenzene
NNDPA	N-nitrosodiphenylamine
MEK	Methyl ethyl ketone
CN	Cyanide
Tol	Toluene
4M2P	4 Methyl pentanone
Tetra	Tetrachloroethylene
1,2-DCB	1,2-Dichlorobenzene
1,2-DCE	1,2-Dichloroethylene
1,1,1-TCA	1,1,1-Trichloroethane
TCE	Trichloroethylene
ND	No detection
BQL	Below quantification limits

- Test trench location
- Shallow soil sample location
- Waste sample location
- Surface water/sediment sample location
- Leachate sample location

NOTE: All surface water and leachate concentrations are in µg/l.

NOTE: All waste and sediment concentrations are in mg/kg.

TCLP concentrations are in mg/l.

KEY MAP

	SW	SD
MC	1	0.004
Al	217	21,900
Fe	446	40,800
Pb	ND	565
Mn	28.6	1,140
Hg	ND	0.66
Zn	ND	596

OHSW-9/
OHSD-9

50 0 50 100
SCALE IN FT.

FIGURE 4-1A
WASTE, LEACHATE, SURFACE WATER AND SEDIMENT CONTAMINANT CONCENTRATIONS
TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

FIGURE 4-1B

WASTE, LEACHATE, SURFACE WATER AND SEDIMENT CONTAMINANT CONCENTRATIONS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

LEGEND

Cd	Cadmium
CB	Chlorobenzene
Fe	Iron
Mn	Manganese
Hg	Mercury
Zn	Zinc
Al	Aluminum
MC	Methylene chloride
CD	Carbon disulfide
Benz	Benzene
Pb	Lead
1,4-DCB	1,4-Dichlorobenzene
Cu	Copper
PAEs	Phthalate acid esters
PAHs	Polynuclear aromatic hydrocarbons
Cr	Chromium
DBF	Dibenzofuran
Naph	Naphthalene and naphthalene-like substances
4-MP	4-Methylphenol
EB	Ethylbenzene
NNDPA	N-nitrosodiphenylamine
MEK	Methyl ethyl ketone
CN	Cyanide
Tol	Toluene
4M2P	4 Methyl pentanone
Tetra	Tetrachloroethylene
1,2-DCB	1,2-Dichlorobenzene
1,2-DCE	1,2-Dichloroethylene
1,1,1-TCA	1,1,1-Trichloroethane
TCE	Trichloroethylene

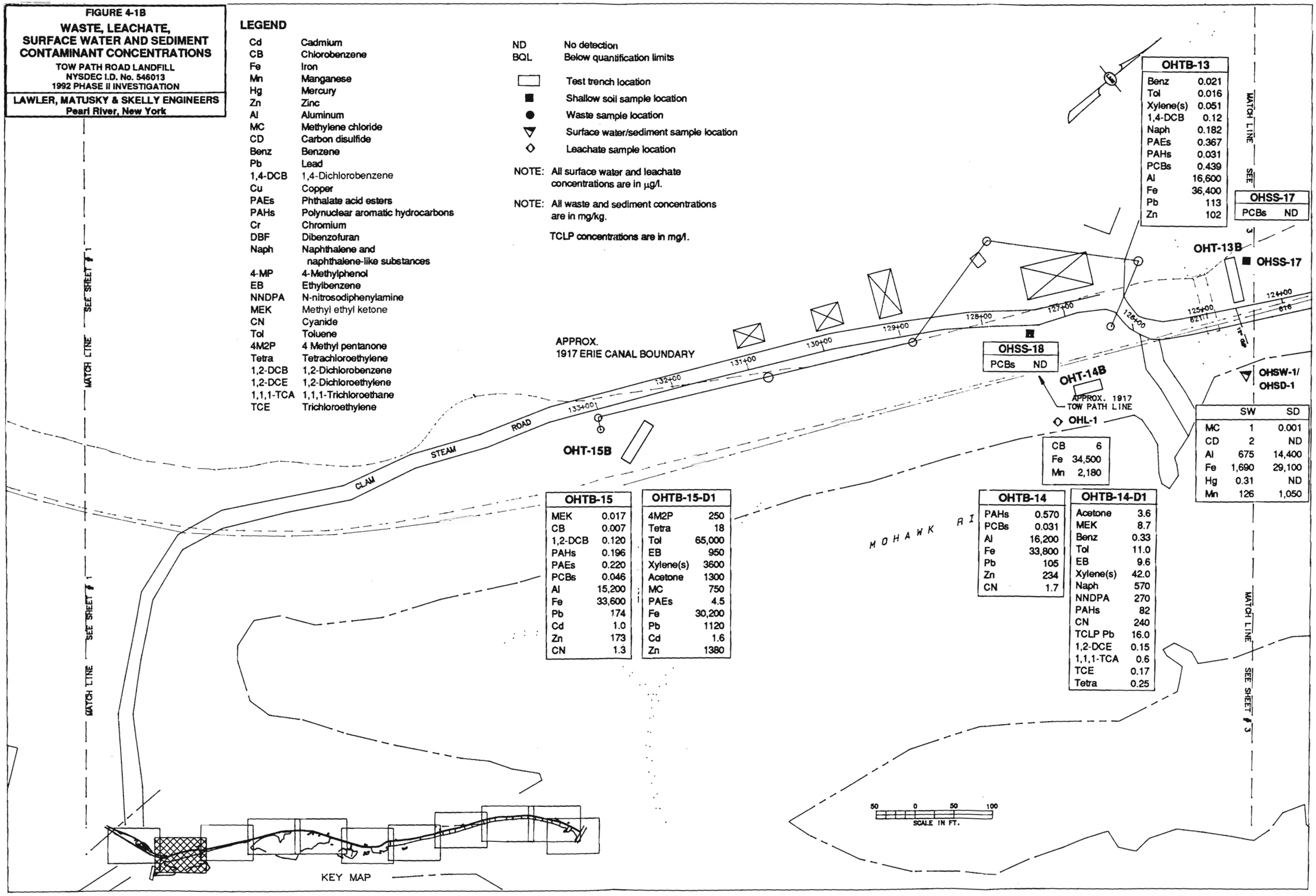
ND	No detection
BQL	Below quantification limits

- Test trench location
- Shallow soil sample location
- Waste sample location
- Surface water/sediment sample location
- Leachate sample location

NOTE: All surface water and leachate concentrations are in µg/l.

NOTE: All waste and sediment concentrations are in mg/kg.

TCLP concentrations are in mg/l.



OHTB-13	
Benz	0.021
Tol	0.016
Xylene(s)	0.051
1,4-DCB	0.12
Naph	0.182
PAEs	0.367
PAHs	0.031
PCBs	0.439
Al	16,600
Fe	36,400
Pb	113
Zn	102

OHSS-17	
PCBs	ND

OHSS-18	
PCBs	ND

	SW	SD
MC	1	0.001
CD	2	ND
Al	675	14,400
Fe	1,690	29,100
Hg	0.31	ND
Mn	126	1,050

CB	6
Fe	34,500
Mn	2,180

OHTB-15	
MEK	0.017
CB	0.007
1,2-DCB	0.120
PAHs	0.196
PAEs	0.220
PCBs	0.046
Al	15,200
Fe	33,600
Pb	174
Cd	1.0
Zn	173
CN	1.3

OHTB-15-D1	
4M2P	250
Tetra	18
Tol	65,000
EB	950
Xylene(s)	3600
Acetone	1300
MC	750
PAEs	4.5
Fe	30,200
Pb	1120
Cd	1.6
Zn	1380

OHTB-14	
PAHs	0.570
PCBs	0.031
Al	16,200
Fe	33,800
Pb	105
Zn	234
CN	1.7

OHTB-14-D1	
Acetone	3.6
MEK	8.7
Benz	0.33
Tol	11.0
EB	9.6
Xylene(s)	42.0
Naph	570
NNDPA	270
PAHs	82
CN	240
TCLP Pb	16.0
1,2-DCE	0.15
1,1,1-TCA	0.6
TCE	0.17
Tetra	0.25

LEGEND

Cd	Cadmium
CB	Chlorobenzene
Fe	Iron
Mn	Manganese
Hg	Mercury
Zn	Zinc
Al	Aluminum
MC	Methylene chloride
CD	Carbon disulfide
Benz	Benzene
Pb	Lead
1,4-DCB	1,4-Dichlorobenzene
Cu	Copper
PAEs	Phthalate acid esters
PAHs	Polynuclear aromatic hydrocarbons
Cr	Chromium
DBF	Dibenzofuran
Naph	Naphthalene and naphthalene-like substances
4-MP	4-Methylphenol
EB	Ethylbenzene
NNDPA	N-nitrosodiphenylamine
MEK	Methyl ethyl ketone
CN	Cyanide
Tol	Toluene
4M2P	4 Methyl pentanone
Tetra	Tetrachloroethylene
1,2-DCB	1,2-Dichlorobenzene
1,2-DCE	1,2-Dichloroethylene
1,1,1-TCA	1,1,1-Trichloroethane
TCE	Trichloroethylene

ND	No detection
BQL	Below quantification limits

- Test trench location
- ■ Shallow soil sample location
- ● Waste sample location
- ▽ Surface water/sediment sample location
- ◇ Leachate sample location

NOTE: All surface water and leachate concentrations are in µg/l.

NOTE: All waste and sediment concentrations are in mg/kg.

TCLP concentrations are in mg/l.

OHTB-9	
Benz	0.002
Tol	0.068
CB	0.044
Xylene(s)	0.007
1,4-DCB	0.077
Naph	0.062
PAHs	0.430
PAEs	1.601
PCBs	0.226
Al	10,300
Fe	57,000
Zn	1150
CN	3.1
Pb	244
Hg	4.1
Cd	3.0

OHTB-9D1	
MEK	10,000
Benz	1900
Tol	530,000
TCLP Benz	3

OHTB-9 (14)	
PCBs	0.190

OHTB-11	
MEK	0.048
Benz	0.004
Tol	0.16
CB	0.10
EB	0.003
Xylenes	0.026
1,4-DCB	0.28
Naph	1.454
NNDPA	0.04
PAHs	0.668
PCBs	0.085
Al	14,300
Fe	22,800

OHTB-10	
Benz	0.003
Tol	0.036
CB	0.007
Xylene(s)	0.022
1,4-DCB	0.04
Naph	0.112
PAHs	0.223
PAEs	0.169
PCBs	0.093
Al	7090
Fe	17,000

OHTB-12	
MEK	0.009
Tol	0.003
CB	0.02
Xylene(s)	0.063
DCBs	0.405
Naph	0.587
PAHs	0.220
PCBs	0.071
Al	13,800
Fe	26,300
Zn	117

Toluene	0.0024
1,4-DCB	0.063
BA	0.021
PAEs	2.620
NNDPA	0.044
Fe	3,110
Al	1,520

NO SAMPLE

NO SAMPLE

NO SAMPLE

OHT-11B

OHT-9

OHT-10B

OHT-8

OHT-08-A

OHT-7

OHT-6

OHT-9B

OHT-12B

APPROX. 1917 TOW PATH LINE

TOW PATH ROAD

RIVER

MATCH LINE — SEE SHEET # 2

MATCH LINE — SEE SHEET # 4

OHSS-14	
PCBs	ND

OHSS-15	
PCBs	ND

OHSS-16	
PCBs	ND

OHL-4

OHL-2

OHL-3

OHSW-2/ OHSD-2	SW	SD
CD	10	ND
CB	2	ND
PAEs	3	0.130
PCBs	0.058	ND
Al	111	8,040
Fe	5,150	20,500

CB	4
Fe	5,490
Mn	443
Zn	10.6
Cu	4

Fe	2,200
Mn	1,050

OHSW-10/ OHSD-10	SW	SD
MC	1	0.015
PAEs	4	0.192
PAHs	ND	0.277
Fe	494	37,700
Hg	0.48	2.6
Al	56	19,100
Cr	ND	178
Zn	ND	172

Benz	12
CB	21
1,4-DCB	5
MEK	2
Fe	66,100
Mn	1,590
Sb	33.4
Pb	4.2
Zn	27.2

OHSW-11/ OHSD-11	SW	SD
MC	13	0.013
CB	2	ND
PAEs	4	ND
PAHs	ND	0.239
Hg	ND	0.52
Zn	64.9	153
Fe	251	28,400
Al	91.3	16,200
Cr	ND	223

OHSW-12/ OHSD-12	SW	SD
MC	1	ND
PAEs	4	0.300
PAHs	ND	0.275
Al	175	15,900
Fe	516	28,800
Cr	ND	256
Zn	7.4	166

KEY MAP

50 0 50 100
SCALE IN FT.

FIGURE 4-1C

WASTE, LEACHATE, SURFACE WATER AND SEDIMENT CONTAMINANT CONCENTRATIONS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

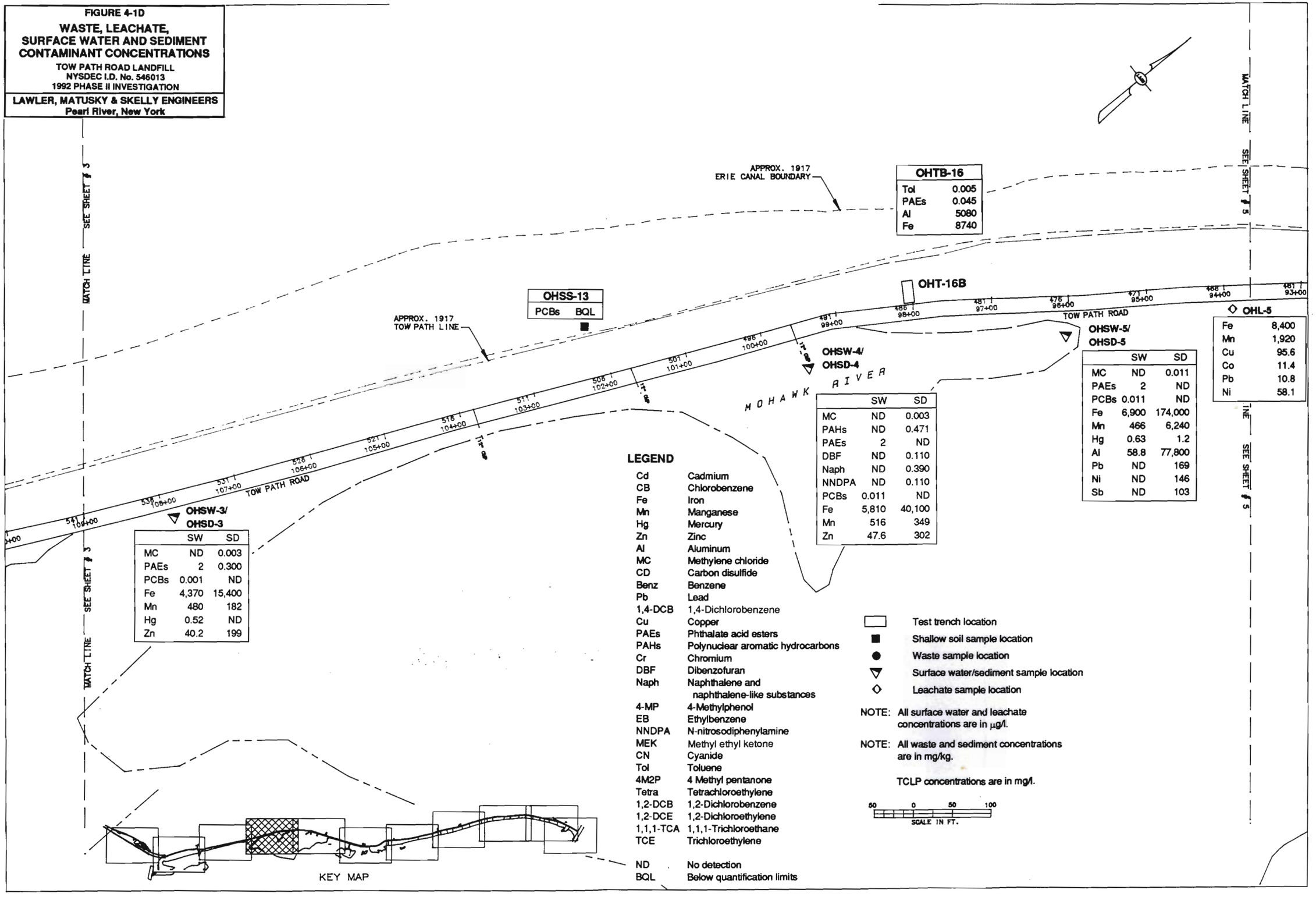
LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

FIGURE 4-1D

WASTE, LEACHATE, SURFACE WATER AND SEDIMENT CONTAMINANT CONCENTRATIONS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York



	SW	SD
MC	ND	0.003
PAEs	2	0.300
PCBs	0.001	ND
Fe	4,370	15,400
Mn	480	182
Hg	0.52	ND
Zn	40.2	199

	SW	SD
MC	ND	0.003
PAHs	ND	0.471
PAEs	2	ND
DBF	ND	0.110
Naph	ND	0.390
NNDPA	ND	0.110
PCBs	0.011	ND
Fe	5,810	40,100
Mn	516	349
Zn	47.6	302

	SW	SD
MC	ND	0.011
PAEs	2	ND
PCBs	0.011	ND
Fe	6,900	174,000
Mn	466	6,240
Hg	0.63	1.2
Al	58.8	77,800
Pb	ND	169
Ni	ND	146
Sb	ND	103

LEGEND

Cd	Cadmium
CB	Chlorobenzene
Fe	Iron
Mn	Manganese
Hg	Mercury
Zn	Zinc
Al	Aluminum
MC	Methylene chloride
CD	Carbon disulfide
Benz	Benzene
Pb	Lead
1,4-DCB	1,4-Dichlorobenzene
Cu	Copper
PAEs	Phthalate acid esters
PAHs	Polynuclear aromatic hydrocarbons
Cr	Chromium
DBF	Dibenzofuran
Naph	Naphthalene and naphthalene-like substances
4-MP	4-Methylphenol
EB	Ethylbenzene
NNDPA	N-nitrosodiphenylamine
MEK	Methyl ethyl ketone
CN	Cyanide
Tol	Toluene
4M2P	4 Methyl pentanone
Tetra	Tetrachloroethylene
1,2-DCB	1,2-Dichlorobenzene
1,2-DCE	1,2-Dichloroethylene
1,1,1-TCA	1,1,1-Trichloroethane
TCE	Trichloroethylene
ND	No detection
BQL	Below quantification limits

- Test trench location
- Shallow soil sample location
- Waste sample location
- Surface water/sediment sample location
- Leachate sample location

NOTE: All surface water and leachate concentrations are in µg/l.

NOTE: All waste and sediment concentrations are in mg/kg.

TCLP concentrations are in mg/l.

50 0 50 100
SCALE IN FT.

FIGURE 4-1E

WASTE, LEACHATE, SURFACE WATER AND SEDIMENT CONTAMINANT CONCENTRATIONS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

Toluene	0.008
EB	0.007
Xylenes	0.089
CB	0.017
PAHs	50.100
DBF	2.700
Naph	10.100
PAEs	14.000
Phenol	2.800
PCBs	43.000
Fe	207,000
Al	3,100
Mn	1,850
Zn	1,270
Hg	1.6

KEY MAP

OHT-01-A

OHT-1

MATCH LINE SEE SHEET # 4

MATCH LINE SEE SHEET # 6

APPROX. 1917 ERIE CANAL BOUNDARY

OHTB-8	
Tol	0.005
CB	0.009
1,4-DCB	0.11
Naph	0.085
PAHs	0.224
PCBs	0.098
Al	17,900
Fe	34,600
Zn	468

OHT-8B

APPROX. 1917 TOW PATH LINE

OHSS-12	
PCBs	BQL

OHSS-12

TOW PATH ROAD

MOHAWK RIVER

APPROX. 1917 MOHAWK RIVER BOUNDARY

1 STY

1 STY FRAME

LEGEND

Cd	Cadmium
CB	Chlorobenzene
Fe	Iron
Mn	Manganese
Hg	Mercury
Zn	Zinc
Al	Aluminum
MC	Methylene chloride
CD	Carbon disulfide
Benz	Benzene
Pb	Lead
1,4-DCB	1,4-Dichlorobenzene
Cu	Copper
PAEs	Phthalate acid esters
PAHs	Polynuclear aromatic hydrocarbons
Cr	Chromium
DBF	Dibenzofuran
Naph	Naphthalene and naphthalene-like substances
4-MP	4-Methylphenol
EB	Ethylbenzene
NNDPA	N-nitrosodiphenylamine
MEK	Methyl ethyl ketone
CN	Cyanide
Tol	Toluene
4M2P	4 Methyl pentanone
Tetra	Tetrachloroethylene
1,2-DCB	1,2-Dichlorobenzene
1,2-DCE	1,2-Dichloroethylene
1,1,1-TCA	1,1,1-Trichloroethane
TCE	Trichloroethylene
ND	No detection
BQL	Below quantification limits

Test trench location

Shallow soil sample location

Waste sample location

Surface water/sediment sample location

Leachate sample location

NOTE: All surface water and leachate concentrations are in µg/l.

NOTE: All waste and sediment concentrations are in mg/kg.

SCALE IN FT. 50 0 50 100

KEY MAP

LEGEND

Cd	Cadmium
CB	Chlorobenzene
Fe	Iron
Mn	Manganese
Hg	Mercury
Zn	Zinc
Al	Aluminum
MC	Methylene chloride
CD	Carbon disulfide
Benz	Benzene
Pb	Lead
1,4-DCB	1,4-Dichlorobenzene
Cu	Copper
PAEs	Phthalate acid esters
PAHs	Polynuclear aromatic hydrocarbons
Cr	Chromium
DBF	Dibenzofuran
Naph	Naphthalene and naphthalene-like substances
4-MP	4-Methylphenol
EB	Ethylbenzene
NNDPA	N-nitrosodiphenylamine
MEK	Methyl ethyl ketone
CN	Cyanide
Tol	Toluene
4M2P	4 Methyl pentanone
Tetra	Tetrachloroethylene
1,2-DCB	1,2-Dichlorobenzene
1,2-DCE	1,2-Dichloroethylene
1,1,1-TCA	1,1,1-Trichloroethane
TCE	Trichloroethylene
ND	No detection
BQL	Below quantification limits

Test trench location

Shallow soil sample location

Waste sample location

Surface water/sediment sample location

Leachate sample location

NOTE: All surface water and leachate concentrations are in µg/l.

NOTE: All waste and sediment concentrations are in mg/kg.

TCLP concentrations are in mg/l.

OHTB-7	
Tol	71
EB	29
Xylene(s)	190
Naph	0.55
PCBs	0.376
Al	11,100
Fe	44,200
Zn	517
Pb	150
Cd	1.9

OHTB-6	
Tetra	0.002
PCBs	0.031
Al	16,700
Fe	31,900

OHL-7	
CB	0.002
Fe	20,700
Mn	976
Pb	5
Zn	160

OHSS-10	
PCBs	BQL

OHSS-11	
PCBs	ND

OHL-6	
Toluene	0.038
Benz	0.005
CB	0.002
Fe	20,500
Mn	558
Sb	33
Pb	10.7
Zn	50.1

OHT-7B

OHT-6B

APPROX. 1917 TOW PATH LINE

APPROX. 1917 ERIE CANAL BOUNDARY

TOW PATH ROAD

MOHAWK RIVER

MATCH LINE SEE SHEET # 5

MATCH LINE SEE SHEET # 7

OVER HEAD TELEPHONE

UNDER GROUND TELEPHONE

N.Y. TELE

WOOD RAIL FENCE

METAL GUARD RAILS

CENTER LINE STREAM

KEY MAP

50 0 50 100
SCALE IN FT.

FIGURE 4-1F

WASTE, LEACHATE, SURFACE WATER AND SEDIMENT CONTAMINANT CONCENTRATIONS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

LEGEND

Cd	Cadmium
CB	Chlorobenzene
Fe	Iron
Mn	Manganese
Hg	Mercury
Zn	Zinc
Al	Aluminum
MC	Methylene chloride
CD	Carbon disulfide
Benz	Benzene
Pb	Lead
1,4-DCB	1,4-Dichlorobenzene
Cu	Copper
PAEs	Phthalate acid esters
PAHs	Polynuclear aromatic hydrocarbons
Cr	Chromium
DBF	Dibenzofuran
Naph	Naphthalene and naphthalene-like substances
4-MP	4-Methylphenol
EB	Ethylbenzene
NNDPA	N-nitrosodiphenylamine
MEK	Methyl ethyl ketone
CN	Cyanide
Tol	Toluene

4M2P	4 Methyl pentanone
Tetra	Tetrachloroethylene
1,2-DCB	1,2-Dichlorobenzene
1,2-DCE	1,2-Dichloroethylene
1,1,1-TCA	1,1,1-Trichloroethane
TCE	Trichloroethylene
ND	No detection
BQL	Below quantification limits

- Test trench location
- ■ Shallow soil sample location
- ● Waste sample location
- ▽ Surface water/sediment sample location
- ◇ Leachate sample location

NOTE: All surface water and leachate concentrations are in µg/l.

NOTE: All waste and sediment concentrations are in mg/kg.

TCLP concentrations are in mg/l.

MATCH LINE SEE SHEET # 6

MATCH LINE SEE SHEET # 8

WHITE ROAD

APPROX. 1917 ERIE CANAL BOUNDARY

APPROX. 1917 TOW PATH LINE

APPROX. 1917 MOHAWK RIVER BOUNDARY

TOW PATH ROAD

MOHAWK RIVER

CENTER LINE STREAM

WOOD RAIL FENCE

CHAIN LINK FENCE

2 STY FRAME

1 1/2 STY FRAME

A FRAME

GARAGE

UNDER GROUND TELEPHONE

N.Y. TELE

6" GAS

OHTB-5

MEK	0.017
CB	0.041
Xylene(s)	0.039
Naph	0.027
PAHs	0.480
NNDPA	0.088
PCBs	0.037
Al	6420
Fe	21,600
Pb	108
Zn	366
Cd	1.2

OHT-5B

OHSS-9

PCBs	ND

OHL-8

Fe	43,700
Mn	1,400
Pb	4.8
Zn	16.6
Al	159

OHSS-8

PCBs	ND

OHSW-6/
OHSD-6

	SW	SD
MC	ND	0.019
PAEs	1	ND
Al	440	14,100
Fe	1,350	29,900

KEY MAP

50 0 50 100
SCALE IN FT.

FIGURE 4-1G

WASTE, LEACHATE, SURFACE WATER AND SEDIMENT CONTAMINANT CONCENTRATIONS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

LEGEND

Cd	Cadmium
CB	Chlorobenzene
Fe	Iron
Mn	Manganese
Hg	Mercury
Zn	Zinc
Al	Aluminum
MC	Methylene chloride
CD	Carbon disulfide
Benz	Benzene
Pb	Lead
1,4-DCB	1,4-Dichlorobenzene
Cu	Copper
PAEs	Phthalate acid esters
PAHs	Polynuclear aromatic hydrocarbons
Cr	Chromium
DBF	Dibenzofuran
Naph	Naphthalene and naphthalene-like substances
4-MP	4-Methylphenol
EB	Ethylbenzene
NNDPA	N-nitrosodiphenylamine
MEK	Methyl ethyl ketone
CN	Cyanide
Tol	Toluene
4M2P	4 Methyl pentanone
Tetra	Tetrachloroethylene
1,2-DCB	1,2-Dichlorobenzene
1,2-DCE	1,2-Dichloroethylene
1,1,1-TCA	1,1,1-Trichloroethane
TCE	Trichloroethylene

ND	No detection
BQL	Below quantification limits

- Test trench location
- Shallow soil sample location
- Waste sample location
- Surface water/sediment sample location
- Leachate sample location

NOTE: All surface water and leachate concentrations are in µg/l.

NOTE: All waste and sediment concentrations are in mg/kg.

TCLP concentrations are in mg/l.

MATCH LINE SEE SHEET # 1

MATCH LINE SEE SHEET # 2

WHITE ROAD

TOW P

2 STY BRICK

OHSS-4
PCBs ND

OHT-4

OHT-04-A

Toluene	35,000.0
MC	530.0
Benz	47.0
EB	19.0
Xylenes	31.0
Naph	0.520
PAEs	5.249
4-MP	0.550
NNDPA	0.110
PCBs	0.210
Fe	18,000
Al	8,680

OHSW-7/
OHSD-7

	SW	SD
MC	ND	0.003
PAEs	ND	0.490
Al	470	6,090
Fe	1,140	14,800

OHSS-5
PCBs ND

OHT-2

OHT-02-A

PAHs	0.461
DBF	0.027
Naph	0.850
PAEs	2.933
1,4-DCB	0.580
4-MP	0.065
PCBs	0.880
4,4-DDD	0.096
Fe	32,100
Al	10,800

OHT-3B

OHTB-3

Al	3840
Fe	7170

OHSS-6

OHT-3

OHSS-6
PCBs ND

OHSS-7
PCBs BQL

OHT-4B

OHTB-4

PAHs	1.202
Al	15,400
Fe	25,900

KEY MAP

50 0 50 100
SCALE IN FT.

FIGURE 4-1H

WASTE, LEACHATE, SURFACE WATER AND SEDIMENT CONTAMINANT CONCENTRATIONS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

MATCH LINE SEE SHEET # 8

MATCH LINE SEE SHEET # 10

APPROX. 1917
ERIE CANAL BOUNDARY

TOW PATH ROAD

TOW PATH ROAD

OHT-2B

OHT-1B

OHSS-3	
PCBs	ND

OHSS-2	
PCBs	ND

APPROX. 1917
TOW PATH LINE

APPROX. 1917
MOHAWK RIVER BOUNDARY

OHTB-2	
CB	0.012
Naph	0.032
PAHs	0.970
PCBs	0.130
Al	13,400
Fe	29,000
Zn	436
Cd	1.1

OHTB-1	
MEK	0.022
CB	0.017
PAHs	0.660
Naph	0.104
1,4-DCB	0.062
PCBs	0.630
Fe	36,000
Pb	112
Zn	133

LEGEND

Cd	Cadmium
CB	Chlorobenzene
Fe	Iron
Mn	Manganese
Hg	Mercury
Zn	Zinc
Al	Aluminum
MC	Methylene chloride
CD	Carbon disulfide
Benz	Benzene
Pb	Lead
1,4-DCB	1,4-Dichlorobenzene
Cu	Copper
PAEs	Phthalate acid esters
PAHs	Polynuclear aromatic hydrocarbons
Cr	Chromium
DBF	Dibenzofuran
Naph	Naphthalene and naphthalene-like substances
4-MP	4-Methylphenol
EB	Ethylbenzene
NNDPA	N-nitrosodiphenylamine
MEK	Methyl ethyl ketone
CN	Cyanide
Tol	Toluene
4M2P	4 Methyl pentanone
Tetra	Tetrachloroethylene
1,2-DCB	1,2-Dichlorobenzene
1,2-DCE	1,2-Dichloroethylene
1,1,1-TCA	1,1,1-Trichloroethane
TCE	Trichloroethylene
ND	No detection
BQL	Below quantification limits

- Test trench location
- ■ Shallow soil sample location
- ● Waste sample location
- ▽ Surface water/sediment sample location
- ◇ Leachate sample location

NOTE: All surface water and leachate concentrations are in µg/l.

NOTE: All waste and sediment concentrations are in mg/kg.

TCLP concentrations are in mg/l.

50 0 50 100
SCALE IN FT.

KEY MAP

FIGURE 4-11
WASTE, LEACHATE, SURFACE WATER AND SEDIMENT CONTAMINANT CONCENTRATIONS
TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

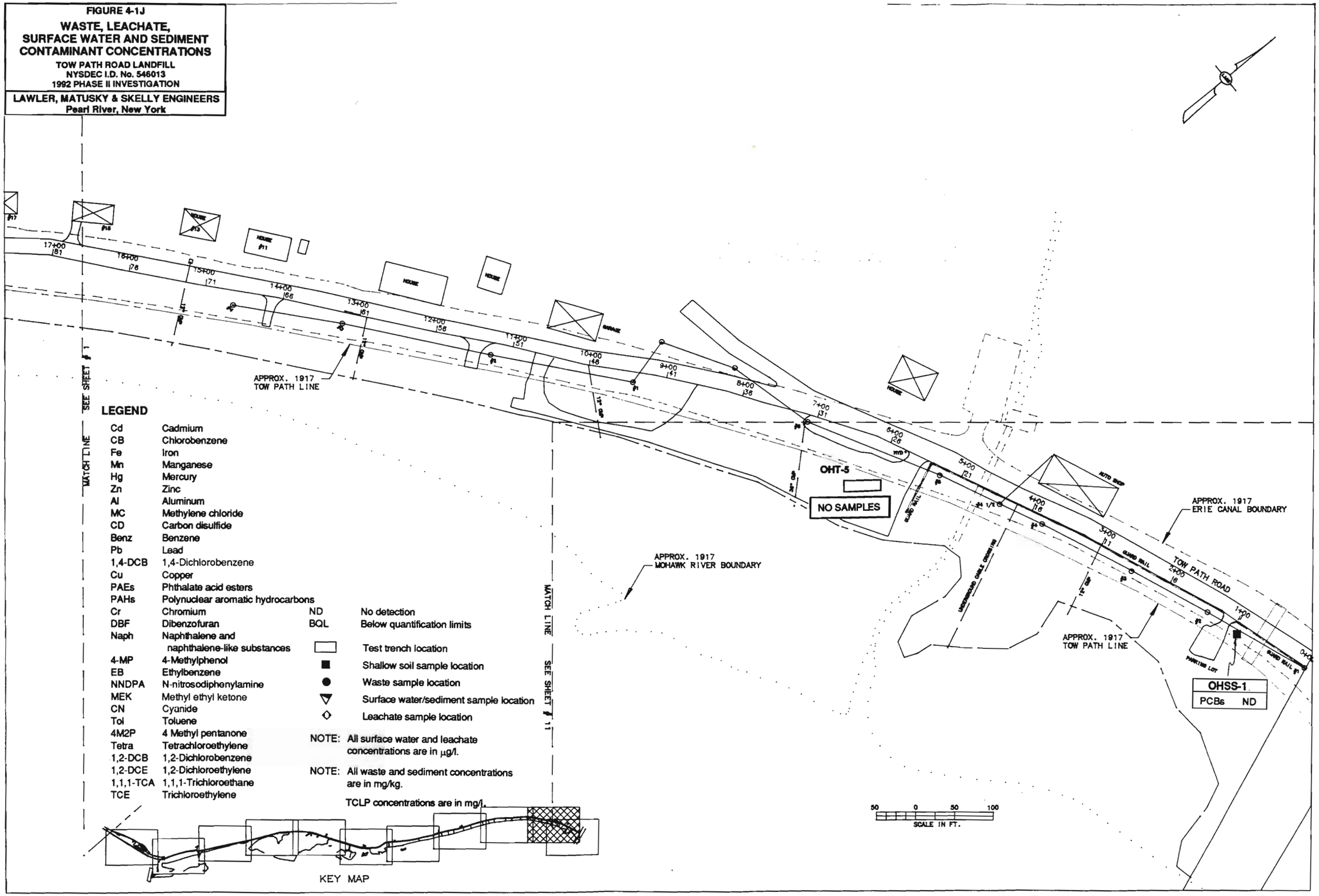
LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

FIGURE 4-1J

WASTE, LEACHATE, SURFACE WATER AND SEDIMENT CONTAMINANT CONCENTRATIONS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York



LEGEND

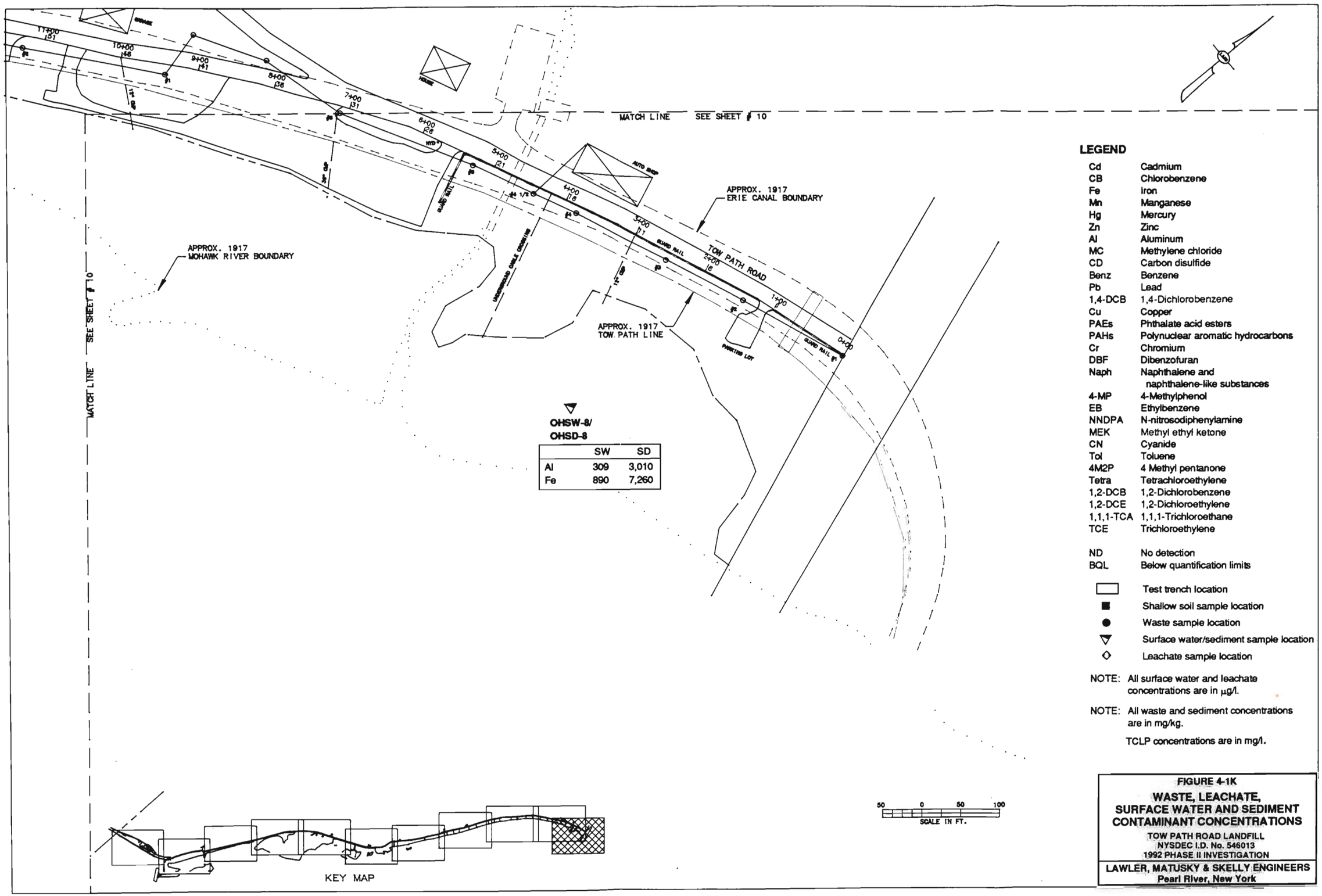
Cd	Cadmium
CB	Chlorobenzene
Fe	Iron
Mn	Manganese
Hg	Mercury
Zn	Zinc
Al	Aluminum
MC	Methylene chloride
CD	Carbon disulfide
Benz	Benzene
Pb	Lead
1,4-DCB	1,4-Dichlorobenzene
Cu	Copper
PAEs	Phthalate acid esters
PAHs	Polynuclear aromatic hydrocarbons
Cr	Chromium
DBF	Dibenzofuran
Naph	Naphthalene and naphthalene-like substances
4-MP	4-Methylphenol
EB	Ethylbenzene
NNDPA	N-nitrosodiphenylamine
MEK	Methyl ethyl ketone
CN	Cyanide
Tol	Toluene
4M2P	4 Methyl pentanone
Tetra	Tetrachloroethylene
1,2-DCB	1,2-Dichlorobenzene
1,2-DCE	1,2-Dichloroethylene
1,1,1-TCA	1,1,1-Trichloroethane
TCE	Trichloroethylene

ND	No detection
BQL	Below quantification limits
▭	Test trench location
■	Shallow soil sample location
●	Waste sample location
▽	Surface water/sediment sample location
◇	Leachate sample location

NOTE: All surface water and leachate concentrations are in µg/l.

NOTE: All waste and sediment concentrations are in mg/kg.

TCLP concentrations are in mg/l.



LEGEND

Cd	Cadmium
CB	Chlorobenzene
Fe	Iron
Mn	Manganese
Hg	Mercury
Zn	Zinc
Al	Aluminum
MC	Methylene chloride
CD	Carbon disulfide
Benz	Benzene
Pb	Lead
1,4-DCB	1,4-Dichlorobenzene
Cu	Copper
PAEs	Phthalate acid esters
PAHs	Polynuclear aromatic hydrocarbons
Cr	Chromium
DBF	Dibenzofuran
Naph	Naphthalene and naphthalene-like substances
4-MP	4-Methylphenol
EB	Ethylbenzene
NNDPA	N-nitrosodiphenylamine
MEK	Methyl ethyl ketone
CN	Cyanide
Tol	Toluene
4M2P	4 Methyl pentanone
Tetra	Tetrachloroethylene
1,2-DCB	1,2-Dichlorobenzene
1,2-DCE	1,2-Dichloroethylene
1,1,1-TCA	1,1,1-Trichloroethane
TCE	Trichloroethylene

ND No detection
BQL Below quantification limits

- Test trench location
- Shallow soil sample location
- Waste sample location
- Surface water/sediment sample location
- Leachate sample location

NOTE: All surface water and leachate concentrations are in µg/l.

NOTE: All waste and sediment concentrations are in mg/kg.

TCLP concentrations are in mg/l.

FIGURE 4-1K

WASTE, LEACHATE, SURFACE WATER AND SEDIMENT CONTAMINANT CONCENTRATIONS

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

of Halfmoon ordered the town to abandon the landfill within six weeks, compact and cover it with 2 ft of suitable material, and prevent leachate from entering the intermittent stream across the area known as "the inside waters." Subsequent to the order, the town contracted with H. Butler to operate the site (Ref. 14). Aetna was relieved of its duties in May 1967 and Chiarello Landfill and Disposal, Inc., took over the operation for the town. A Permit to Establish was issued to this firm on 24 April 1967 and inspection reports indicate that the operation was satisfactory on 13 May 1967 (Ref. 14). In July 1968 Chiarello was taken over by Capital Division Disposal Company, which operated the site until October 1968 (Refs. 14 and 15). The site was apparently filled from east to west, as indicated on a map of the Barge Canal produced in 1969 (Appendix C, Ref. 16); a 1985 Barge Canal map shows the old Erie Canal totally filled in (Appendix C, Ref. 17). In October 1968 (Ref. 14) Capital was ordered by the New York State Supreme Court to close and cover the landfill with 2 ft of cover.

A Certificate to Establish a New Refuse Disposal Area was issued to the Supervisor and Town Board of Halfmoon on 8 January 1969. This site was located off lower Newton Road (Ref. 14). On 10 January 1969 the NYSDOH District Office in Glens Falls inspected the old site; finding an unsatisfactory operation, it advised the town of its responsibility to close the site. A subsequent inspection on 24 April 1969 indicated that the covering must be completed. On 5 May 1969 NYSDOH received a letter from the town requesting a conference to determine what needed to be done to the site (Ref. 14). On 10 June 1970 a NYSDOH inspection took place; leachate and uncovered refuse were observed and the river was turbid from the leachate. On 24 June 1970 NYSDOH informed the town that leachate samples had been collected for analysis and the town was advised to retain an engineer (Ref. 14). In December 1970 an explosion occurred in a house near the junction of Tow Path Road and Clam Steam Road, evidently the second explosion at this location (Ref. 14). The explosion was apparently due to methane gas that had migrated into the septic system. Engineers felt that the explosion was caused by poor design and was not a direct result of the landfill (Appendix C, Ref. 15). On 22 January 1971 the town was asked to construct conversion ditches, grade the top of the landfill, and engage an engineer. On 13 February 1971 the State Supreme Court awarded $250,000 in damages to the town (which was reportedly never collected) from Capital Division Disposal Company for failure to adequately cover the site. On 8 July 1971 the state inspected the site to determine a solution to the

leachate problem. Leachate samples were collected and analyzed on that date, on 21 April and 2 October 1974, and on 8 January and 15 May 1975 (Ref. 14).

On 6 June 1979 NYSDOH prepared a memo stating that the site had a bad leachate problem and recommended that the records be searched to determine whether any hazardous or industrial waste had been deposited at the site (Ref. 18). In December 1979 EPA prepared a Potential Hazardous Waste Site Identification and Preliminary Assessment form in which it was recommended that a site inspection be conducted (Ref. 19). On 7 April 1980 NYSDOH prepared a Hazardous Waste Disposal Site Report in which further investigation was recommended (Ref. 20).

On 21-22 May 1980 EPA inspected the site and collected samples. A report prepared on 4 June 1980 stated that the leachate problem was minor (Ref. 15). Water from a private drinking water well, the Mohawk River near Krause's Beach, and a drainage ditch near the Crescent Boat Club was sampled. The data, which were reported on in August 1980, indicated that very little organic contamination was present (Ref. 21). On 29 September 1980 EPA prepared a Potential Hazardous Waste Site Final Strategy Determination form that indicated no action was needed on the site (Ref. 22).

In 1985 Wehran Engineering conducted a Phase I investigation of the Tow Path Road Landfill for NYSDEC and prepared a report on the findings in January 1987. The site inspection conducted on 13 February 1985 found evidence of leachate. Because of the site's proximity to drinking water wells, the site was scored 28.78 on the Hazard Ranking System (HRS). The score was based on a groundwater route score of 48.12, a surface water route score of 12.76, and an air route score of 0. The report recommended a Phase II investigation to consist of drilling and installation of monitoring wells; collection of samples from each of the wells; collection of surface water, sediment, and leachate samples; a geophysical survey; and report preparation (Ref. 23).

On 24 August 1987 NYSDEC collected a soil/sediment sample from the bank of the Mohawk River and had it analyzed for VOCs, semivolatile organic compounds, and metals (Ref. 24). In November 1987 NYSDEC collected surface water, sediment, and soil samples from various

locations along the landfill (Ref. 25). In 1988 NYSDOH collected 13 samples from residential wells in the vicinity of the site (Ref. 26). In May 1989 NYSDEC collected four sediment, three soil, and two surface water samples near the area (Ref. 27). All data are discussed in Section 4.5.

From October to December 1991 NYSDEC interviewed current and former residents, former employees of the dumping contractor, the owner of the dumping company, and waste haulers. The interviews are summarized in a memorandum included in Appendix C (Ref. 28). In general, the interviewees verified that dumping started in the east and moved west and that the dumping occurred in lifts. The dumping was confined solely to the canal bed in the area east of Beach Road and extended beyond the limits of the canal in the western section from 0.5 mile west of Beach Road to Clam Steam Road. Various municipalities reportedly used the dump, including the cities of Troy, Cohoes, Watervliet, Green Island, and Schenectady and the towns of Waterford, Colonie, North and East Greenbush, and Halfmoon. The interviewees reported that most of the waste was of municipal or commercial origin; however, drums or drummed wastes were observed being deposited into the landfill. Many of the drums were crushed by a bulldozer before being disposed of in the canal. There is consistent information indicating that Behr Manning Company (BMC) disposed of industrial waste at the landfill. BMC was purchased by the Norton Company Coated Abrasive Division in 1968. According to former landfill employees, the BMC waste consisted of viscous material with a pronounced solvent odor, glue wastes, and liquid in 55-gal drums. Several individuals report seeing trucks bearing the BMC name dumping drums into the landfill. Most of the interviewees indicated that the area from the boat club to Clam Steam Road was the usual dumping area. Based on a Hazardous Waste Questionnaire filled out by the Norton Company in 1984 (Appendix C, Ref. 29), NYSDEC suspects that BMC dumped hazardous waste at the Tow Path Road Landfill. In the questionnaire Norton states that an estimated 2300 tons of solvent-based phenolic and urethane sludges and solvents (including toluene, xylene, ethyl alcohol, methyl isobutyl ketone, and methyl ethyl ketone) were dumped at the Town of Colonie Landfill from 1966 to 1975. As this landfill did not open until December 1968, it has been assumed that the material was disposed of at the Tow Path Road Landfill from 1966 to 1968. Based on this information, NYSDEC estimated the amount of hazardous

material that may have been disposed of at the Tow Path Road Landfill at roughly 511 to 766 tons.

4.2 SITE TOPOGRAPHY

The Tow Path Road Landfill site is located in the Town of Halfmoon on Tow Path Road (Canal Road) in the southeast portion of Saratoga County, New York (Figure 1-1). Originally the site was a part of the old Erie Canal and was filled in in the 1960s to prevent accidental drownings. The site is approximately 2.5 miles long and runs northeast-southwest from the Route 9 bridge to the twin Interstate 87 bridges. It is between 40 and 400 ft wide. The Mohawk River borders the site along the south-southeastern boundary. A residential area containing over 40 houses is spread along the site's boundary.

The site is divided into three segments; these are distinguished as Tow Path Road crosses over the former canal bed in two locations and travels some distance on the side of the canal. The topography and general setting of each of the three segments varies slightly. The most northerly section of the canal is located between Tow Path Road and the Mohawk River. This is a nearly level area approximately 60-80 ft wide and approximately 5 ft above the river. Any existing slope is away from Tow Path Road and into the river. Surface drainage runs over manicured grass that covers nearly this entire section. Subsurface drains direct stormwater runoff under the roadway directly through the fill and into the river. The ground surface several hundred feet west of Tow Path Road rises rather sharply to an elevation of 50 to 70 ft above the river, making the drainage direction more pronounced.

The middle section of the canal is identified by the crossing of Tow Path Road over the actual canal bed. From this point the canal lies west of both the river and roadway. This portion of the canal is almost entirely level; the only slope is in the southern portion. Surface drainage is carried into a parallel ditch that extends along several hundred feet of the landfill. Drainage along the remainder of this section is carried over the ground surface and through underground storm drainage pipes into the river. The surface of the southerly portion of this section has been filled with refuse to a point where it is approximately 20 ft above the level of the river. Land just west of the fill area rises to an elevation nearly 200 ft above the river.

Along this ridge line bedrock outcrops are seen in many locations. Runoff from precipitation that does not infiltrate the formation travels across the landfill or into drains that discharge it to the river.

The third section of the site - relatively small in comparison to the first two - is located at the point where Tow Path Road crosses back over the landfill. This portion of the site has a distinct easterly slope toward the Mohawk River. The point of the old canal lying adjacent to the roadway is approximately 15-20 ft above the river; the area nearest the shore is 5 to 8 ft above the river. Ground west of Tow Path Road rises to an elevation of 40 to 50 ft above the river, causing a prominent drainage flow direction into the river.

4.3 GEOLOGY

The Tow Path Road Landfill occupies a portion of the former Erie Canal. The site lies at the north part of the Hudson-Mohawk Lowland physiographic province. Most of the province has relatively low elevation and relief. It is underlain primarily by Ordovician shale that has been exposed by erosion of the overlying Silurian and Devonian Limestone. Limestone may not have been deposited in the vicinity of the site as the paleogeographical boundaries of the Silurian and Devonian seas were restricted to areas located southwest of the site (Ref. 30). Most of the site is directly underlain by a thin layer of unconsolidated deposits; where the unconsolidated deposits are absent, consolidated rock outcrops at the surface.

4.3.1 Bedrock

Bedrock in the immediate vicinity of the Tow Path Road Landfill site consists of the Austin Glen Shale Member of the Normanskill formation. This unit comprises interbedded light gray to grayish-black shales, graywacke, and thin layers of sandstones. The geological history of the bedrock at the site indicates that the middle Ordovician Austin Glen formation is a part of the Taconic sequence of Cambro-Ordovician age. This sequence was initially deposited far to the east of its present location in the Protoatlantic sea.

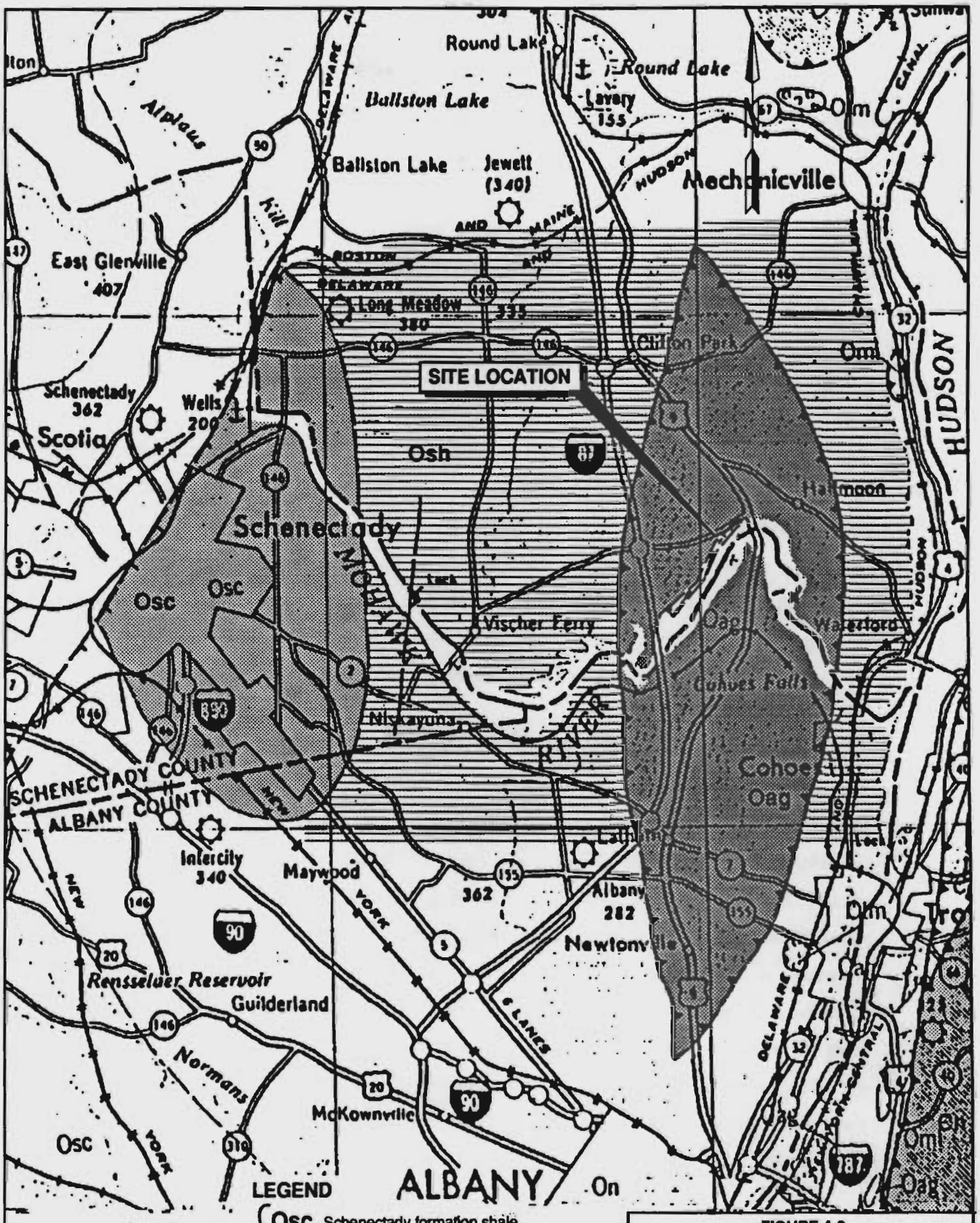
The emplacement of the Taconic (Eugeosynclinal, Allochthonous) sequence, including the Austin Glen Shales, was accomplished during the Taconic orogeny by westward low-angle thrusting caused by crustal shortening or gravity sliding, followed by unconformity that separated this sequence. Austin Glen Shales finally rested above the Snake Hill formation (shales), which is considered younger (late middle Ordovician) than Austin Glen Shales (Ref. 31). It is also believed that the Snake Hill formation was formed in situ and was not transported from its original depositional environment (Ref. 32). The thickness of the shales ranges from a few hundred feet within the Austin Glen member to more than 1000 ft within the Snake Hill formation (Figure 4-2).

Existing carbonate rocks consist largely of dolomite and include Hoyt limestone, Little Falls dolomite, Amsterdam limestone, and Glens Falls limestone. These lie under the Snake Hill formation and are dated from Upper Cambrian to early middle Ordovician. The thickness of the carbonate rocks reportedly ranges from 300 to 400 ft. The carbonate rocks overlie the Potsdam sandstone of the lower Cambrian. The thickness of the sandstone is believed to range from approximately 200 to 400 ft.

The Precambrian basement complex underlies the Potsdam sandstone. This crystalline formation is composed of several different types of metamorphic and igneous rocks. The metamorphic rocks include schist, quartzite, gneiss, and limestone (marble). The igneous rocks include granite, anorthosite, syenite, and gabbro. In most places the metamorphic and igneous rocks are intermingled.

4.3.2 **Unconsolidated Deposits**

A review of existing surficial information on the area indicates that the unconsolidated material consists of shallow lacustrine silts and clays, the result of deposition in the Pleistocene epoch. More recent erosional events, including the formation and continuing flow in the Mohawk River, have locally removed these deposits down to the bedrock surface or have left a only thin veneer of lacustrine material (Ref. 33). Redeposition of fluvial sediments, including organic peat and plant matter, has occurred in close proximity to the river. These depositional sequences are the result of periodic flood events during which the



Source: Water Resources of the Albany-Schenectady-Troy area of New York, 1964, USGS Water Supply Paper, and Geologic Map of New York, 1970, NYS Museum and Science Service.

FIGURE 4-2

BEDROCK GEOLOGY MAP

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

sediment load is dispersed beyond the banks of the river into the surrounding lowland areas (Figure 4-3).

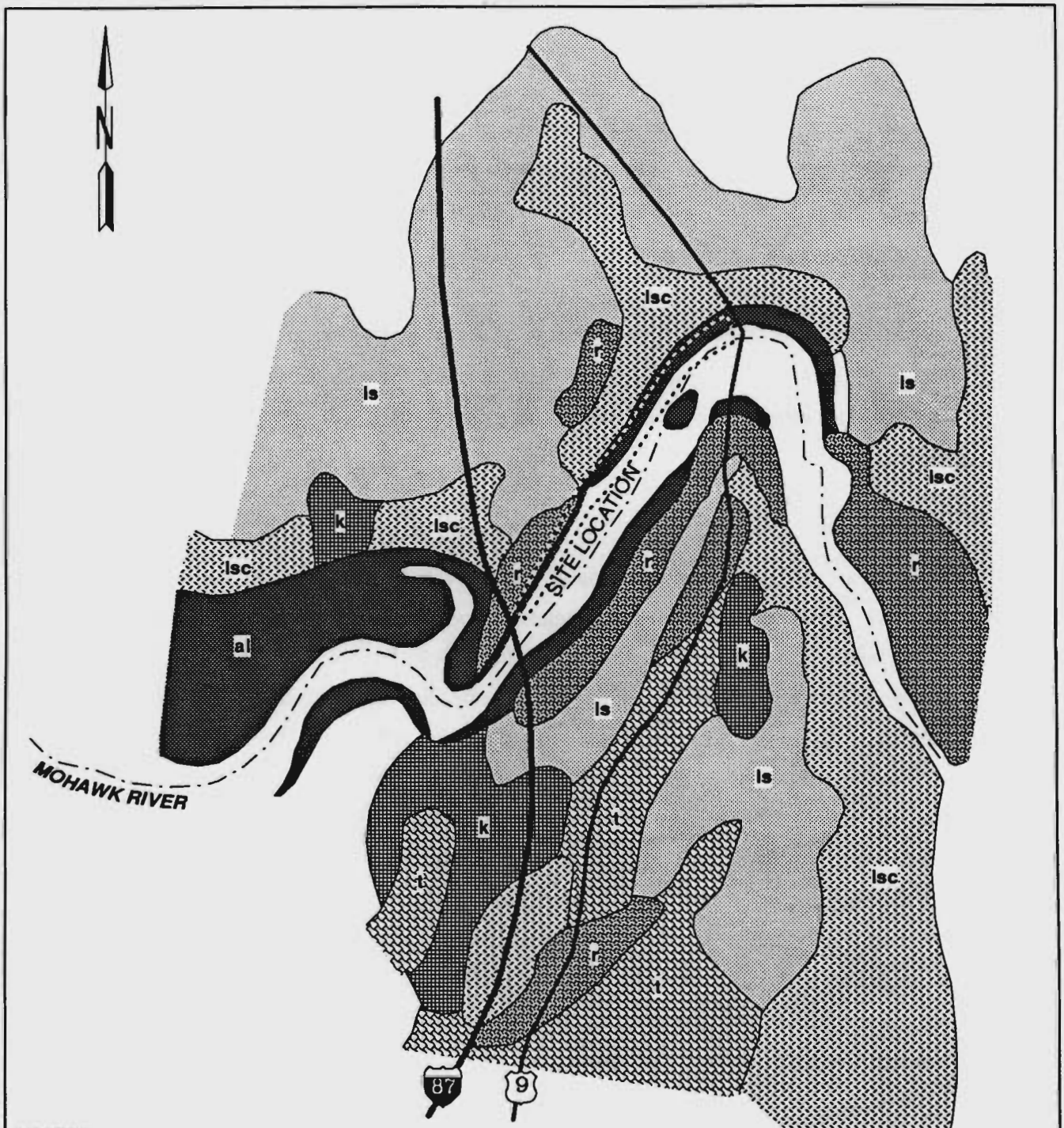
The canal was apparently located in silty sands, clays, and organic matter that are the result of both Pleistocene and more recent deposition. Most of the canal was found to have from 0.5 to 2 ft of silty clay material remaining above the bedrock surface.

4.4 HYDROGEOLOGY

The Tow Path Road Landfill site is located in the eastern subarea of the Mohawk River floodplain, which is part of the Hudson River basin. Groundwater at the site is found under static water table conditions. Depth to the static groundwater table varies with the local topography; however, it is not fully understood how the water in the canal interacts with this groundwater. Based on the limited groundwater data obtained during the test pit excavations, static groundwater exists in the consolidated (bedrock) and unconsolidated (overburden) material without any confining or restricting layers.

All residents in the area of Tow Path Road rely on private well water for domestic supplies. Based upon the depth of the wells reported by NYSDEC and the observed bedrock orientation, it is believed that the residential wells draw water from the fractured bedrock. Groundwater in the bedrock flows through openings along faults, joints, bedding, and cleavage planes. The yield of flows through wells drawing from bedrock depends on the number and size of the rock openings penetrated by the wells. In general, the yield of wells in this formation is relatively low. Wells in the surrounding area of the site have an average yield of about 2 to 4 gpm (Ref. 31). The general chemical characteristics of groundwater obtained from the shales showed that this type of water is high in mineral content (over 500 ppm), including sulfate and chloride. High sulfur content is found naturally in groundwater due to the presence of hydrogen sulfide. This is believed to be formed by reduction of the sulfate found in the shale (Ref. 33).

There is little information on the static groundwater in the unconsolidated material other than the fact that the Erie Canal contained sufficient water to float barges. Several factors in the



LEGEND

- ls — Lacustrine sand deposits (quartzite sand)
- lsc — Lacustrine silt and clay (proglacial deposits)
- k — Kame deposits (texture: from boulders to sand)
- r — Exposed bedrock (shale)
- al — Recent deposits (fine shale to gravel)
- t — Till deposits (clay, silt, clay, boulder-clay)

0 2800 5600 ft

SCALE
1 in. = 5600 ft

FIGURE 4-3

SURFICIAL GEOLOGY MAP

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

site area affect the quantity and characteristics of groundwater flow: the relatively stable level and constant flow direction of the Mohawk River, the local topography that directs surface runoff and provides a reservoir for shallow groundwater, and the physical conditions associated with the buried canal.

The Mohawk River flows over bedrock that is mantled by minor amounts of sediments. Thus, there is no substantial confining bed isolating bedrock groundwater from the river. Groundwater levels immediately adjacent to the river are found at elevations similar to that of the river.

Topography on both sides of the river rises sharply a short distance from its banks. Bedrock outcrops are seen over large portions of these elevated areas. Land west of this section of the river, beyond this initial rise in elevation, remains higher than the river by a minimum of 50 ft. Surface drainage in this outward area is visible in fairly well-formed dendritic patterns that are directed in an overall southerly direction to the Mohawk River. These surface water courses do not run through the site, but are found generally to the south of the landfill. One stream, located just southwest of the Route 9 bridge, is culverted under the roadway and runs southeasterly through the landfill. The main cause of the diversion of surface water to the south beyond the site is the large, protruding mass of bedrock that lies immediately west of the site and is oriented parallel to the river and canal bed. Although no depth measurements of groundwater were taken from this upgradient area, it is believed that the depth to groundwater is elevated above the river and that the river acts as a sink rather than a source supplying groundwater (Figure 1-1). Based on this assumption, the general gradient is believed to be easterly and southeasterly.

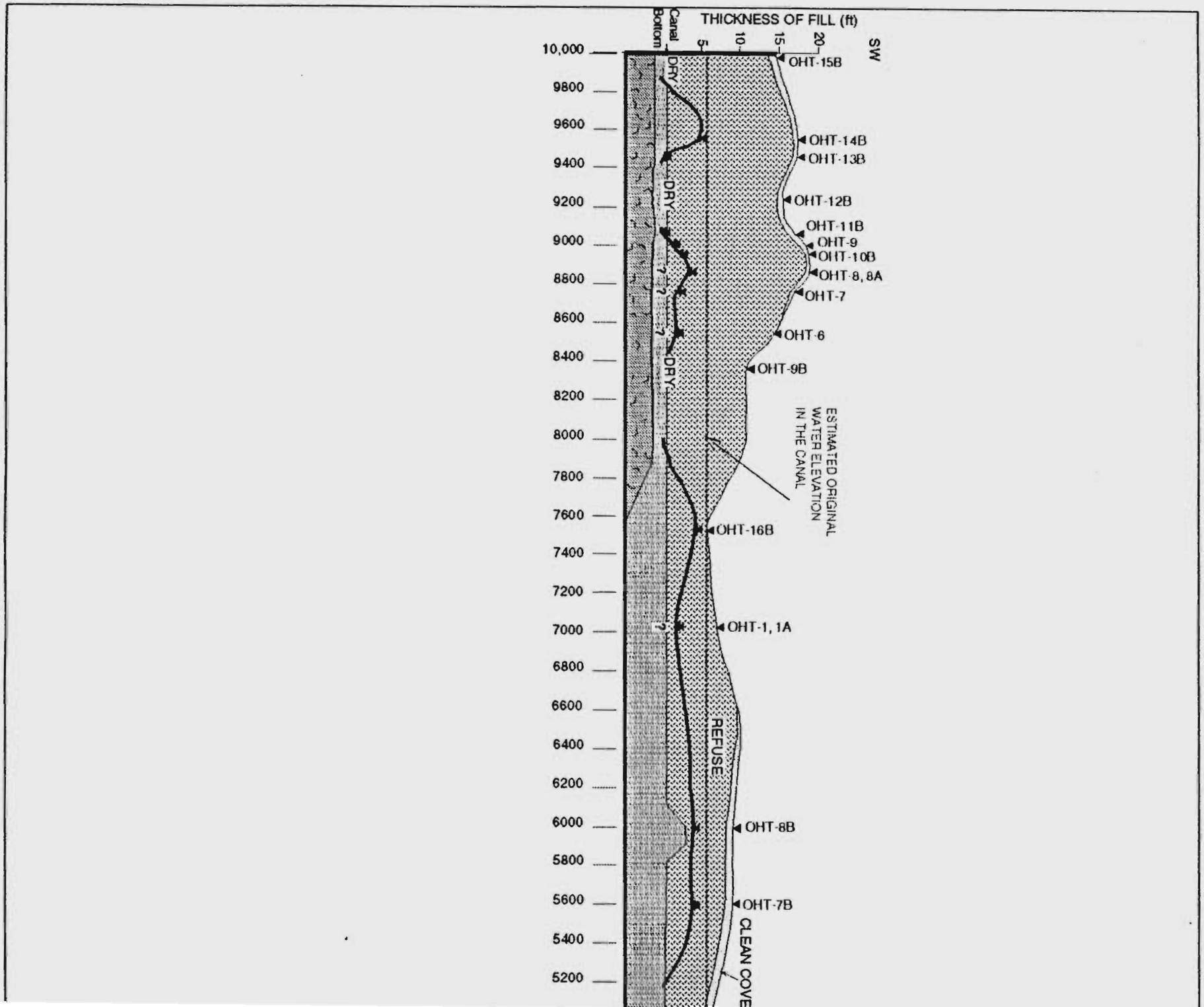
Given the apparent thin veneer of surficial material lying above the bedrock in the immediate vicinity of the site, the saturated thickness of the unconsolidated material is probably not substantial. This does not mean that all unconsolidated material is found above the water table, but rather that most of the groundwater will be found in bedrock. As there are no distinct confining layers over a wide expanse, the head difference between water found in bedrock and that existing in overburden materials should not be noticeable.

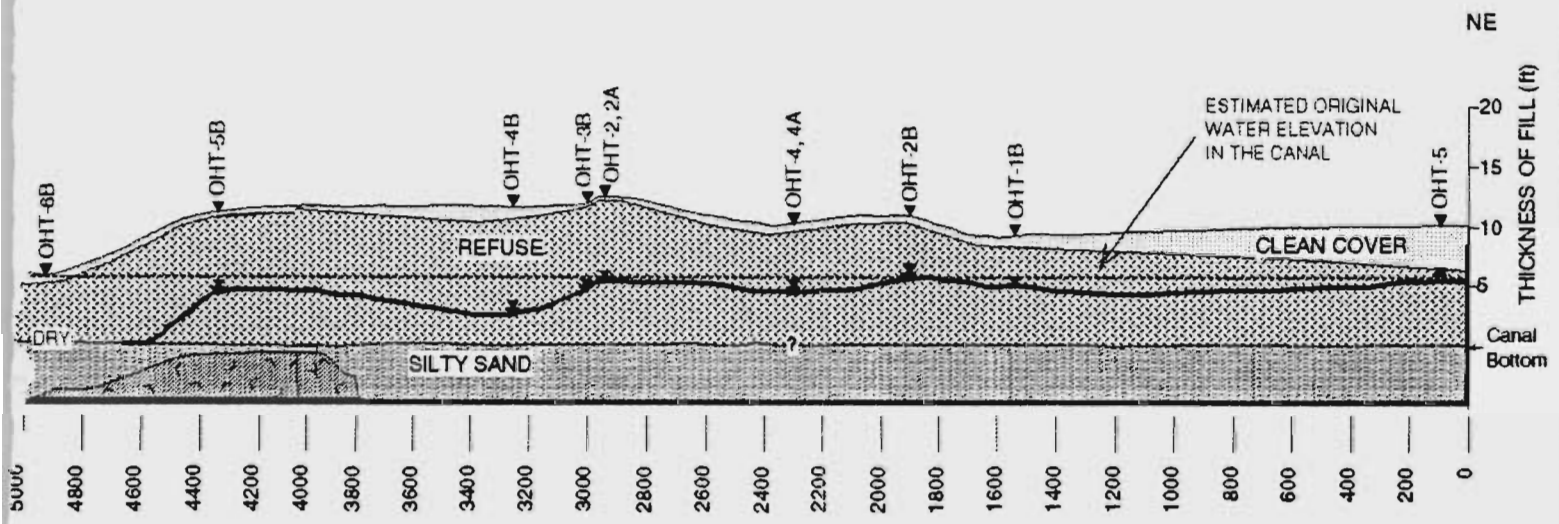
The topography indicates that the groundwater in unconsolidated and consolidated material flows from the high elevations west toward the river. Although some groundwater flows through the unconsolidated material, most of the flow is in the bedrock. The Erie Canal was built in the overburden material, and historical information indicates that the canal did not receive its water from the Mohawk River but in fact had a higher water level (aqueduct bridges crossed the river). The exact hydraulic designs of the old Erie Canal have not been researched for this Phase II investigation; however, it is generally believed that the canal received its water from upgradient sources - lakes, ponds, and streams or perhaps groundwater flow in overburden materials. Because the old canal held water at elevations above that of the river (exact elevations not known), the overburden materials in which the canal was dug had to have a permeability low enough to allow for the head difference without a vast supply of upgradient water.

During the Phase II investigation a substantial number of test pits were excavated in and through the fill material within the canal. The results of the excavations, measured water levels, inspection of underlying materials, and comparisons between the relative elevation of canal water and river water indicate that the existing buried canal is not necessarily a continuous closed system (Figure 4-4). It should be mentioned that no formal survey was performed to compare water measurements accurately and that water in test trenches was not allowed to stabilize completely. However, based upon the close proximity of the river and the excavation, and the rapid inflow of water into the trenches, the measurements are believed to be accurate for comparative purposes.

Excavations conducted along the entire northerly section of the canal found a 0.5- to 0.4-ft layer of cover material consisting of a mixture of silty sand and sand. The cover material does not prevent the downward percolation of precipitation or the upward migration of gases from within the landfill. Telephone poles, mailboxes, trees, and storm drains were all found in this section of the site, each extending at least into the cover material and most likely farther into the fill material, thus providing a migratory path for precipitation and vapors.

The material found at the lower extremity of the pits in this area consisted of silty sand, silt, and silty clay that exhibit decreased permeability rates. The measured water level within the


THICKNESS OF FILL (ft)
Canal Bottom
5
10
15
20
SW
10,000
9800
9600
9400
9200
9000
8800
8600
8400
8200
8000
7800
7600
7400
7200
7000
6800
6600
6400
6200
6000
5800
5600
5400
5200
OHT-15B
OHT-14B
OHT-13B
OHT-12B
OHT-11B
OHT-9
OHT-10B
OHT-8, 8A
OHT-7
OHT-6
OHT-9B
OHT-16B
OHT-1, 1A
OHT-8B
OHT-7B
DRY
DRY
DRY
?
?
?
?
ESTIMATED ORIGINAL WATER ELEVATION IN THE CANAL
REFUSE
CLEAN COVE



LEGEND

- Clean cover
- Refuse/debris
- Silty sand
- Bedrock
- ▼ Test TRENCH location
- ⧗ Static water table
- ? Bottom of canal not encountered

0 400 ft

HORIZONTAL SCALE
400 ft

VERTICAL SCALE
0
10 ft
10 ft

FIGURE 4-4

SITE CROSS SECTION

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

canal was at or very near the level found in the river. Although no obvious breaches of the canal floor were encountered in the excavations, the similar water elevations indicate a possible hydraulic connection in some other location, e.g., the culverted stream in the northern end of the site or in other areas where undocumented excavation has occurred.

Surficial cover material in the midsection of the site was significantly less and in some cases virtually nonexistent. An accumulation of organic material and vegetation has created a thin cover of 1 to 2 in. over this area.

Excavations in the middle section of the canal indicated that the bedrock surface was directly below the canal in a number of locations. Certain areas were found to have little low-permeable material above the fractured rock surface.

The measured depths to water in excavations where bedrock was found immediately below the canal were lower than in other trench locations or nonexistent. This section of the landfill was several feet higher with respect to the surface of the river and it appears that, in areas of relatively shallow water, some containment is occurring within the canal. However, in comparison, the dry trenches where rock was encountered immediately below the fill indicate a direct connection with the groundwater. Some drainage that is not visible on the surface may be occurring through the canal bottom.

Areas where there appears to be drainage into the underlying bedrock include trench locations OHT-6B, -9B, -11B, and -12B. Based upon visual inspection of this section, the ground surface appears to be between 8 and 20 ft above the river. This would indicate that the bottoms of the trenches that were found to be dry are slightly above the river level in this area, allowing drainage. Also, locations where standing water was found above the river are capable of containing water to a certain degree. This confining ability may be caused by various types of fill and the compaction method by which it is emplaced in conjunction with a competent canal bed composed of low-permeable material.

The third section of the landfill is similar to the southern portion of the second area in that the ground surface lies approximately 8 to 20 ft above the river. Bedrock was encountered

in one trench immediately below the fill, and no water was encountered in that excavation (OHT-15B). A second excavation in this section (OHT-14B) dug outside the canal, between the canal and river, encountered 7 ft of saturated fill. This high static water elevation in relation to the river and canal may be a result of the second lift of fill in this area, placed on what may have been the old tow path.

4.5 OTHER DATA

Tables 4-1 to 4-5 summarize the existing data on and around the Tow Path Road Landfill site before the Phase II investigation. These data consist mostly of residential well and surface water/sediment sampling data (Ref. 34).

4.5.1 Residential Well Data

The site overlies the Austin Glen formation (graywackes, shale) that is used as an aquifer for drinking water for the residences in the vicinity of the landfill. Because the area occupied by the landfill is not only a potential recharge area for the aquifer but also an area through which groundwater could potentially flow, the effect of the landfill on groundwater quality is of primary concern. NYSDEC Class GA groundwater standards and guidance values are therefore in effect. The best usage of Class GA waters is as a source of potable water supply. Class GA waters are fresh groundwater found in the saturated zone of unconsolidated deposits and consolidated rock or bedrock. The Class GA standards include those general standards for principal organic contaminants (POCs) that became effective on 1 September 1991. The standards include Table 1, which provides standards or guidance values for specific compounds; Table 2, which contains a partial list of POCs covered by the groundwater standard of 5 µg/l; and Table 3, which includes compounds not covered by the POC standard. For compounds that do not come under any of the tables, the standards provide a definition of POCs that would fall under the groundwater standards, i.e., those that fall into two general classes: halogenated alkanes and halogenated ethers.

Chemicals that do not fall into either of these categories and are not included in the aforementioned tables are subject to a determination of their applicability to the general POC

TABLE 4-1 (Page 1 of 3)

EXISTING RESIDENTIAL WELL SAMPLES DATA SUMMARY

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	CLAM STEAM TAVERN 5/21/80	CLAM STEAM TAVERN 6/27/88	LOCAL RESIDENCE 10/25/83	BEACH ROAD RESIDENCE 6/30/88	BEACH ROAD RESIDENCE 6/30/88	BEACH ROAD RESIDENCE 6/30/88	NYSDEC STANDARDS	NATURAL GW AMBIENT RANGES (n)
VOLATILE ORGANICS (µg/l)								
Chloroform	ND	10	ND	ND	ND	ND	-	-
4-Methyl-2-pentanone	NR	10	ND	ND	ND	ND	NS	-
SEMIVOLATILE ORGANICS (µg/l)								
Diethylphthalate	12 j	ND	NR	ND	ND	ND	50 GV	-
PESTICIDES/PCBs (µg/l)	NR	ND	NR	ND	ND	ND	-	-
METALS (µg/l)								
Aluminum	NR	262	NR	337	ND	ND	NS	<5 - 1,000
Antimony	20 k	ND	NR	ND	ND	ND	3 GV	-
Arsenic	1 j	ND	ND	ND	ND	ND	25	<1 - 30
Barium	NR	110	ND	106	16	23	1,000	10 - 500
Beryllium	3 k	ND	NR	ND	ND	ND	3 GV	<10
Cadmium	1 k	ND	ND	ND	ND	ND	10	<1
Chromium	6 k	ND	ND	ND	ND	ND	50	<1 - 5
Copper	1 k	ND	NR	8	ND	6	200	<1 - 30
Iron	NR	457	NR	660	511	37	300 (m)	10 - 10,000
Lead	20 k	ND	ND	ND	ND	ND	25	<15
Manganese	NR	13	NR	13	1,220	95	300 (m)	<1 - 1,000
Mercury	0.2 k	ND	ND	ND	ND	ND	2	<1
Nickel	10 k	ND	NR	ND	ND	ND	NS	<10 - 50
Selenium	0.8 k	ND	ND	ND	ND	ND	10	<1 - 10
Strontium	NR	617	NR	157	313	580	NS	-
Thallium	0.4 k	ND	ND	ND	ND	ND	4 GV	-
Zinc	3 j	191	NR	ND	18	757	300	<10 - 2,000

(m) - Iron and manganese not to exceed 500 µg/l.
(n) - Ref. 35, Appendix A.
j - Estimated concentration; compound present below quantitation limit.
k - Actual value known to be less than value given.
GV - Guidance value.

ND - Not detected at analytical detection limit.
NR - Not run.
NS - No standard.

TABLE 4-1 (Page 2 of 3)

EXISTING RESIDENTIAL WELL SAMPLES DATA SUMMARY

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	BEACH ROAD RESIDENCE 7/6/88	KRAUSE'S HALFMOON BEACH 7/6/88	BEACH ROAD RESIDENCE 7/6/88	TOW PATH ROAD RESIDENCE 6/27/88	TOW PATH ROAD RESIDENCE 6/27/88	TOW PATH ROAD RESIDENCE 5/12/88	NYSDEC STAND.	NATURAL GW AMBIENT RANGES (n)
VOLATILE ORGANICS (µg/l)	ND	ND	ND	ND	ND	ND	-	-
SEMIVOLATILE ORGANICS (µg/l)	ND	ND	ND	ND	ND	ND	-	-
PESTICIDES/ PCBs (µg/l)	ND	ND	ND	ND	ND	ND	-	-
METALS (µg/l)								
Aluminum	ND	ND	ND	ND	644	301	NS	<5 - 100
Barium	6	ND	5	22	180	372	1,000	10 - 500
Copper	ND	67	8	65	7	16	200	<1 - 30
Iron	1,450	ND	24	ND	1,330	637	300 (m)	10 - 10,000
Manganese	368	ND	ND	2,980	24	14	300 (m)	<1 - 1,000
Strontium	92	159	123	436	344	676	NS	-
Zinc	580	43	194	42	ND	ND	300	<10 - 2,000

(n) - Ref. 35, Appendix A.
(m) - Iron and manganese not to exceed 500 µg/l.
ND - Not detected at analytical detection limit.
NS - No standard.

TABLE 4-1 (Page 3 of 3)

EXISTING RESIDENTIAL WELL SAMPLES DATA SUMMARY

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	TOW PATH ROAD RESIDENCE 5/17/88	TOW PATH ROAD RESIDENCE 5/16/88	TOW PATH ROAD RESIDENCE 5/17/88	FIELD BLANK 5/21/80	FIELD BLANK 7/6/88	NYSDEC STAND.	NATURAL GW AMBIENT RANGES (n)
VOLATILE ORGANICS (µg/l)	ND	ND	ND	ND	ND	-	-
SEMIVOLATILE ORGANICS (µg/l)	ND	ND	ND	ND	ND	-	-
PESTICIDES/ PCBs (µg/l)	ND	ND	ND	ND	ND	-	-
METALS (µg/l)							
Aluminum	ND	ND	ND	NR	NR	NS	<5 - 100
Barium	245	215	254	NR	NR	1,000	10 - 500
Copper	ND	ND	ND	NR	NR	200	<1 - 30
Iron	99	354	51	NR	NR	300 (m)	10 - 10,000
Manganese	26	24	ND	NR	NR	300 (m)	<1 - 1,000
Strontium	3,060	422	364	NR	NR	NS	-
Zinc	ND	ND	ND	NR	NR	300	<10 - 2,000

(n) - Ref. 35, Appendix A.
(m) - Iron and manganese not to exceed 500 µg/l.
ND - Not detected at analytical detection limit.

NR - Not run.
NS - No standard.

TABLE 4-2 (Page 1 of 2)

EXISTING SURFACE WATER SAMPLES DATA SUMMARY

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	MOHAWK RIVER ADJACENT TO KRAUSE BEACH 5/22/80	SW-1 11/18/87	SW-2 11/18/87	SW-3 11/18/87	SW-4 11/18/87	SW-5 11/18/87	SW-6 11/18/87	0.4 MILE EAST OF CLAM STEAM TAVERN CULVERT 5/9/89	CULVERT SOUTH SIDE OF TOW PATH RD. 5/9/89	NYS SW CLASS A STANDARDS AQUATIC	NYS SW CLASS A STANDARDS HUMAN
VOLATILE ORGANICS (µg/l)											
Methylene chloride	ND	62.0 b	84.0 b	60.0 b	77.0 b	65.0 b	18 b	NR	NR	NS	5 GV
Acetone	NR	21.0 b	21.0 b	20.0 b	23.0 b	28.0 b	6.2 b j	NR	NR	NS	NS
Tentatively Identified Compounds											
Unknown alkane	NR	7.8 j	9.7 j	7.6 j	ND	7.6 j	ND	NR	NR	NS	NS
3-Methyl pentane	NR	ND	ND	ND	10 j	ND	ND	NR	NR	NS	NS
SEMIVOLATILE ORGANICS (µg/l)											
bis(2-Ethylhexyl)phthalate	ND	ND	270 b	1,500 b	790 b	270 b	ND	NR	NR	0.6	4 GV
Di-n-butyl phthalate	ND	ND	ND	ND	ND	28	ND	NR	NR	NS	50 GV
Tentatively Identified Compounds											
Unknown	NR	ND	44 (3) j	ND	19 j	ND	ND	NR	NR	NS	NS
PESTICIDES/PCBs (µg/l)											
Total PCBs	NR	ND	ND	ND	ND	ND	ND	0.0592	0.0634	NS	NS

( ) - Number of compounds in total.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
GV - Guidance value.

ND - Not detected at analytical detection limit.
NR - Not run.
NS - No standard.

TABLE 4-2 (Page 2 of 2)

EXISTING SURFACE WATER SAMPLES DATA SUMMARY

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	MOHAWK RIVER ADJACENT TO KRAUSE BEACH 5/22/80	SW-1 11/18/87	SW-2 11/18/87	SW-3 11/18/87	SW-4 11/18/87	SW-5 11/18/87	SW-6 11/18/87	0.4 MILE EAST OF CLAM STEAM TAVERN CULVERT 5/9/89	CULVERT SOUTH SIDE OF TOW PATH RD. 5/14/89	NYS SW CLASS A STANDARDS (h) AQUATIC	NYS SW CLASS A STANDARDS (h) HUMAN
METALS (µg/l)											
Aluminum	NR	70	380	710	15,810	110	280	NR	NR	100 (i)	NS
Antimony	20 k	ND	ND	ND	ND	68	ND	NR	NR	NS	3.0 GV
Barium	NR	77	98	128	476	169	152	NR	NR	NS	1,000
Cadmium	2.0	ND	ND	ND	ND	ND	57	NR	NR	1.6	10
Calcium	NR	50,200	40,100	45,700	127,100	67,700	63,600	NR	NR	NS	NS
Chromium	6 k	ND	ND	49	101	ND	23	NR	NR	304	50
Copper	3.0 j	ND	ND	ND	124	ND	ND	NR	NR	17.7	200
Iron	NR	16,529	34,800	52,800	106,500	20,325	35,007	NR	NR	300	300
Lead	20 k	33.2	121.5	27.5	1116	20.7	11.4	NR	NR	5.8	50
Magnesium	NR	6,000	5,000	4,900	16,700	7,300	7,900	NR	NR	NS	35,000
Manganese	NR	652	421	624	2,150	653	577	NR	NR	NS	300
Mercury	0.53	ND	ND	ND	ND	ND	ND	NR	NR	0.2 GV	2.0
Nickel	10 k	ND	25	ND	27	ND	ND	NR	NR	137	NS
Potassium	NR	ND	ND	ND	6100	ND	ND	NR	NR	NS	NS
Silver	2 k	65	10	ND	ND	ND	ND	NR	NR	0.1 (i)	50
Sodium	NR	4,800	3,500	3,300	30,800	21,500	23,100	NR	NR	NS	NS
Thallium	0.9 j	ND	ND	ND	ND	ND	ND	NR	NR	8.0	4.0 GV
Vanadium	NR	ND	ND	ND	31	ND	ND	NR	NR	14	NS
Zinc	7.0 j	173	353	252	1,104	145	546	NR	NR	30	300
Cyanide	NR	ND	ND	ND	ND	ND	ND	NR	NR	5.2 (f)	100

(f) - Free cyanide, sum of HCN + CN^-.
(h) - Hardness: 160.0 mg equivalent $CaCO_3$/l.
(i) - Ionic.
j - Estimated concentration; compound present below quantitation limit.
k - Actual value known to be less than value given.
GV - Guidance value.
ND - Not detected at analytical detection limit.
NR - Not run.
NS - No standard.

TABLE 4-3 (Page 1 of 2)

EXISTING SEDIMENT SAMPLES DATA SUMMARY

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	SED-1 11/18/87	SED-2 11/18/87	SED-4 11/18/87	NO DUMPING SIGN 5/9/89	4 FT OFF CULVERT 5/9/89	NORTH OF TOW PATH RD. 5/9/89	CULVERT NORTH OF TOW PATH RD. 5/9/89
VOLATILE ORGANICS (mg/kg)							
Acetone	0.370 b	0.089 b	0.230 b	NR	NR	NR	NR
Methylene chloride	0.260 b	0.140 b	0.140 b	NR	NR	NR	NR
Tentatively Identified Compounds							
Ethyl ether	ND	ND	0.012 j	NR	NR	NR	NR
SEMIVOLATILE ORGANICS (mg/kg)							
Di-n-butyl phthalate	ND	ND	6.000 b	NR	NR	NR	NR
Tentatively Identified Compounds							
Unknown	8.900 (3) j	46.400 (2) j	74.050 (10) j	NR	NR	NR	NR
3-Methyl octane	ND	0.900 j	1.000 j	NR	NR	NR	NR
Unknown alkane	ND	ND	5.800 (2) j	NR	NR	NR	NR
Unknown alkene	ND	ND	8.800 (3) j	NR	NR	NR	NR
2,3-Dichloro naphthalene	ND	ND	87.100 (3) j	NR	NR	NR	NR
2,3,6-Trichloronaphthalene	ND	ND	84.000 (2) j	NR	NR	NR	NR
1,4,6,7-Tetrachloronaphthalene	ND	ND	39.400 (3) j	NR	NR	NR	NR
Unknown isomer benzoyl chloride, 3, fluoro	ND	ND	4.000 j	NR	NR	NR	NR

( ) - Number of compounds in total.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
ND - Not detected at analytical detection limit.
NR - Not run.

TABLE 4-3 (Page 2 of 2)

EXISTING SEDIMENT SAMPLES DATA SUMMARY

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	SED-1 11/18/87	SED-2 11/18/87	SED-4 11/18/87	NO DUMPING SIGN 5/9/89	4 FT OFF CULVERT 5/9/89	NORTH OF TOW PATH RD. 5/9/89	CULVERT NORTH OF TOW PATH RD. 5/9/89
METALS (mg/kg)							
Aluminum	5,100	3,900	8,700	11,600	8,000	6,400	8,930
Antimony	ND	30	ND	NR	NR	NR	NR
Arsenic	6.2	ND	2.1	ND	ND	ND	ND
Barium	90	40	80	105	127	45.1	101
Cadmium	12.4	2.4	1.9	ND	ND	ND	ND
Calcium	5,430	1,300	4,680	9,050	9,800	13,500	11,000
Chromium	110	30	20	59.4	14.2	8.88	14.2
Cobalt	ND	ND	ND	ND	ND	ND	7.6
Copper	60	ND	ND	36.7	39.7	15	29.1
Iron	112,100	27,100	20,100	33,200	88,700	17,200	35,000
Lead	20	40	190	ND	ND	39.9	82.7
Magnesium	2,700	1,000	3,500	5,910	4,470	4,930	5,130
Manganese	250	130	310	387	518	190	239
Nickel	20	ND	10	23	19.6	12.1	17.7
Potassium	ND	ND	1,200	1,880	ND	ND	1,040
Vanadium	ND	ND	10	25.4	ND	16.6	18.9
Zinc	580	310	100	107	193	67.4	159
Cyanide	3.4	1.2	6.6	NR	NR	NR	NR
PESTICIDES/PCBs (mg/kg)							
Aroclor 1248	ND	ND	ND	ND	ND	NR	0.35
Aroclor 1260	ND	ND	ND	ND	ND	NR	0.86

ND - Not detected at analytical detection limit.
NR - Not run.

TABLE 4-4

LEACHATE SAMPLE DATA SUMMARY (MAY 1980)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	DRAINAGE DITCH ACROSS FROM CRESCENT BEACH YACHT CLUB	LEACHATE COMPOSITION SANITARY(*)
VOLATILE ORGANICS (µg/l)	ND	-
SEMIVOLATILE ORGANICS (µg/l)	ND	-
PESTICIDES/PCBs (µg/l)		
4,4'-DDD	0.1	-
METALS (µg/l)		
Antimony	50 j	0 - 3,190
Arsenic	11	0 - 70,200
Beryllium	3 k	0 - 360
Cadmium	59	0 - 400
Chromium	130	0 - 5,600
Copper	130	0 - 9,900**
Mercury	0.83	0 - 10
Lead	390	<100 - 2,000**
Nickel	68	0 - 7,500
Selenium	0.80 k	0 - 1,850
Silver	2 j	0 - 1,960
Thallium	1 j	0 - 780
Zinc	1,100	0 - 370,000**

* - Ref. 38.
** - Ref. 36.
j - Estimated value.
k - Actual value known to be less than value given.
ND - Not detected at analytical detection limit.

TABLE 4-5 (Page 1 of 3)

EXISTING SOIL SAMPLES DATA SUMMARY

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	0101 RIVER BANK 8/24/87	60 FT NORTH OF DUMP SIGN 5/9/89	75 FT NORTH OF SIDE ROAD 5/9/89	COLORED MATERIAL FROM TOW PATH RD. 5/9/89
VOLATILE ORGANICS (mg/kg)				
Methylene chloride	0.168	NR	NR	NR
Acetone	0.123	NR	NR	NR
Carbon disulfide	0.0002	NR	NR	NR
1,1-Dichloroethane	0.0002	NR	NR	NR
1,2-Dichloroethane	0.0001	NR	NR	NR
Chloroform	0.0003	NR	NR	NR
2-Butanone	0.0083	NR	NR	NR
1,1,1-Trichloroethane	0.0001	NR	NR	NR
1,2-Dichloropropane	0.0007	NR	NR	NR
Trichloroethylene	0.0009	NR	NR	NR
1,1,2-Trichloroethane	0.0007	NR	NR	NR
Benzene	0.0013	NR	NR	NR
2-Chloroethyl vinyl ether	0.0075	NR	NR	NR
Toluene	0.0029	NR	NR	NR
Styrene	0.0001	NR	NR	NR

NR - Not run.

TABLE 4-5 (Page 2 of 3)

EXISTING SOIL SAMPLES DATA SUMMARY

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	0101 RIVER BANK 8/24/87	60 FT NORTH OF DUMP SIGN 5/9/89	75 FT NORTH SIDE OF ROAD 5/9/89	COLORED MATERIAL FROM TOW PATH RD. 5/9/89
SEMIVOLATILE ORGANICS (mg/kg)				
Phenol	0.0009	NR	NR	NR
n-Nitroso-di-n-propylamine	0.0068	NR	NR	NR
Isophorone	0.0003	NR	NR	NR
Benzoic acid	0.0031	NR	NR	NR
Dimethylphthalate	0.0003	NR	NR	NR
Diethylphthalate	0.0012	NR	NR	NR
Fluorene	0.0155	NR	NR	NR
Di-n-butylphthalate	0.0109	NR	NR	NR
bis(2-Ethylhexyl)phthalate	0.0045	NR	NR	NR
Di-n-octylphthalate	0.0045	NR	NR	NR

NR - Not run.

TABLE 4-5 (Page 3 of 3)

EXISTING SOIL SAMPLES DATA SUMMARY

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	0101 RIVER BANK 8/24/87	60 FT NORTH OF DUMP SIGN 5/9/89	75 FT NORTH SIDE OF ROAD 5/9/89	COLORED MATERIAL FROM TOW PATH RD. 5/9/89	NATIVE SOIL CONCENTRATIONS TYPICAL RANGE (n)
METALS (mg/kg)					
Aluminum	11,875	20,900	9,300	15,500	10,000 - 300,000
Arsenic	124.7	33.1	35.8	31.0	1.0 - 40
Barium	638	239	239	94.6	100 - 3,500
Beryllium	1.11	0.88	ND	0.61	0.1 - 40
Cadmium	ND	ND	1.1	ND	0.01 - 7.0
Calcium	NR	11,900	11,800	57,100	100 - 400,000
Chromium	170.8	26.9	25.6	16.8	5.0 - 3,000
Cobalt	11.9	15.6	10.0	11.8	1.0 - 40
Copper	26.4	47	62.9	25.8	2.0 - 100
Iron	25,769	38,200	102,000	27,500	7,000 - 550,000
Lead	16.1	25.4	269	ND	2.0 - 200
Magnesium	13,510	10,200	3,050	17,400	600 - 6,000
Manganese	714.9	821	548	588	100 - 4,000
Mercury	1.1	ND	ND	ND	0.01 - 0.08
Nickel	23.9	33.8	29.5	24.5	5.0 - 1,000
Potassium	3,262	4,550	1,060	2,710	400 - 30,000
Sodium	370	ND	ND	ND	750 - 7,500
Vanadium	28.7	38.9	16.9	28.8	20 - 500
Zinc	70.5	117	575	70.4	10 - 300
PESTICIDES/PCBs (mg/kg)					
Aroclor 1260	NR	ND	0.170	NR	-
Aroclor 1248	NR	ND	0.410	NR	-

(n) - Ref. 35, Appendix A.
ND - Not detected at analytical detection limit.
NR - Not run.

standard by the Criteria and Standards Section of NYSDEC. In addition, tentatively identified compounds (TICs) are arbitrarily assigned a value of 50 µg/l as the standard.

Table 4-1 presents the existing residential well sampling data collected near the vicinity of the Tow Path Road Landfill site. Also shown on the table are the NYSDEC standards and natural ambient groundwater values taken from Dragun (Ref. 35), which are used for comparison purposes. Plate 1 at the back of this report shows the location of some of these samples. Clam Steam Tavern was sampled in 1980 and 1988. The metals data are unusable in some cases as most of the metals were listed as having a known value less than the actual value provided. Diethylphthalate was found at a concentration of 12.1 µg/l, which is less than the guidance value of 50 µg/l. The 1988 data show the presence of chloroform and 4-methyl-2-pentanone in the volatile fraction; however, the 10 µg/l concentration of chloroform was greater than the 7 µg/l standard. In the metals fraction only iron at 457 µg/l was above the standard of 300 µg/l. Other metals found include aluminum, barium, manganese, strontium, and zinc. All metals found were within the range of natural background groundwater.

None of the other residences sampled had any positive detections of any VOCs, semivolatiles, or pesticides/PCBs. The major metal found in the remaining residential samples was iron, which was found above the 300 µg/l standard in six residences ranging from 354 to 1450 µg/l. Note that the value of 1450 µg/l was almost five times the standard, although still within the range of natural background groundwater. Manganese was also found above the 300 µg/l standard at three residences, ranging from 368 to 2980 µg/l. The value of 2980 µg/l is almost 10 times higher than the standard, and it and the concentration of 1220 µg/l were above the natural background concentration of 1000 µg/l. Iron and manganese are components of municipal landfill leachate as well as groundwater and are assigned secondary water quality standards for aesthetic reasons only. Zinc was found above the 300 µg/l standard at two residences; however, the concentration in both samples was within the range of natural background.

Copper, although not above the standard of 200 µg/l, was higher than the natural background groundwater value of 30 µg/l at two of the residences. None of the other metals detected were above the natural background range.

4.5.2 **Surface Water and Sediment Data**

The Mohawk River runs along the southern boundary of the site and receives groundwater, leachate, and surface runoff from the Tow Path Road Landfill site. Culverts have been placed underneath Tow Path Road and through the fill material to carry runoff from the hills north of the site into the river. The river is classified by the NYSDEC Division of Water (DOW) as a Class A surface water. Class A surface waters are used as a source of water supply for drinking, culinary, or food processing purposes and any other uses. The Mohawk is used as the drinking water supply for the City of Cohoes (population 18,144), located approximately 3 miles downstream of the landfill (Ref. 39).

Table 4-2 summarizes the existing surface water data on the Tow Path Road Landfill site. Also shown on the table are the NYSDEC surface water standards for both aquatic and human protection. The 1980 sample showed no detections of any organic compounds. The locations of the six samples collected by NYSDEC in November 1987 are shown on Plate 1. Most of these samples appear to be ponded water samples or discharges from culverts that run underneath the road. These samples were analyzed for VOCs; however, the two compounds detected, methylene chloride and acetone, were also found in the blank, indicating possible laboratory contamination. Several TICs, consisting mostly of unknown alkanes, were also detected in the volatile fraction.

In the semivolatile fraction only di-n-butylphthalate was found without also being found in the blank. Di-n-butylphthalate was found at less than the guidance value for human use (50 µg/l). Phthalates (plastics) are typical landfill constituents. Several unknown TICs were also found.

PCBs were detected in both samples collected in May 1989; however, the concentration found was less than 0.1 µg/l of total PCBs.

Metals were analyzed for all but the 1989 samples. Note that the aquatic standard for certain metals - cadmium, copper, chromium, lead, and nickel - is based on the hardness content of the water. Hardness was not analyzed for in any of these samples (nor in the Phase II

samples), but has been calculated based on the calcium and magnesium content of the samples. To be consistent, only the Phase II data were used in the calculation. The average value of each metal was used in the equation (Ref. 40). This equation yielded a calculated hardness value of 160 mg/l, which was used to determine the Class A standards for the above-mentioned metals. A hardness value of 160 mg/l is considered hard water (Ref. 41).

The 1980 metals data are unusable in some cases because several of the data points were flagged as the actual value was known to be less than the stated value given. Only the cadmium and mercury values exceeded the aquatic standard of 1.6 and the guidance value of 0.2, respectively.

For the NYSDEC samples SW-1 appears from the plate to be the discharge from a culvert near Beach Road. The samples' iron and manganese values were high, each exceeding aquatic and human standards of 300 µg/l; the iron value was 55 times higher than the standard. Lead and silver exceeded both aquatic and human standards in this sample; zinc exceeded only the aquatic standard.

SW-2 appears to be located in a ponded leachate area on the side of the road opposite SW-1. Sample violations were similar to those at SW-1, with the aluminum aquatic standard of 100 µg/l and the zinc human standard violated. The iron value was 116 times higher than the standard (300 µg/l). As iron and manganese are two common elements of landfill leachate, these findings indicate that these surface waters have been contaminated by leachate from the site.

SW-3 was also located in the ponded leachate area north of Tow Path Road. Contaminant concentrations were similar to those found in SW-2; however, no silver was detected.

SW-4 was taken from a ponded leachate area across from the yacht club. It had the highest concentration of metals found in any of the samples, with the iron concentration 355 times the standard. The aluminum concentration, 158 times the standard (100 µg/l), was also extremely high. Chromium, copper, and vanadium were above the standard in this sample and not in any of the others.

SW-5 was located on the discharge side of a culvert west of the yacht club. The concentrations found in this sample were similar to those found in SW-3. However, SW-5 was the only sample for which antimony was found above 3 µg/l, the guidance value for human health.

SW-6 was taken to the east of SW-4 in a ponded leachate area. Concentrations were similar to SW-5; however, zinc was about four times higher, antimony was not detected, and cadmium was found above the aquatic and human standards of 1.6 and 10 µg/l, respectively.

Sediment samples were taken at three of the six surface water locations during 1987. The data are summarized on Table 4-3. All samples showed VOCs and semivolatiles with blank contamination. SED-4 also had one TIC VOC and several TIC semivolatiles. Four other samples collected in 1989 were not analyzed for VOCs or semivolatiles. Pesticides/PCBs were analyzed for all but one sample collected in 1989. Only one sample, from the culvert north of Tow Path Road, had detectable PCBs, totaling 1.21 mg/kg, a concentration much lower than the NYSDEC guideline of 50 mg/kg for hazardous sediments (Ref. 42).

Metals analyses in the three sediment samples taken in 1987 showed a pattern similar to the corresponding surface water samples; however, SED-4 did not contain any copper, whereas the surface water sample did. Another interesting observation was that silver, although in the surface water samples from SW-1 and -2, was not found in the corresponding sediment samples. Cyanide was also detected in the sediment sample from all three 1987 samples, but was not found in the surface water.

Four other sediment samples were collected in May 1989; these samples showed quantities of metals similar to the 1987 samples.

4.5.3 **Leachate Data**

On 22 May 1980 EPA took three samples from the Tow Path Road Landfill, one a leachate sample. The data are summarized on Table 4-4. The sample taken from a drainage ditch across from the Crescent Boat Club indicates some heavy metals contamination, as shown on

the table. Also shown, for comparison purposes, are typical sanitary landfill leachate characteristics (Refs. 36 and 38). The data indicate that none of the concentrations are found outside either of these ranges. A small amount (0.1 µg/l) of a pesticide, 4,4'-DDD, was also found in the sample.

4.5.4 **Soil Data**

Four soil samples were collected at the Tow Path Road Landfill prior to the Phase II investigation, one in 1987 and three in 1989. Table 4-5 summarizes the data collected from these sampling events. The 1987 sample collected from along the riverbank was analyzed for VOCs, semivolatiles, and metals. The VOC data indicate the presence of low levels of chemicals, including methylene chloride, acetone, other chlorinated solvents, and gasoline-related compounds. None of the compounds were found in high concentrations and all are typical of municipal landfill waste. The volatiles data also indicate low levels of chemicals, most of which were phthalate acid esters (PAEs), which are used in plastics and plasticizers and are commonly found in landfill waste.

None of the samples collected in 1989 were analyzed for volatile or semivolatile constituents. The metals data collected for all four samples are shown on Table 4-5, along with native soil concentrations as found in Dragun (Ref. 35). The arsenic data from 1987 exceeded the native soil value by about three times; the other data were within the range. The magnesium concentration was also outside the limit in three of the four samples. Magnesium, a compound that contributes to the hardness of water, is a very common element. Lead was found above the range of 2-200 mg/kg in one sample; zinc exceeded the native soil concentration in this same sample.

Pesticide/PCB analyses were performed on two of the samples collected in 1989; only one sample contained very small quantities of PCBs (<0.6 mg/kg total).

4.6 PHASE II RESULTS

4.6.1 Site Inspection

The site inspection (Ref. 1) was conducted on 10-11 October 1991. NYSDEC met with LMS on the morning of 10 October and conducted an overall drive-through survey of the site. After the survey, the meters were calibrated and an initial air monitoring survey was conducted with an HNU PID, an OVA FID, an MSA CGI, and a dosimeter. During the air monitoring survey, leachate ponding and seeps were noted, although very little leachate was observed because of the dry conditions at the time. Any observations of refuse, drums, or other debris were noted and recorded. After the air monitoring survey, locations for the magnetometer survey were determined and marked. Clearing of the sampling locations was also initiated at this time.

4.6.2 Environmental Surroundings

The trenching investigation showed a depth of cover at the landfill from approximately 6 ft to no cover at all in a few locations where garbage is visible at the surface. The landfill vegetation ranges from maintained grass lawns to early secondary succession shrub and wooded growth areas. In a few locations leachate emerges and pools with runoff in low-lying areas to form small wetland areas dominated by stands of reeds (*Phragmites communis*). There was no evidence of stressed flora and fauna, but the investigation was conducted in the fall when biological stress is not readily noticeable.

Leachate, surface water, and sediment samples were collected along the shores of the Mohawk River bordering the Tow Path Road Landfill between I-87 and Route 9. Leachate plumes and seeps are most prevalent between Clam Steam Tavern and Whites Lane. Leachate emerges on both sides of Tow Path Road, dictated by the local topography, and drains toward the Mohawk River. Orange iron flocculent staining is very conspicuous where the leachate emerges, pools, and flows toward the river. This staining is located in the river where the leachate enters, but is not noticeable much past the shoreline.

The shoreline sediment of the river bordering the landfill varies according to the effects of the river current. The shoreline between I-87 and Whites Lane is protected from the river currents by an offshore island and a number of small peninsular land masses. Sediment in this area is very silty, with organic detritus and some sand. The shoreline between Whites Lane and County Route 819 is exposed to the river currents and is therefore characteristically sand and gravel with some silt. The area between County Route 819 and the Route 9 bridge is somewhat protected and the sediments exhibit more silt and organic detritus.

During the investigation, waterfowl were noted in open waters offshore around the island, near the bay, and around the yacht club peninsula. Winter songbirds were observed along the entire landfill area. Much of the shoreline area where samples were collected was covered with ice, hindering observation of the aquatic flora and fauna. A minnow was observed at the upgradient surface water location near the I-87 bridge.

4.6.3 **Waste Sample Data (November 1991)**

Table 4-6 presents the data collected in November 1991 for samples from the test trenches; standards are shown where applicable. Figures 4-1A through 4-1K show the sampling locations and a summary of the data (Refs. 43 and 44). Appendix C contains the data usability summary (Ref. 45).

4.6.3.1 ***Volatile Organic Compounds.*** Four samples were collected from the November 1991 test trench investigation at the Tow Path Road Landfill site and analyzed for VOCs. The first sample, OHT-01-A, was taken from the first trench, OHT-1, and consisted of a white, pulplike material with a moderate petroleum odor. The test trench was located in an area of ponded leachate just west of the entrance to the peninsula. The VOC data indicate the presence of very low levels of chemicals associated with gasoline (benzene, toluene, ethylbenzene, and xylene [BTEX]), with a total concentration of 0.104 mg/kg. Benzene was not actually found in this sample, but it may have been present and not quantifiable. Methylene chloride was found in this sample, but because it was also found in the blank its presence is most likely due to laboratory contamination. Chlorobenzene was detected in the sample at 0.017 mg/kg; chlorobenzene is a man-made substance, not found in petroleum but

TABLE 4-6 (Page 1 of 5)

WASTE SAMPLES DATA SUMMARY (NOVEMBER 1991)

Tow Path Road Landfill NYSDEC I.D. 546013

PARAMETER	OHT-01-A	OHT-02-A	OHT-04-A	DL OHT-04-A	OHT-08-A	MS OHT-08-A	MSD OHT-08-A
				[DL: 1,000:1]			
VOLATILE ORGANICS (mg/kg)							
Methylene chloride	0.027 b	0.020 b	ND	530.000 b d j	0.004 j	ND	0.003 j
Carbon disulfide	0.001 j	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	47.000	ND	ND	ND	ND
Toluene	0.008 j	ND	900.000 e	35,000.000 b d e	0.0024	ND	ND
Chlorobenzene	0.017	ND	ND	ND	ND	ND	ND
Ethylbenzene	0.007 j	ND	19.000	ND	ND	ND	ND
Xylene (total)	0.089	ND	31.000	ND	ND	ND	ND
Tentatively Identified Compounds							
Unknown	0.010 j	ND	510.200 (7) j	36,000.000 j	ND	NR	NR
C17J14 aromatic hydrocarbon	ND	ND	11.500 (2) j	ND	ND	NR	NR
Unknown alkane	ND	ND	35.400 (3) j	ND	ND	NR	NR
Unknown hydrocarbon	ND	ND	11.000 j	ND	ND	NR	NR
Unknown alkene	0.035 j	ND	ND	ND	ND	NR	NR

( ) - Number of compounds in total.
b - Found in associated blanks.
d - Concentration recovered from diluted sample.
e - Estimated concentration; exceeds GC/MS calibration range.
j - Estimated concentration; compound present below quantitation limit.
DL - Diluted sample analysis.
MS - Matrix spike.
ND - Not detected at analytical detection limit. (Ref. 43).
NR - Not run.
MSD - Matrix spike duplicate.

WASTE SAMPLES DATA SUMMARY (NOVEMBER 1991)

Tow Path Road Landfill NYSDEC I.D. 546013

PARAMETER	DL OHT-01-A	RE OHT-01-A	OHT-02-A	OHT-04-A	OHT-08-A	MS OHT-08-A	MSD OHT-08-A
	[DL:20:1]	[DL:20:1]					
SEMIVOLATILE ORGANICS (mg/kg)							
Phenol	3.000 j	2.800 j	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	0.580 j	ND	0.063 j	ND	ND
4-Methylphenol	ND	ND	0.065 j	0.550	ND	ND	ND
Benzoic acid	ND	ND	ND	ND	0.021 j	0.022 j	0.021 j
Naphthalene	4.000 j	4.200 j	0.520 j	0.380 j	ND	ND	ND
2-Methylnaphthalene	5.100 j	5.900 j	0.330 j	0.140 j	ND	ND	ND
Acenaphthene	ND	ND	0.033 j	ND	ND	ND	ND
Dibenzofuran	2.700 j	2.700 j	0.027 j	ND	ND	ND	ND
Diethylphthalate	ND	ND	ND	0.930	ND	ND	ND
Fluorene	11.000 j	9.400 j	ND	ND	ND	ND	ND
n-Nitrosodiphenylamine(¶)	ND	ND	ND	0.110 b j	0.044 b j	0.045 b j	0.046 b j
Phenanthrene	45.000	23.000	0.170 j	0.076	ND	ND	ND
Anthracene	ND	ND	0.015 j	ND	ND	ND	ND
Di-n-butylphthalate	ND	ND	0.430 j	1.100	2.600[1]	1.300[1]	0.190 j [1]
Fluoranthene	4.000 j	2.400 j	0.100 j	ND	ND	ND	ND
Pyrene	4.700 j	4.000 j	0.096 j	ND	ND	ND	ND
Butylbenzylphthalate	ND	ND	0.039 j	0.380 j	ND	ND	ND
Benzo(a)anthracene	ND	ND	0.047 j	ND	ND	ND	ND
Chrysene	6.800 j	8.500 j	0.075 j	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate	27.000 b	14.000 b	2.400 b	2.800 b	0.020 j	0.160 j	0.190 j
Di-n-octylphthalate	1.900 j	ND	0.064 j	0.039 j	ND	ND	ND
Benzo(a)pyrene	ND	2.800 j	ND	ND	ND	ND	ND

1 - The reported di-n-butylphthalate results should be considered estimated due to the inconsistencies among the three analyses.
¶ - Cannot be separated from diphenylamine.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
DL - Diluted sample analysis.
MS - Matrix spike.
ND - Not detected at analytical detection limit.
RE - Reextracted analysis.
MSD - Matrix spike duplicate.

TABLE 4-6 (Page 3 of 5)

WASTE SAMPLES DATA SUMMARY (NOVEMBER 1991)

Tow Path Road Landfill NYSDEC I.D. 546013

PARAMETER	DL OHT-01-A	DL OHT-01-A	RE OHT-01-A	OHT-02-A	OHT-04-A	OHT-08-A	MS OHT-08-A	MSD OHT-08-A
	[DL:20:1]	[DL: 20:1]	[DL: 20:1]					
SEMIVOLATILE ORGANICS (mg/kg)								
Tentatively Identified Compounds								
Unknown alkane	609.000 (14) j	NR	430.000 (13) j	37.500 (9) j	17.950 (6) j	4.140 (7) j	NR	NR
Unknown	84.000 (3) j	NR	68.000 (4) j	15.020 (7) j	33.640 (10) j	5.200 (10) j	NR	NR
Unknown acid	ND	NR	ND	ND	8.800 (3) j	ND	NR	NR
Sulfur (S8)	ND	NR	ND	1.700 j	1.800 j	ND	NR	NR
Substituted benzene	ND	NR	ND	ND	ND	0.410 j	NR	NR
Unknown aromatic	ND	NR	16.000 j	13.100 (2) j	ND	0.230 j	NR	NR
Dimethyl naphthalene isomer	18.000 j	NR	ND	ND	ND	ND	NR	NR
C13H14 aromatic hydrocarbon	100.000 (2) j	NR	ND	ND	ND	ND	NR	NR
Substituted cyclohexane	ND	NR	23.100 (2) j	ND	ND	ND	NR	NR
Hexadecanoic acid	ND	NR	ND	3.700 j	ND	ND	NR	NR
PESTICIDES/PCBs (mg/kg)	[Not Diluted]							
4,4'-DDD	ND	ND	NR	0.096	ND	ND	ND	ND
Aroclor 1242	ND	ND	NR	0.880	ND	ND	ND	ND
Aroclor 1254	ND	43.000 d	NR	ND	0.210	ND	ND	ND

( ) - Number of compounds in total.
d - Concentration recovered from diluted sample.
j - Estimated concentration; compound present below quantitation limit.
DL - Diluted sample analysis.
MS - Matrix spike.

ND - Not detected at analytical detection limit.
NR - Not run.
RE - Reextracted analysis.
MSD - Matrix spike duplicate.

WASTE SAMPLES DATA SUMMARY (NOVEMBER 1991)

Tow Path Road Landfill NYSDEC I.D. 546013

PARAMETER	OHT-01-A	OHT-02-A	OHT-04-A	DUP OHT-08-A	MSD OHT-08-A
METALS (mg/kg)					
Aluminum	3,100 R	10,800 R	8,680 R	1,520 R	1,885 R
Antimony	74.9	6.9 B	ND	ND	ND
Arsenic	4.2	3.6	5.6	ND	ND
Barium	69.8 B	222	152	9.3 B	10.6 B
Beryllium	ND	1.2 B	ND	ND	ND
Cadmium	ND	ND	ND	ND	ND
Calcium	5870	19,400	12,800	3,400	3546
Chromium	406 R	28.0 R	18.1 R	11.7 R	14.9 R
Cobalt	21.4	9.9 B	6.3 B	ND	2.3 B
Copper	97.8	30.6	14.1	7.2	8.5
Iron	207,000 R	32,100 R	18,000 R	3,110 R	3,964 R
Lead	625 R *	172 B *	129 R *	4.2 R *	16.9 R *
Magnesium	831 B	6,110	4,910	309 B	412 B
Manganese	1,850	400	349	107	127
Mercury	1.6	ND	ND	NU	NU
Nickel	63.1	37.2	15.1	24.8	29.1
Potassium	ND	1,800	1,320	ND	ND
Selenium	ND N W	ND N W	ND N W	ND N W	ND
Silver	ND	ND	ND	ND	ND
Sodium	ND	ND	ND	ND	ND
Thallium	ND	ND	ND	ND	ND
Vanadium	16.3 B	105	20.3	51.8	59.6
Zinc	1,270 E	354 E	151	56.0 E	66.5
Cyanide	UN	UN	UN	UN	UN

* - Lead results should be considered estimated due to the poor precision between the sample and duplicate (68% difference).
B - Value is less than the contract-required detection limit but greater than the instrument detection limit.
E - Value estimated due to interference.
N - Spiked sample recovery is not within control limits.
R - Duplicate analysis not within control limits.
W - Post-digestion spike out of control limits; sample absorbance is less than 50% of spike absorbance.
ND - Not detected at analytical detection limit.
NU - The mercury results are not usable because the mercury spike recovery was 0%.
UN - Cyanide results for these samples unusable because cyanide matrix spike recovery was 0%.
DUP - Duplicate sample analysis.
MSD - Matrix spike duplicate.

TABLE 4-6 (Page 5 of 5)

WASTE SAMPLES DATA SUMMARY (NOVEMBER 1991)

Tow Path Road Landfill NYSDEC I.D. 546013

PARAMETER	OHT-01-A	OHT-02-A	OHT-04-A	OHT-08-A	HAZARDOUS CRITERIA AND EP TOX STANDARDS
HAZARDOUS CHARACTERISTICS					
pH @ 20°C	5.12	7.46	7.70	7.71	NS
Ignitability	>212	>212	>212	>212	1
Corrosivity, inches/year	<0.01	<0.01	<0.01	<0.01	0.25 +
Reactivity to cyanide, ppm	<1.0	<1.0	<1.0	<1.0	250
Reactivity to sulfide, ppm	<1.0	<1.0	<1.0	<1.0	500
EP TOX ORGANICS (mg/l)					
Endrin	ND	ND	ND	ND	0.02
Lindane	ND	ND	ND	ND	0.40
Methoxychlor	ND	ND	ND	ND	10
Toxaphene	ND	ND	ND	ND	0.50
2,4-D	ND	ND	ND	ND	10
2,4,5-TP (silvex)	ND	ND	ND	ND	1.0
EP TOX METALS (mg/l)					
Arsenic	ND	ND	ND	ND	5.0
Barium	0.286	0.381	0.214	0.0589 B	100
Cadmium	ND	ND	ND	ND	1.0
Chromium	ND	ND	ND	ND	5.0
Lead	ND	0.0297 B	ND	ND	5.0
Mercury	ND	ND	ND	ND	0.2
Selenium	ND	ND	ND	ND	1.0
Silver	ND	ND	ND	ND	5.0

1 - It is not a liquid and is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture, or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard.
\+ - Rate of corrosivity of steel at 131°F as determined by NACE test.
B - Value less than contract-required detection limit but greater than instrument detection limit.
ND - Not detected at analytical detection limit.
NS - No standard.

used as an intermediate in the production of other products. Therefore, its presence can be attributed only to human activities. Unknown TICs totaling 0.045 mg/kg were also detected in the sample.

Sample OHT-02-A was taken from test trench OHT-2 in an area where a perfumelike odor was noticed. Test trench OHT-2 was located approximately 400 ft east of Whites Lane in a grassy area. No VOCs other than methylene chloride (whose presence was most likely due to laboratory contamination) were detected in this sample.

Sample OHT-04-A taken from test trench OHT-4 consisted of a mixture of waste, soil, and drum contents from the vicinity of a drum labeled "General Electric Waterford, New York, Silicone Products." The test trench was located approximately one-third of the way between Whites Lane and Route 819 at the eastern end of the site. This grassy area is used by the adjacent property owners. The odor of the material coming from the drum indicated the presence of toluene, which was confirmed by the VOC analysis that showed over 35,000 mg/kg of toluene in the sample. The sample had to be diluted to 1000:1 and the calibration limits of the gas chromatograph/mass spectrometer (GC/MS) were still exceeded. Toluene is usually derived from coal tars, and commercial grades generally contain small quantities of benzene (Ref. 46). Toluene is used as a solvent in paints, coatings, resins, gums, most oils, rubber, vinyl organosolvents, as a diluent and thinner in nitrocellulose lacquers, as an adhesive solvent in plastic toys and model airplanes, in the manufacture of various compounds (including explosives [TNT]), and as a gasoline additive (Refs. 47 and 48). The diluted sample also showed 530 mg/kg of methylene chloride, but none was detected in the undiluted sample. As it was also found in the laboratory blank, and as the quantity found in the sample was below the quantitation limit, it is most likely a result of laboratory contamination. The undiluted sample contained 47 mg/kg of benzene, 19 mg/kg of ethylbenzene, and 31 mg/kg of total xylenes. Although the presence of BTEX in the sample may be indicative of gasoline contamination, these compounds may be present as impurities of the toluene found in the drum. TICs totaling 568 mg/kg were detected in the undiluted sample; these consisted of unknowns and an aromatic hydrocarbon. The diluted sample contained 36,000 mg/kg of an unknown.

Sample OHT-08-A was obtained from drums found in test trench OHT-8. The test trench was dug to the west at the end of the peninsula and west of the clearing with the "No Dumping" sign. The drums contained a gray-blue-brown and red gritlike material. Matrix spike/matrix spike duplicate (MS/MSD) samples were also taken from this site. Methylene chloride was found below the quantitation limit in the sample and in the MSD. Toluene was found at a concentration of 0.024 mg/kg only in the sample. No TICs were detected in the sample. The quantity of VOCs found is extremely low and does not indicate hazardous materials.

4.6.3.2 ***Semivolatile Organic Compounds***. Sample OHT-01-A was reextracted after the initial analysis. The sample contained 50.1 mg/kg of polynuclear aromatic hydrocarbons (PAHs). These compounds (fluorene, 9.4 mg/kg; phenanthrene, 23.0 mg/kg; fluoranthene, 2.4 mg/kg; pyrene, 4.0 mg/kg; chrysene, 8.5 mg/kg; and benzo(a)pyrene, 2.8 mg/kg), when associated with dibenzofuran (2.7 mg/kg), are normally found in coal tars. Coal tars are used for waterproofing, pipe coatings, roads, roofing, sealants, and insulation. PAHs are common compounds in landfill debris. Naphthalene at 4.2 mg/kg and 2-methylnaphthalene at 5.9 mg/kg were also found in the waste sample. Naphthalene and naphthalenelike substances are normally associated with diesel fuel. Bis(2-ethylhexyl)phthalate, a PAE, was also found. PAEs are found in plastics and plasticizers and are typical landfill contaminants. Phenol at 2.8 mg/kg was also detected. Phenol is used as a disinfectant, in the manufacture of medical products and resins, and as a reagent in chemical analyses. TICs (537.1 mg/kg), mostly unknowns and a substituted cyclohexane, were found in the sample.

Sample OHT-02-A also contained compounds similar to those found in OHT-01-A, including PAHs, PAEs, and naphthalene and naphthalenelike substances. PAHs totaled 0.461 mg/kg, with 0.170 mg/kg of phenanthrene the highest concentration of any PAH found. All concentrations were estimated as they were present below the quantitation limit. Dibenzofuran was also present, at 0.027 mg/kg, indicating that the PAHs were from coal tars. Naphthalene and naphthalenelike substances were present at a total concentration of 0.850 mg/kg. PAEs, consisting of bis(2-ethylhexyl)phthalate (2.4 mg/kg), di-n-octylphthalate (0.064 mg/kg), di-n-butylphthalate (0.430 mg/kg), and butylbenzylphthalate (0.039 mg/kg), were detected in the sample. Only the bis(2-ethylhexyl)phthalate was found above the quantitation

limit; it was also detected in the blank, however, indicative of possible laboratory contamination. Other compounds found included 1,4-dichlorobenzene at 0.580 mg/kg and 4-methylphenol at 0.065 mg/kg. The former compound, also known as p-dichlorobenzene, is used as an air deodorant and an insecticide; the latter compound, also called p-cresol, is used as a disinfectant. Both compounds were detected below the quantitation limit. A total of 71.02 mg/kg of TICs were found in this sample; all but two were unknowns. The other compounds detected were hexadecanoic acid and sulfur.

The waste sample with the high toluene (OHT-04-A) also contained several semivolatiles, including naphthalene and 2-methylnaphthalene at 0.380 and 0.140 mg/kg, respectively. Also detected were PAEs totaling 5.249 mg/kg, with bis(2-ethylhexyl)phthalate having the highest concentration (2.8 mg/kg), followed by di-n-butylphthalate (1.1 mg/kg). As in the previous sample, bis(2-ethylhexyl)phthalate was found in the laboratory blank, indicating that some of the quantity found may be due to laboratory contamination. 4-Methylphenol was detected at 0.550 mg/kg and N-nitrosodiphenylamine was found at 0.110 mg/kg (this compound is used as an accelerator in vulcanizing rubber). Nitrosamines are potential carcinogens found in cutting fluids and in soils from the reaction with herbicides and nitrogen used as fertilizer. TICs totaling 62.19 mg/kg, consisting of unknowns and sulfur, were detected in this sample.

Waste sample OHT-08-A had 0.044 mg/kg of N-nitrosodiphenylamine, 0.063 mg/kg of 1,4-dichlorobenzene, 2.6 mg/kg of di-n-butylphthalate, and 0.020 mg/kg of bis(2-ethylhexyl)phthalate. With the exception of the di-n-butylphthalate concentration, all values were estimated. Results of the MS/MSD analysis were consistent with the sample analysis, with the exception of the bis(2-ethylhexyl)phthalate result. The MS and MSD results of 1.3 and 0.190 mg/kg, respectively, are inconsistent with the sample result of 2.6 mg/kg; therefore, the results for di-n-butylphthalate must be considered as estimated. Also found in the sample was benzoic acid at 0.021 mg/kg; benzoic acid is used as a food additive, in the manufacture of dyes, and for curing tobacco. TICs totaling 9.980 mg/kg in the sample consisted of unknowns and a substituted benzene.

4.6.3.3 ***Pesticides/PCBs.*** Waste sample OHT-01-A was run twice, once undiluted and the second time diluted 20:1. No pesticides or PCBs were detected in the undiluted sample. A

total of 43.0 mg/kg of Aroclor 1254 was detected in the diluted sample. This value is lower than the 50 mg/kg that EPA and NYSDEC define as hazardous waste (Refs. 49 and 50).

The sample from the second test trench, OHT-02-A, contained a small quantity (0.096 mg/kg) of the pesticide 4,4'-DDD and 0.880 mg/kg of the PCB Aroclor 1242. The third test trench sample, OHT-04-A, had 0.210 mg/kg of Aroclor 1254; the fourth sample, OHT-08-A, had no detections of pesticides or PCBs.

4.6.3.4 ***Metals and Cyanide.*** Metals and cyanide were analyzed for in all four waste samples; however, because of poor spike recovery the cyanide results for all four samples are unusable and the mercury results are unusable on sample OHT-08-A. Sample OHT-01-A contained very high levels of iron (207,000 mg/kg). Other metals found in high concentrations include aluminum at 3100 mg/kg, manganese at 1850 mg/kg, and zinc at 1270 mg/kg. The mixed metallic debris in the trench undoubtedly accounts for the high levels. The sample also contained mercury at 1.6 mg/kg. The second waste sample, OHT-02-A, also had high levels of iron (32,100 mg/kg) and aluminum (10,800 mg/kg). This test trench contained a crushed drum near the location where the sample was taken, which probably explains the high metals readings. The third waste sample, OHT-04-A, had high quantities of iron (18,000 mg/kg) and aluminum (8680 mg/kg). This sample was taken from and around the drum containing the toluene waste; the high metals readings are most likely due to drum fragments in the waste. The final waste sample, OHT-08-A, was taken from several intact drums found in the test trench. The levels in this sample were much lower than in the other waste samples (3110 mg/kg of iron and 1520 mg/kg of aluminum), possibly because the drum metal had not yet broken down.

4.6.3.5 ***Miscellaneous.*** Analyses for the Resource Conservation and Recovery Act (RCRA) hazardous characteristics of ignitability, corrosivity, and reactivity were run on each of the waste samples. None of the samples exceeded any of the standards. For each of the samples pH analyses were performed; all samples but OHT-01-A had pH in the neutral range of 7-8. Sample OHT-01-A had a slightly acidic pH of 5.12, which may be due to the waste material found at this location. Extraction procedure (EP) toxicity organics and metals were also analyzed for each waste sample. No organics were detected above the quantitation limit in

any of the samples. Only barium in all four samples (from 0.0589 mg/l in OHT-08-A to 0.381 mg/l in OHT-02-A) and lead in sample OHT-02-A (0.0297 mg/l) were detected in the metals analysis. All levels found were far below the toxicity standard of 100 mg/l for barium and 5 mg/l for lead.

4.6.4 Surface Water and Sediment Data

As stated in Section 4.2, the Mohawk River in the vicinity of the site is classified as Class A. Twelve surface water samples were taken during the Phase II investigation and the results are shown on Table 4-7. Also shown on the table are the Class A surface water standards for comparison purposes. Sediment samples were also acquired at the same location as the surface water samples; Table 4-8 summarizes these data. Figures 4-1A through 4-1K show the location of the surface water/sediment locations and also present a data summary. The results are discussed below.

4.6.4.1 ***Volatile Organic Compounds***. The background or upgradient sample location, OHSW-9, was taken along the shoreline just upriver of the twin I-87 bridges. Methylene chloride was the only VOC detected in this sample and it was estimated. The value of 1 µg/l was below the guidance value of 5 µg/l for human health. No TIC VOCs were detected in this sample. The corresponding sediment sample also had methylene chloride at an estimated quantity of 0.004 mg/kg; no TICs were detected in the upgradient sediment sample.

OHSW-1 was taken just east of the junction of Clam Steam Road and Tow Path Road; the sample contained estimated quantities of methylene chloride (1 µg/l) and carbon disulfide (2 µg/l) and no TICs. The methylene chloride value was below the 5 µg/l guidance value for human health. The MS/MSD was also taken at this location, with the MS indicating the presence of methylene chloride and carbon disulfide at 2 µg/l for both samples. No detections were found in the MSD sample. The sediment sample taken from this location showed 0.001 mg/kg of methylene chloride and no TICs; MS/MSDs taken at this location indicated no VOCs.

TABLE 4-7 (Page 1 of 5)

SURFACE WATER SAMPLES DATA SUMMARY (NOVEMBER 1991)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSW-1	MS OHSW-1	MSD OHSW-1	OHSW-2	OHSW-3	OHSW-4	OHSW-5	OHSW-6	OHSW-7	NYSDEC SW CLASS A STANDARDS AQUATIC	NYSDEC SW CLASS A STANDARDS HUMAN
VOLATILE ORGANICS (µg/l)											
Methylene chloride	1 j	2 j	ND	ND	ND	ND	ND	ND	ND	NS	5.0 GV
Carbon disulfide	2 j	2 j	ND	10	ND	ND	ND	ND	ND	NS	NS
Chlorobenzene	ND	ND	ND	2 j	ND	ND	ND	ND	ND	5	20
Tentatively Identified Compounds	ND	NR	NR	ND	ND	ND	ND	ND	ND	-	-
SEMIVOLATILE ORGANICS (µg/l)											
bis(2-Ethylhexyl)phthalate	ND	ND	ND	3 b j	2 b j	2 b j	2 b j	1 b j	ND	0.6	4.0 GV
Benzo(a)pyrene	ND *	ND	ND	ND	ND	ND	ND	ND	ND	0.0012 GV	0.002 GV
Indeno(1,2,3-cd)pyrene	ND *	ND	ND	ND	ND	ND	ND	ND	ND	NS	0.002 GV
Dibenz(a,h)anthracene	ND *	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
Benzo(g,h,i)perylene	ND *	ND	ND	ND	ND	ND	ND	ND	ND	NS	NS
Tentatively Identified Compounds											
Unknown	9.5 j	NR	NR	11 j	ND	9.1 j	9.2 j	19.6 (2) j	ND	-	-
Unknown cycloalkane	ND	NR	NR	ND	16 j	21 j	12 j	18 j	ND	-	-
PESTICIDES/PCBs (µg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	-	-
CONVENTIONALS											
pH (standard units)	7.22	NR	NR	6.73	6.60	6.66	6.45	7.31	7.61	6.5 - 8.5	6.5 - 8.5
Specific conductance (µmhos/cm)	284	NR	NR	610	467	459	538	288	276	NS	NS
COD (mg/l)	55	NR	NR	48	44	64	20	28	13	NS	NS
TDS (mg/l)	157	NR	NR	319	267	257	363	163	157	NS	NS
TSS (mg/l)	59	NR	NR	37	44	68	54	40	50	NS	NS

* - Due to the low internal standard recovery, the reported detection levels for these compounds are estimated and may vary up to tenfold; values exceeding the detection limit are possible.
( ) - Number of compounds in total.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.

GV - Guidance value.
MS - Matrix spike.
ND - Not detected at analytical detection limit.
NR - Not run.
NS - No standard.
MSD - Matrix spike duplicate.

SURFACE WATER SAMPLES DATA SUMMARY (NOVEMBER 1991)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSW-8	OHSW-9	OHSW-10	OHSW-11	OHSW-12	FIELD BLANK	TRIP BLANK	NYSDEC SW CLASS A STANDARDS AQUATIC	NYSDEC SW CLASS A STANDARDS HUMAN
VOLATILE ORGANICS (µg/l)									
Methylene chloride	ND	1 j	1 b j	13	1 b j	1 j	1 b j	NS	5.0 GV
Chlorobenzene	ND	ND	ND	2 j	ND	ND	ND	5	20
Tentatively Identified Compounds	ND	ND	ND	ND	ND	ND	ND	-	-
SEMIVOLATILE ORGANICS (µg/l)									
bis(2-Ethylhexyl)phthalate	ND	ND	4 b j	4 b j	4 b j	4 b j	NR	0.6	4.0 GV
Benzo(a)pyrene	ND	ND *	ND	ND	ND	ND	NR	0.0012 GV	0.002 GV
Indeno(1,2,3-cd)pyrene	ND	ND *	ND	ND	ND	ND	NR	NS	0.002 GV
Dibenz(a,h)anthracene	ND	ND *	ND	ND	ND	ND	NR	NS	NS
Benzo(g,h,i)perylene	ND	ND *	ND	ND	ND	ND	NR	NS	NS
Tentatively identified Compounds									
Unknown	ND	ND	9 j	13 j	13 j	23 (2) j	NR	-	-
PESTICIDES/PCBs (µg/l)	ND	ND	ND	ND	ND	ND	NR	-	-
CONVENTIONALS									
pH (standard units)	7.66	7.57	7.05	7.38	7.26	NR	NR	-	-
Specific conductance (µmhos/cm)	405	263	333	290	282	NR	NR	-	-
COD (mg/l)	37	32	57	62	81	NR	NR	-	-
TDS (mg/l)	222	139	174	165	171	NR	NR	-	-
TSS (mg/l)	47	23	9	10	12	NR	NR	-	-

* - Due to the low internal standard recovery, the reported detection levels for these compounds are estimated and may vary up to tenfold; values exceeding the detection limit are possible.

( ) - Number of compounds in total.

b - Found in associated blanks.

j - Estimated concentration; compound present below quantitation limit.

GV - Guidance value.

ND - Not detected at analytical detection limit.

NR - Not run.

NS - No standard.

SURFACE WATER SAMPLES DATA SUMMARY (NOVEMBER 1991)[1]

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSW-1		OHSW-2		OHSW-3		MS OHSW-3		NYSDEC SW CLASS A STANDARDS	
	AQUEOUS	FILTRATE	AQUEOUS	FILTRATE	AQUEOUS	FILTRATE	AQUEOUS	FILTRATE	AQUATIC	HUMAN
LOW-LEVEL PCBs (µg/l)	ND	ND	ND	ND	ND	ND	ND	ND	0.001	0.01

PARAMETER	OHSW-3		MSD OHSW-3		OHSW-4		OHSW-5		MS OHSW-5		NYSDEC SW CLASS A STANDARDS	
	AQUEOUS	FILTRATE	AQUEOUS	FILTRATE	AQUEOUS	FILTRATE	AQUEOUS	FILTRATE	AQUEOUS	FILTRATE	AQUATIC	HUMAN
LOW-LEVEL PCBs (µg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001	0.01

PARAMETER	OHSW-5		MSD OHSW-5		OHSW-6		OHSW-7		OHSW-8		NYSDEC SW CLASS A STANDARDS	
	AQUEOUS	FILTRATE	AQUEOUS	FILTRATE	AQUEOUS	FILTRATE	AQUEOUS	FILTRATE	AQUEOUS	FILTRATE	AQUATIC	HUMAN
LOW-LEVEL PCBs (µg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.001	0.01

PARAMETER	MS OHSW-8		MSD OHSW-8		OHSW-9		OHSW-10		NYSDEC SW CLASS A STANDARDS	
	AQUEOUS	FILTRATE	AQUEOUS	FILTRATE	AQUEOUS	FILTRATE	AQUEOUS	FILTRATE	AQUATIC	HUMAN
LOW-LEVEL PCBs (µg/l)	ND	ND	ND	ND	ND	ND	ND	ND	0.001	0.01

PARAMETER	OHSW-11		OHSW-12		NYSDEC SW CLASS A STANDARDS	
	AQUEOUS	FILTRATE	AQUEOUS	FILTRATE	AQUATIC	HUMAN
LOW-LEVEL PCBs (µg/l)	ND	ND	ND	ND	0.001	0.01

1 - Analyses performed by Aquatec Inc.
MS - Matrix spike.
ND - Not detected at analytical detection limit.
MSD - Matrix spike duplicate.

TABLE 4-7 (Page 4 of 5)

SURFACE WATER SAMPLES DATA SUMMARY (NOVEMBER 1991)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	DUP OHSW-1	MSD OHSW-1	OHSW-2	OHSW-3	OHSW-4	OHSW-5	OHSW-6	OHSW-7	NYSDEC SW CLASS A STANDARDS (h) AQUATIC	NYSDEC SW CLASS A STANDARDS (h) HUMAN
METALS (µg/l)										
Aluminum	675 N R[1]	475 R[1]	111 B	ND N R[1]	ND N R[1]	58.8 B N R[1]	440 N R[1]	470 N R[1]	100 (i)	NS
Antimony	ND	ND	ND	ND	ND	ND	ND	ND	NS	3.0 GV
Arsenic	ND	ND	ND	ND	ND	ND	ND	ND	190	50
Barium	35.1 B	31.6 B	91.2 B	88.9 B	102 B	144 B	30.4 B	25.7 B	NS	1,000
Beryllium	ND	ND	ND	ND	ND	ND	ND	ND	1,100	3.0 GV
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND	1.6	10
Calcium	43,400	40,771	76,900	69,000	68,200	90,300	41,200	38,100	NS	NS
Chromium	ND	ND	ND	ND	ND	ND	ND	ND	304	50
Cobalt	ND	ND	ND	ND	ND	ND	ND	ND	5.0	NS
Copper	ND	6.3 B	ND	ND	7.4 B	ND	8.4 B	ND	17.7	200
Iron	1,690 R	1,290 R	5,150	4,370 R	5,810 R	6,900 R	1,350 R	1,140 R	300	300
Lead	ND W N	ND	ND+	ND W N	ND W N	ND W N	3.3	ND W N	5.8	50
Magnesium	7,570	7,117	10,700	9,310	9,390	11,900	7,260	6,660	NS	35,000
Manganese	126	115	259	480	516	466	175	62.8	NS	300
Mercury	0.31 N R	ND R	ND R	0.52 N R	ND N R	0.63 N R	ND N R	ND N R	0.2 GV	2.0
Nickel	ND	ND	ND	ND	ND	ND	ND	ND	137	NS
Potassium	1,850 B	1,522 B	2,250 B	4,300 B	3,850 B	2,200 B	1,460 B	ND	NS	NS
Selenium	ND	ND	ND	ND	ND W	ND W	ND	ND	1.0	10
Silver	ND	ND	ND	ND	ND	ND	ND	ND	0.1 (i)	50
Sodium	13,000	12,258	13,100	14,500	14,900	13,900	13,400	12,800	NS	NS
Thallium	UN	UN	ND	UN	UN	UN	UN	UN	8.0	4.0 GV
Vanadium	ND	ND	ND	ND	ND	ND	ND	ND	14	NS
Zinc	12.2 B	14.7 B	15.8 B R	40.2	47.6	18.4 B	6.3 B	8.5 B	30	300
Cyanide	ND	ND	ND	ND	ND	ND	ND	ND	5.2 (f)	100

\+ - Due to a 50% recovery of the RCRA standard, the reported lead values are estimated; values exceeding the detection limit are possible.
1 - Due to poor MS/MSD recoveries, the results for aluminum for these samples are inconclusive and should be considered estimates.
(f) - Free cyanide, sum of HCN + CN^-.
(h) - Hardness: 160 mg equivalent CaCO3/l.
(i) - Ionic.
B - Value less than contract-required detection limit but greater than instrument detection limit.
N - Spiked sample recovery is not within control limits.
R - Duplicate analysis not within control limits.
W - Post-digestion spike out of control limits; sample absorbance is less than 50% of spike absorbance.
GV - Guidance value.
ND - Not detected at analytical detection limit.
NS - No standard.
UN - Thallium results unusable because matrix spike produced 0% recovery.
DUP - Duplicate sample analysis.
MSD - Matrix spike duplicate.

TABLE 4-7 (Page 5 of 5)

SURFACE WATER SAMPLES DATA SUMMARY (NOVEMBER 1991)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSW-8	OHSW-9	OHSW-10	DUP OHSW-11	MSD OHSW-11	OHSW-12	FIELD BLANK	NYSDEC SW CLASS A STANDARDS (h) AQUATIC	NYSDEC SW CLASS A STANDARDS (h) HUMAN
METALS (µg/l)									
Aluminum	309 N R[1]	217 N R[1]	56.0 B	91.3 B	63.2 B	175 B	ND	100 (i)	NS
Antimony	ND	ND	ND	ND	ND	ND	ND	NS	3.0 GV
Arsenic	ND	ND W	ND	ND	ND	ND	ND	190	50
Barium	25.7 B	ND	27.7 B	24.2 B	23.1 B	22.3 B	ND	NS	1,000
Beryllium	ND	ND	ND	ND	ND	ND	ND	1,100	3.0 GV
Cadmium	ND	ND	ND	ND	ND	ND	ND	1.6	10
Calcium	47,000	35,300	38,300	41,500	40,290	41,500	ND	NS	NS
Chromium	ND	ND	ND	ND	ND	ND	ND	304	50
Cobalt	ND	ND	ND	ND	ND	ND	ND	5.0	NS
Copper	ND	ND	ND	ND	ND	3.0 B	ND	17.7	200
Iron	890 R	446 R	494	251	209	516	ND	300	300
Lead	ND W N	ND W N	ND+	ND	NR	ND	ND	5.8	50
Magnesium	8,510	6,030	6,570	7,170	6,924	7,140	ND	NS	35,000
Manganese	191	28.6	38.6	8.2 B	7.4 B	32.9	ND	NS	300
Mercury	ND N R	ND N R	0.48 R[2]	ND R[2]	0.53[2]	ND R	ND R	0.2 GV	2.0
Nickel	ND	ND	ND	ND	ND	ND	ND	137	NS
Potassium	1,030 B	1,340 B	ND	1,940 B	1656 B	1,790 B	ND	NS	NS
Selenium	ND W	ND W	ND	ND	ND	ND	ND	1.0	10
Silver	ND	ND	ND	ND	ND	ND	ND	0.1 (f)	50
Sodium	26,000	12,000	10,500	11,100	10,800	10,300	ND	NS	NS
Thallium	UN	UN	ND	ND	ND	ND	UN	8.0	4.0 GV
Vanadium	ND	ND	ND	ND	ND	ND	ND	14	NS
Zinc	4.0 B	ND	ND R	64.9 R	30.2	7.4 B R	ND R	30	300
Cyanide	ND	ND	ND	ND	NR	ND	ND	5.2 (f)	100

\+ - Due to a 50% recovery of the RCRA standard, the reported lead values are estimated; values exceeding the detection limit are possible.
1 - Due to poor MS/MSD recoveries, results for aluminum for these samples are inconclusive and should be considered estimates.
2 - Mercury results should be considered estimated due to poor correlation between the duplicate and MSD OHSW-11.
(f) - Free cyanide, sum of HCN + CN^-.
(h) - Hardness: 160 mg equivalent CaCO3/l.
(i) - Ionic.
B - Value less than contract-required detection limit but greater than instrument detection limit.
N - Spiked sample recovery is not within control limits.
R - Duplicate analysis not within control limits.
W - Post-digestion spike out of control limits; sample absorbance is less than 50% of spike absorbance.
GV - Guidance value.
ND - Not detected at analytical detection limit.
NR - Not run.
NS - No standard.
UN - Thallium results unusable because matrix spike produced 0% recovery.
DUP - Duplicate sample analysis.
MSD - Matrix spike duplicate.

TABLE 4-8 (Page 1 of 4)

SEDIMENT SAMPLES DATA SUMMARY (NOVEMBER 1991)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSD-1	MS OHSD-1	MSD OHSD-1	OHSD-2	OHSD-3	OHSD-4	OHSD-5	OHSD-6
VOLATILE ORGANICS (mg/kg)								
Methylene chloride	0.001 j	ND	ND	ND	0.003 j	0.003 j	0.011 j	0.019
Tentatively Identified Compounds	ND	ND	ND	ND	ND	ND	ND	ND
SEMIVOLATILE ORGANICS (mg/kg)								
Naphthalene	ND	ND	ND	ND	ND	0.280 j	ND	ND
2-Methylnaphthalene	ND	ND	ND	ND	ND	0.110 j	ND	ND
Acenaphthene	ND	ND	ND	ND	ND	0.081 j	ND	ND
Dibenzofuran	ND	ND	ND	ND	ND	0.110 j	ND	ND
Fluorene	ND	ND	ND	ND	ND	0.170 j	ND	ND
n-Nitrosodiphenylamine(¶)	ND	ND	ND	ND	ND	0.110 j	ND	ND
Phenanthrene	ND	ND	ND	ND	ND	0.220 j	ND	ND
bis(2-Ethylhexyl)phthalate	ND	ND	ND	0.130 j	0.300 j	ND	ND	ND
Benzo(a)pyrene	ND *	ND	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	ND *	ND	ND	ND	ND	ND	ND	ND
Dibenz(a,h)anthracene	ND *	ND	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	ND *	ND	ND	ND	ND	ND	ND	ND
Tentatively Identified Compounds								
Unknown	36.540 (4) j a b	ND	ND	0.640 (3) j	30.970 (4) j a b	22.250 (2) j a b	170.950 (2) j a b	57.000 j a b
Unknown acid	ND	ND	ND	4.180 (3) j	ND	ND	ND	ND
Sulfur S8	ND	ND	ND	0.750 j	ND	ND	ND	ND
Unknown alkane	ND	ND	ND	2.140 (3) j	ND	ND	ND	ND
Unknown aromatic	ND	ND	ND	0.630 j	ND	ND	ND	ND
PESTICIDES/PCBs (mg/kg)	ND	ND	ND	ND	ND	ND	ND	ND

* - Due to low internal standard recovery, the reported detection levels for these compounds are estimated and may vary up to tenfold; values exceeding the detection limit are possible.
( ) - Number of compounds in total.
¶ - Cannot be separated from diphenylamine.
a - Suspected aldol condensation product.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
MS - Matrix spike.
ND - Not detected at analytical detection limit. (Ref. 43).
MSD - Matrix spike duplicate.

TABLE 4-8 (Page 2 of 4)

SEDIMENT SAMPLES DATA SUMMARY (NOVEMBER 1991)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSD-7	OHSD-8	OHSD-9	OHSD-10	OHSD-11	OHSD-12
VOLATILE ORGANICS (mg/kg)						
Methylene chloride	0.003 j	ND	0.004 j	0.015 j	0.013	ND
Tentatively Identified Compounds	ND	ND	ND	ND	ND	ND
SEMIVOLATILE ORGANICS (mg/kg)						
Phenanthrene	ND	ND	ND	ND	ND	0.059 j
Fluoranthene	ND	ND	ND	0.120 j	0.078 j	0.094 j
Pyrene	ND	ND	ND	0.080 j	0.063 j	0.071 j
Benzo(a)anthracene	ND	ND	ND	ND	0.049 j	0.051 j
Chrysene	ND	ND	ND	0.077 j	0.049 j	ND
bis(2-Ethylhexyl)phthalate	0.490	ND	ND	0.120 j	ND	0.300 j
Di-n-octylphthalate	ND	ND	ND	0.072 j	ND	ND
Tentatively Identified Compounds						
Unknown	31.390 (3) j a b	41.380 (3) j a b	71.000 j a b	3.210 (4) j	ND	1.200 (3) j
Unknown acid	ND	ND	ND	1.100 j	0.530 j	0.620 j
Sulfur S8	ND	ND	ND	1.600 j	ND	ND
Unknown alkane	ND	ND	ND	0.690 j	ND	ND
Unknown aromatic	ND	ND	ND	ND	0.630 j	0.380 j
PESTICIDES/PCBs (mg/kg)	ND	ND	ND	ND	ND	ND

( ) - Number of compounds in total.
a - Suspected aldol condensation product.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
ND - Not detected at analytical detection limi. (Ref. 43).

TABLE 4-8 (Page 3 of 4)

SEDIMENT SAMPLES DATA SUMMARY (NOVEMBER 1991)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	DUP OHSD-1	MSD OHSD-1	OHSD-2	OHSD-3	OHSD-4	OHSD-5	OHSD-6
METALS (mg/kg)							
Aluminum	14,400	16,745	8,040	4,710	8,680	77,800	14,100
Antimony	12.6 B	10.9 B	16.4 B	9.9 B	14.6 B	103	ND
Arsenic	5.2	5.4	3.7	3.1	4.4	10.5 B	4.4 B
Barium	101	113	35.9 B	40.4 B	56.8	518	98.0
Beryllium	1.1 B	0.9 B	0.57 B	0.48 B	ND	3.9 B	ND
Cadmium	ND	ND	ND	ND	ND	ND	ND
Calcium	3,360	2,693	1,800	4,460	16,300	17,600	17,500
Chromium	16.0 R	19.6 R	13.9	14.6 R	12.9 R	91.8 R	71.6 R
Cobalt	16.4	16.6	5.8 B	3.5 B	8.9 B	94.1	12.7 B
Copper	14.1	14.9	13.2	12.2	10.9	77.2	39.7
Iron	29,100	34,279	20,500	15,400	40,100	174,000	29,900
Lead	33.3	31.5	13.8	29.3	36.5	169	36.4 SA
Magnesium	4,020	4,684	3,630	2,580	6,100	23,100	7,390
Manganese	1,050	1,106	143	182	349	6,240	540
Mercury	ND N	ND	ND	ND N	ND N	1.2 N	ND N
Nickel	17.0	23.5	14.4	13.2	19.8	146	26.7
Potassium	2,080	2,272	1,100 B	1,040 B	1,600	10,800	2,100 B
Selenium	ND N W	ND	ND W	ND N	ND N W	ND N	ND N
Silver	ND	ND	ND	ND	ND	ND	ND
Sodium	ND	ND	ND	ND	ND	ND	ND
Thallium	ND W	ND	ND W	ND W	ND	ND W	ND
Vanadium	28.4	30.0	16.5	11.4 B	17.3	142	29.2
Zinc	60.4 R	74.2 R	58.0	199 R	302 R	328 R	139 R
Cyanide	ND N	ND	ND N	ND N	ND N	ND N	ND N

B - Value less than contract-required detection limit but greater than instrument detection limit.
N - Spiked sample recovery not within control limits.
R - Duplicate analysis not within control limits.
W - Post-digestion spike out of control limits; sample absorbance is less than 50% of spike absorbance.

ND - Not detected at analytical detection limit. (Ref. 43).
SA - Value determined by the method of standard addition.
DUP - Duplicate sample analysis.
MSD - Matrix spike duplicate.

TABLE 4-8 (Page 4 of 4)

SEDIMENT SAMPLES DATA SUMMARY (NOVEMBER 1991)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSD-7	OHSD-8	OHSD-9	OHSD-10	OHSD-11	DUP OHSD-12	MSD OHSD-12
METALS (mg/kg)							
Aluminum	6,090	3010	21,900	19,100	16,200	15,900	17,043
Antimony	ND	ND	27.5 B	ND	15.6 B	ND	16.6 B
Arsenic	2.9	1.7 B	7.5	9.0	5.8 SA	6.9	6.0
Barium	34.1 B	19.2 B	201	125 B	109	113	114
Beryllium	ND	ND	ND	ND	ND	ND	ND
Cadmium	ND	ND	ND	ND	ND	ND	ND
Calcium	3,710	2,280	23,300	13,600	16,000	17,300	16,286
Chromium	9.0 R	4.7 R	101 R	178	223	256	229
Cobalt	5.5 B	ND	22.1 B	11.1 B	14.6 B	ND B	14.0 B
Copper	2.9 B	ND	173	60.6	58.3	66.1	60.1
Iron	14,800	7,260	40,800	37,700	28,400	28,800	27,760
Lead	7.8	6.4 SA	565	85.9	70.7	64.6	74.1
Magnesium	2,560	1,280 B	8,500	8,020	8,160	8,610	8,360
Manganese	359	185	1,140	527	447	496	470
Mercury	ND N	ND N	0.66 N	2.6	0.52	0.28	0.27
Nickel	11.1	ND	99.1	46.2	42.1	40.8	25.3
Potassium	711 B	256 B	4,160	3,780	3,180	3,030	3,510
Selenium	ND N	ND N	ND N	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND	ND
Sodium	ND	ND	ND	ND	ND	ND	ND
Thallium	ND	ND	ND W	ND W	ND W	ND W	ND
Vanadium	10.6 B	6.6 B	41.7	36.0	31.9	31.5	32.4
Zinc	52.6 R	32.9 R	596 R	172	153	166	155
Cyanide	ND N	ND N	ND N	ND N	ND N	ND N	NR

B - Value less than contract-required detection limit but greater than instrument detection limit.
N - Spiked sample recovery is not within control limits.
R - Duplicate analysis not within control limits.
W - Post-digestion spike out of control limits; sample absorbance is less than 50% of spike absorbance.

ND - Not detected at analytical detection limit. (Ref. 43).
NR - Not run.
SA - Value determined by the method of standard addition.
DUP - Duplicate sample analysis.
MSD - Matrix spike duplicate.

OHSW-2 was taken in an area of leachate seeps about halfway between Clam Steam Road and the tip of the Krause's Restaurant peninsula. Both carbon disulfide and chlorobenzene were detected (10 and 2 µg/l, respectively) in this sample. The chlorobenzene concentration was lower than the aquatic and human health standard for Class A water of 5 and 20 µg/l, respectively. No TICs were found in this sample. The sediment sample, OHSD-2, showed no VOCs or TICs.

OHSW-10, -11, and -12 were taken at 50, 150, and 300 ft, respectively, out from the shore at OHSW-2 to check on contamination out in the river. OHSW-10 and -12 contained low levels of methylene chloride (1 µg/l) and no TICs. Methylene chloride was also detected in the blank associated with these two samples, indicating that the presence may be due to laboratory contamination. The sediment samples from these two locations indicated the presence of methylene chloride at an estimated quantity of 0.015 mg/kg in OHSD-10 and none in OHSD-12. TICs were not detected in either sample. The middle sample, OHSW-11, had 13 µg/l of methylene chloride, which exceeded the 5 µg/l guidance value for human health. The sample also contained chlorobenzene at an estimated quantity of 2 µg/l. This value was below the aquatic standard of 5 µg/l and the human health standard of 20 µg/l. No TICs were detected in this sample. The corresponding sediment sample also contained 0.013 mg/kg of methylene chloride and no TICs. The finding of methylene chloride in the surface water sample at OHSW-11 and not in the other two is partially explained by the methylene chloride found in sediment sample OHSD-11. No TICs were found in sample OHSD-11.

Sample OHSW-3 was taken at the western end of Krause's peninsula. No VOCs or TICs were detected in this sample. In OHSD-3, the sediment sample associated with OHSW-3, only methylene chloride was found, at an estimated quantity of 0.003 mg/kg.

Surface water location OHSW-4 was in the bay area between the peninsula and the main body of land. The sample indicated that no VOCs or TICs were present. The sediment sample indicated the presence of methylene chloride at an estimated quantity of 0.003 mg/kg.

OHSW-5 was taken in the easternmost area between the peninsula and the land in an extremely stagnant water location. No VOCs or TICs were found in the surface water taken

from this location. The sediment sample contained an estimated quantity of 0.011 mg/kg of methylene chloride and no TICs at this location.

OHSW-6 was taken approximately halfway between the boat club and Whites Lane; no VOCs or TICs were detected in the sample. The associated sediment sample had 0.019 mg/kg of methylene chloride and no TICs. Sample OHSW-7/OHSD-7 was taken about 900 ft downstream of Whites Lane. No VOCs were detected in the surface water; however, an estimated quantity of 0.003 mg/kg of methylene chloride was found in the sediment. TICs were not found in the surface water or the sediment samples at this location. The most downstream sample, OHSW-8, was taken halfway between Route 819 and Route 9. No VOCs or TICs were detected in either the surface water or the sediment sample at this location.

The volatiles data from the Mohawk River indicate very little contamination in surface water or sediment. The major contaminant found, methylene chloride, was also found in the blank in some cases and may have been due to laboratory contamination.

4.6.4.2 ***Semivolatile Organic Compounds***. The upgradient sample, OHSW-9/OHSD-9, showed no semivolatiles in either the surface water or sediment sample. Semivolatile TICs were not found in the surface water; however, 71.0 mg/kg of unknowns were found in the sediment sample.

OHSW-1/OHSD-1 had no semivolatiles in either the samples or associated MS/MSDs. Unknowns were found in the surface water and sediment samples at 9.5 µg/l and 36.540 mg/kg, respectively.

The next downstream sample, OHSW-2/OHSD-2, had 3 µg/l and 0.130 mg/kg of bis(2-ethylhexyl) phthalate, respectively, both at an estimated quantity, in the surface water and sediment sample. One unknown TIC was detected at 11 µg/l in the surface water; 7.590 mg/kg of unknowns were found in the sediment sample. The sediment also contained 0.750 mg/kg of sulfur. All three samples (OHSW-10, -11, and -12) taken perpendicular to the shoreline out from OHSW-2 had 4 µg/l of bis(2-ethylhexyl)phthalate at an estimated quantity

and it was found also in the blank, indicating possible laboratory contamination. The three samples also had similar quantities of unknown TICs, ranging from 9 to 13 µg/l. OHSW-10, -11, and -12 had 0.277, 0.239, and 0.275 mg/kg of PAHs and 0.192, 0, and 0.300 mg/kg of PAEs, respectively. OHSD-10 had 5 mg/kg of unknowns and 1.6 mg/kg of sulfur; OHSD-11 had only 1.160 mg/kg of unknowns and no sulfur. The sample taken farthest out from the shoreline, OHSD-12, had 2.2 mg/kg of unknowns and no sulfur. Semivolatiles and semivolatile TICs decreased with distance from the shoreline.

Results for sample OHSW-3 indicated the presence of bis(2-ethylhexyl)phthalate at an estimated quantity of 2 µg/l and TICs totaling 16 µg/l. The sediment sample from the same location, OHSD-3, had 0.300 mg/kg of bis(2-ethylhexyl)phthalate and 30.970 mg/kg of unknown TICs. The next three downstream samples, OHSW-4, -5, and -6, also had low quantities of bis(2-ethylhexyl)phthalate (2, 2, and 1 µg/l, respectively). TICs in the surface waters for these three samples were 30.1, 21.2, and 37.6 µg/l, respectively; these consisted of unknowns. The sediment sample from OHSD-4 had the most semivolatiles of any sediment sample, with 0.471 mg/kg of PAHs, 0.110 mg/kg of dibenzofuran, 0.390 mg/kg of naphthalene and naphthalenelike substances, and 0.110 mg/kg of N-nitrosodiphenylamine; all compounds were estimated as they were detected below the quantitation limit. The sample also had TIC semivolatiles of 22.250 mg/kg, consisting of unknowns. OHSD-5 and -6 had no semivolatiles; however, unknowns totaling 170.950 and 57.000 mg/kg were found in the two samples, respectively.

OHSW-7 and -8 had no positive detections of semivolatiles or TICS. The sediment sample from OHSD-7 had 0.490 mg/kg of bis(2-ethylhexyl)phthalate and 31.390 mg/kg of unknown TICs. Sample OHSD-8 had no semivolatiles, but 41.380 mg/kg of TICs.

The sediment semivolatiles data generally indicate low contamination by PAHs and PAEs, probably as a result of leaching from the landfill. The surface water semivolatiles data show low concentrations of bis(2-ethylhexyl)phthalate, most likely a result of laboratory contamination.

4.6.4.3 ***Pesticides/PCBs.*** No pesticides or PCBs were detected in the regular analysis of the surface water samples from the Mohawk River or in the associated sediment samples. Low-level PCB analyses were run on each of the surface water samples by Aquatec; none of these samples contained any PCBs. Duplicate samples collected and sent by NYSDEC to the NYSDOH Wadsworth Laboratory were analyzed for low-level PCBs. The results are shown on Table 4-9 (Ref. 50). The analytical procedure determines individual congeners of PCBs down to the parts-per-trillion level. Table 4-9 presents a total of all the congeners detected for that sample. As can be seen, the background sample (OHSW-9-A), the next downstream sample (OHSW-1-A), and the three samples downstream of the yacht club had no detectable PCBs. Sample OHSW-2-A, located between Clam Steam Road and the tip of the peninsula, had the highest quantity of PCBs (0.058 µg/l), consisting of 30 congeners. This level exceeded the aquatic standard of 0.001 µg/l and the human health standard of 0.01 µg/l. Samples OHSW-3-A, -4-A, and -5-A, all located in the bay area by the peninsula, contained low levels of PCBs. OHSW-3-A had the lowest value (0.001 µg/l); OHSW-4-A and -5-A had the identical concentration (0.011 µg/l), consisting of eight congeners. OHSW-3-A did not exceed the standards; however, OHSW-4-A and -5-A exceeded both the aquatic standard of 0.001 µg/l and the human health standard of 0.01 µg/l. Test trench sample OHT-01-A, located just to the north of OHSW-4-A and -5-A, contained 43.000 mg/kg of PCBs, which is a likely explanation for the finding in these surface water samples.

4.6.4.4 ***Metals and Cyanide.*** The upstream surface water sample, OHSW-9, had aluminum and iron above the aquatic standard of 100 and 300 µg/l, respectively. The iron human health standard of 300 µg/l was also exceeded in this sample. The sediment sample at this location had high quantities of both aluminum (21,900 mg/kg) and iron (40,800 mg/kg). The sample also had high lead (565 mg/kg), manganese (1140 mg/kg), mercury (0.66 mg/kg), and zinc (596 mg/kg). The surface water standards were not exceeded for any of these metals in this sample, indicating that the metals are not leaching into the water from the sediment.

Sample OHSW-1 had aluminum at 675 µg/l, iron at 1690 µg/l, and mercury at 0.31 µg/l; all exceeded the surface water standards (100 µg/l for aluminum, 300 µg/l for iron, and the aquatic guidance value of 0.2 µg/l for mercury). The sediment sample had 14,400 mg/kg of aluminum, 29,100 mg/kg of iron, and 0.0 mg/kg of mercury. Except for the mercury value, the

TABLE 4-9

NYSDOH SURFACE WATER SAMPLES DATA SUMMARY (NOVEMBER 1991)*

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSW-1A	OHSW-2A	OHSW-3A	OHSW-4A	NYSDEC SW CLASS A STANDARDS AQUATIC	NYSDEC SW CLASS A STANDARDS HUMAN
Low-Level PCBs (µg/l)	ND	0.058 (30)	0.001	0.011 (8)	0.001	0.01

PARAMETER	OHSW-5A	OHSW-6A	OHSW-7A	OHSW-8A	OHSW-9A	NYSDEC SW CLASS A STANDARDS AQUATIC	NYSDEC SW CLASS A STANDARDS HUMAN
Low-Level PCBs (µg/l)	0.011 (8)	ND	ND	ND	ND	0.001	0.01

* - Analyses performed by NYSDOH - Wadsworth Lab.
( ) - Number of congeners in total.
ND - Not detected at analytical detection limit (Ref. 43)

sediment metals concentrations are high enough to explain the high concentrations found in the surface water. Other metals found at high levels in the sediment but not in the surface water include manganese at 1050 mg/kg. The MSD sample showed fairly good correlation with both the surface water and the sediment sample.

Results from the next downstream sample, OHSW-2, showed violations of the aluminum and iron standards. The iron value of 5150 µg/l was more than 17 times the 300 µg/l standard. The sediment had high aluminum (8040 mg/kg) and iron (20,500 mg/kg). The three samples taken out from the shoreline at this location, OHSW-10, -11, and -12, had somewhat inconsistent results. The sample taken from farthest out, OHSW-12, was the only sample that violated the aluminum standard of 100 µg/l and the iron standard of 300 µg/l. Considering the high concentration of iron found in the nearshore sample (over 5000 µg/l in OHSW-2), this seems inconsistent. The middle sample, OHSW-11, had a zinc concentration of 64.9 µg/l, approximately twice that found in the MSD from OHSW-11, which exceeded the aquatic standard of 30 µg/l. The quantity found in OHSW-11 MSD (30.2 µg/l) barely exceeded the aquatic standard of 30 µg/l. The MSD sample also had 0.53 µg/l of mercury, which exceeded the aquatic guidance value of 0.2 µg/l. The sample closest to the nearshore sample, OHSW-10, had an iron value of 494 µg/l, which exceeded the standard of 300 µg/l, and a mercury value of 0.48 µg/l, which exceeded the aquatic guidance value of 0.2 µg/l. It should be noted that because of the inconsistency of the mercury results of the sample and the MSD, the results for OHSW-10, -11, and -11 MSD are estimated. The corresponding sediment samples all showed high levels of aluminum - 19,100, 16,200, and 15,900 mg/kg for OHSD-10, -11, and -12, respectively. Iron at 37,700, 28,400, and 28,800 mg/kg for OHSD-10, -11, and -12, respectively, was also high. Other metals found in high concentrations include chromium (178-256 mg/kg) and zinc (153-172 mg/kg). Mercury at 2.6 mg/kg was found in OHSD-10, but the levels were less than 1 mg/kg for the other two samples. The MSD taken from sample OHSW-12 showed good correlation with the sample.

The three samples taken in the bay area behind Krause's Restaurant (OHSW-3, -4, and -5) had iron values exceeding the standard of 300 µg/l. The values, which ranged from 4370 µg/l at OHSW-3 to 6900 µg/l at OHSW-5, were over 14 times the standard. The manganese standard of 300 µg/l was also exceeded at all three locations. The values of 466 to 516 µg/l

were less than double the standard. The aquatic guidance value of 0.2 µg/l for mercury was also exceeded at two locations (OHSW-3 and -5). The zinc aquatic standard of 30 µg/l was exceeded at OHSW-3 and -4. The values of 40.2 and 47.6 µg/l for OHSW-3 and -4, respectively, were approximately 30% higher than the standard. The sediment samples had high iron, with 15,400, 40,100, and 174,000 mg/kg in OHSD-3, -4, and -5, respectively. Aluminum was also high in OHSD-5 (77,800 mg/kg), as were manganese (6240 mg/kg), lead (169 mg/kg), nickel (146 mg/kg), antimony (103 mg/kg), and mercury (1.2 mg/kg). Other less common metals, such as vanadium, barium, beryllium, and cobalt, were also high in this sample. Zinc was relatively high in all three, ranging from 199 mg/kg in OHSD-3 to 328 mg/kg in OHSD-5. The generally higher metal content found in OHSD-5 can be attributed to the stagnant nature of the sampling location, which prevents movement of sediment out of the bay area. The finding of mercury in this sample in both the surface water and sediment is attributed to the test trench located near this sample, which also had mercury.

Results for samples OHSW-6, -7, and -8 indicated aluminum concentrations above the aquatic standard of 100 µg/l. The iron standard of 300 µg/l was also violated in all three, with concentrations of 1350, 1140, and 890 µg/l in OHSW-6, -7, and -8, respectively. No other violations of surface water standards occurred in any of the samples for any other metals. The sediment samples had high aluminum, although the concentration decreased from a high of 14,100 mg/kg at OHSD-6 to a low of 3010 mg/kg at OHSD-8, the most downstream location. Iron also followed a similar pattern of decreasing in concentration in the downstream direction. The quantity decreased from 29,900 mg/kg in OHSD-6 to 7260 mg/kg in OHSD-8. All other metals also decreased in concentration from upstream to downstream, with the lowest concentrations found in OHSD-8.

No cyanide was found in any of the samples in either the surface water or sediment.

4.6.4.5 ***Miscellaneous Analyses.*** Several conventional analyses were run on the surface water samples: pH, specific conductance, chemical oxygen demand (COD), total dissolved solids (TDS), and total suspended solids (TSS). The pH standard for Class A surface water ranges from 6.5 to 8.5 for both aquatic and human health. Most of the samples had a pH in the 7.1 to 7.7 range; these samples were taken in areas where flow was consistent. The three samples

taken in the bay area behind the Krause peninsula all had low pH values (6.5 to 6.7); this was most likely a result of the stagnant conditions in the bay area. Sample OHSW-2 also had a low pH (6.7), probably because of its proximity to the bay area. The three samples taken perpendicular to the shoreline out from OHSW-2 had pH values above 7, and OHSW-10 had the lowest (7.05).

Specific conductance readings varied from a low of 263 µmhos/cm at OHSW-9 (the upstream sample) to a high of 610 µmhos/cm at OHSW-2. The three samples in the bay area just downstream of OHSW-2 also had high readings, with the highest (538 µmhos/cm) at the most downstream location (OHSW-5). The specific conductance readings at the three locations out from OHSW-2 were similar to those in the upstream sample, ranging from 282 µmhos/cm in the sample from farthest out in the river (OHSW-12) to 333 µmhos/cm in the sample taken closest to the shore sample (OHSW-10). The decrease in value from the shore sample out is attributed to dilution by the river. The downstream samples, OHSW-6 and -7, indicated specific conductivities similar to the background sample. The sample farthest downstream, OHSW-8, had a moderately high specific conductivity of 405 µmhos/cm compared to the background sample.

TDS usually follows a pattern similar to specific conductance as conductance is dependent on the quantity of TDS in the sample. Therefore, it is not surprising that the two samples with the highest specific conductance readings (OHSW-2 and -5) also had the highest TDS readings - 319 and 363 mg/l, respectively. The background sample and the other samples with low specific conductance also had low (<200 mg/l) TDS. The intermediate specific conductance samples had moderate TDS (200-300 mg/l) concentrations.

The TSS concentration is a measure of the quantity of solids in the sample. All TSS values were reasonably low, ranging from a low of 9 mg/l at OHSW-10 to a high of 68 mg/l at OHSW-4. The lower values were found in areas out in the river or in areas next to the shore where there was consistent flow. Areas along the shoreline in stagnant zones had the higher TSS values, reflecting the lack of flow in those areas.

The COD concentration is a measure of the organic content of the water. Results ranged from a low of 13 mg/l in OHSW-7 to a high of 81 mg/l in OHSW-12, with the majority of the values in the 32-48 mg/l range.

4.6.5 **Leachate Data**

Eight leachate samples were collected from the Tow Path Road Landfill site. Figures 4-1A through 4-1K show the sample locations and Table 4-10 summarizes the results. Also shown on the table for comparison purposes are typical sanitary landfill leachate concentrations.

4.6.5.1 ***Volatile Organic Compounds***. OHL-1 was taken along the shoreline just upstream of the intersection of Clam Steam Road and Tow Path Road. The sample had 6 µg/l of chlorobenzene, which is within the range of both sanitary and hazardous waste leachate (Refs. 37 and 38). No TIC VOCs were detected in this sample. Leachate samples OHL -2, -3, and-4 were taken within approximately 600 ft of each other downstream of Clam Steam Road in an area of leachate outbreaks observed during prior site visits. OHL-2 had no detectable VOCs or TICs. OHL-3 had an estimated quantity of 2 µg/l of 2-butanone (otherwise known as methyl ethyl ketone [MEK]), 12 µg/l of benzene, and 21 µg/l of chlorobenzene, all concentrations within the range of sanitary landfill leachate (Ref. 38). The finding of chorobenzene, a man-made compound, in the leachate is indicative of human activities. A total of 14 µg/l of TICs, consisting of trimethyl benzene isomer, was found in this sample. OHL-4 had only an estimated quantity of chlorobenzene at 4 µg/l and no TICs.

OHL-5 was taken from a pipe that runs under Tow Path Road just upstream of Beach Road. Neither the sample nor the MS/MSD taken at this location showed any detectable quantities of VOCs or TIC VOCs. OHL-6, obtained near surface water location OHSW-6, had the most contamination of any of the leachate seep samples. It contained 38 µg/l of toluene, 5 µg/l of benzene, and an estimated quantity of 2 µg/l of chlorobenzene. None of the concentrations found were outside the range for sanitary landfill leachate (Ref. 38). No TICs were detected in this sample. The benzene and toluene may be due to gasoline or related products. Leachate seep OHL-7 was taken from a pipe just upstream of the entrance to the yacht club. The sample had an estimated quantity of 2 µg/l of chlorobenzene and no TICs.

TABLE 4-10 (Page 1 of 4)

LEACHATE SAMPLES DATA SUMMARY (NOVEMBER 1991)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHL-1	OHL-2	OHL-3	OHL-4	OHL-5	MS OHL-5	MSD OHL-5	OHL-6	OHL-7	OHL-8	LEACHATE COMPOSITION SANITARY*
VOLATILE ORGANICS (µg/l)											
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2 - 1,160,000
2-Butanone	ND	ND	2 j	ND	ND	ND	ND	ND	ND	ND	470 - 27,000,000
Benzene	ND	ND	12	ND	ND	ND	ND	5	ND	ND	4 - 1,300,000
Toluene	ND	ND	ND	ND	ND	ND	ND	38	ND	ND	59 - 1,600,000
Chlorobenzene	6	ND	21	4 j	ND	ND	ND	2 j	2 j	ND	5 - 60,000
Tentatively Identified Compounds											
Trimethyl benzene isomer	ND	ND	14 j	ND	ND	NR	NR	ND	ND	ND	-
SEMIVOLATILE ORGANICS (µg/l)											
1,4-Dichlorobenzene	ND	ND	5 j	ND	ND	ND	ND	ND	ND	ND	14 - 16,000
bis(2-Ethylhexyl)phthalate	1 b j	1 b j	4 b j	4 b j	ND	ND	ND	ND	ND	ND	34,000 - 150,000
Tentatively Identified Compounds											
Unknown	ND	8 j	33 (3) j	11 j	ND	NR	NR	ND	ND	ND	-
Unknown cycloalkane	19 j	19 j	ND	ND	ND	NR	NR	ND	ND	ND	-
PESTICIDES/PCBs (µg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-

* - Ref. 38.
( ) - Number of compounds in total.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.

ND - Not detected at analytical detection limit. (Ref. 43).
NR - Not run.
MS - Matrix spike.
MSD - Matrix spike duplicate.

TABLE 4-10 (Page 2 of 4)

LEACHATE SAMPLES DATA SUMMARY (NOVEMBER 1991)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHL-1	OHL-2	OHL-3	OHL-4	LEACHATE COMPOSITION SANITARY*
METALS (µg/l)					
Aluminum	65.5 B N R	61.7 B N R	ND	ND	0- 85,000
Antimony	ND	ND	33.4 B	ND	0 - 3,190
Arsenic	ND	ND	ND	ND	0 - 70,200
Barium	253	150 B	309	177 B	0 - 12,500
Beryllium	ND	ND	ND	ND	0 - 360
Cadmium	ND	ND	ND	ND	0 - 400
Calcium	133,000	126,000	123,000	123,000	60,000 - 7,200,000
Chromium	ND	ND	ND	ND	0 - 5,600
Cobalt	ND	ND	ND	ND	-
Copper	ND	ND	ND	4.0 B	0 - 9,900**
Iron	34,500 R	2,200 R	66,100	5,490	0 - 2,820,000**
Lead	ND W	ND W	4.2 B	ND	<100 - 2,000**
Magnesium	17,400	22,700	23,100	16,500	17,000 - 15,600,000**
Manganese	2,180	1,050	1,590	443	60 - 125,000**
Mercury	ND N R	ND N R	ND R	ND R	0 - 10
Nickel	ND	ND	ND	ND	0 - 7,500
Potassium	9,190	10,700	15,300	6,600	28,000 - 3,770,000**
Selenium	ND N W	ND N W	ND W	ND	0 - 1,850
Silver	ND	ND	ND	ND	0 - 1,960
Sodium	112,000	32,800	70,600	17,600	0 - 7,700,000**
Thallium	ND N W	ND N	ND	ND	0 - 780
Vanadium	ND	ND	ND	ND	-
Zinc	ND	ND	27.2 R	10.6 B R	0 - 370,000**
Cyanide	ND	ND	ND	ND	0 - 6,000

* - Ref. 38.
** - Ref. 36.
B - Value less than contract-required detection limit but greater than instrument detection limit.
N - Spiked sample recovery not within control limits.
R - Duplicate analysis not within control limits.
W - Post-digestion spike out of control limits; sample absorbance is less than 50% of spike absorbance.
ND - Not detected at analytical detection limit. (Ref. 43).

TABLE 4-10 (Page 3 of 4)

LEACHATE SAMPLES DATA SUMMARY (NOVEMBER 1991)
Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	DUP OHL-5	MSD OHL-5	OHL-6	OHL-7	OHL-8	LEACHATE COMPOSITION SANITARY*
METALS (µg/l)						
Aluminum	51.3 B N R	ND	ND N R	ND N R	159 B N R	0- 85,000
Antimony	ND	24.9 B	33.0 B	ND	ND	0 - 3,190
Arsenic	ND	ND	ND	ND	ND	0 - 70,200
Barium	93.6 B	93.6 B	119 B	132 B	115 B	0 - 12,500
Beryllium	ND	ND	ND	ND	ND	0 - 360
Cadmium	ND	3.8 B	ND	ND	ND	0 - 400
Calcium	141,000	144,358	138,000	110,000	88,600	60,000 - 7,200,000
Chromium	ND	ND	ND	ND	ND	0 - 5,600
Cobalt	11.4 B	12.1 B	ND	ND	ND	-
Copper	95.6	95.6	ND	ND	ND	0 - 9,900**
Iron	8,400 R	8,608	20,500 R	20,700 R	43,700 R	0 - 2,820,000**
Lead	10.8	11.3	10.7	5.0	4.8	<100 - 2,000**
Magnesium	15,600	15,842	28,700	11,600	17,000	17,000 - 15,600,000**
Manganese	1,920	1,965	558	976	1,400	60 - 125,000**
Mercury	ND N R	0.22 R	ND N R	0.26 N R	ND N R	0 - 10
Nickel	58.1	30.8 B	ND	ND	ND	0 - 7,500
Potassium	2,450 B	2,818 B	4,220 B	3,740 B	4,460 B	28,000 - 3,770,000**
Selenium	ND N W	ND	ND N W	ND N	ND N W	0 - 1,850
Silver	ND	ND	ND	ND	ND	0 - 1,960
Sodium	8,640	8,746	47,800	25,600	34,900	0 - 7,700,000**
Thallium	ND N W	ND	ND N	ND N	ND N	0 - 780
Vanadium	ND	8.92 B	ND	ND	ND	-
Zinc	ND	933.4	50.1	160	16.6 B	0 - 370,000**
Cyanide	ND	ND	ND	ND	ND	0 - 6,000

* - Ref. 38.
** - Ref. 36.
B - Value less than contract-required detection limit but greater than instrument detection limit.
N - Spiked sample recovery not within control limits.
R - Duplicate analysis not within control limits.
W - Post-digestion spike out of control limits; sample absorbance is less than 50% of spike absorbance.
ND - Not detected at analytical detection limit. (Ref. 43).
DUP - Duplicate sample analysis.
MSD - Matrix spike duplicate.

TABLE 4-10 (Page 4 of 4)

LEACHATE SAMPLES DATA SUMMARY (NOVEMBER 1991)
Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHL-1	OHL-2	OHL-3	OHL-4	OHL-5	OHL-6	OHL-7	OHL-8	HAZARDOUS LIMITS	LEACHATE COMPOSITION SANITARY*
CONVENTIONALS										
pH (standard units)	6.40	6.59	6.32	6.62	6.17	6.70	6.39	6.47	NS	3.7 - 8.5**
Corrosivity (in.yr)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.25 +	-
Ignitability (°F)	>212	>212	>212	>212	>212	>212	>212	>212	140 c/c	-
Reactivity to cyanide (ppm)	<1	<1	<1	<1	<1	<1	<1	<1	250	-
Reactivity to sulfide (ppm)	<1	<1	<1	<1	<1	<1	<1	<1	500	-
Specific conductance (µmhos/cm)	1,228	885	1,200	809	720	1,000	622	728	NS	480 - 72,500
COD (mg/l)	59	63	85	53	55	44	23	48	NS	40 - 89,520**
TDS (mg/l)	693	528	665	426	578	639	471	408	NS	584 - 44,900**
TSS (mg/l)	96	33	33	13	72	60	50	118	NS	10 - 26,500**

* - Ref. 38.
** - Ref. 36.
\+ - Rate of corrosivity of steel at 131°F as determined by NACE test.
c/c - Closed cup flashpoint.
NS - No standard.

OHL-8, the most downstream sample, was taken about 1000 ft upstream of the intersection of Whites Lane and Tow Path Road. The sample contained no VOCs nor TIC VOCs.

4.6.5.2 ***Semivolatile Organic Compounds***. Samples OHL-1 through -4 contained an estimated quantity of bis(2-ethylhexyl)phthalate. The results were all well below the range found in sanitary and hazardous waste landfill leachate. That it was also found in the blank associated with these samples is an indication of possible laboratory contamination. An estimated quantity of 5 µg/l of 1,4-dichlorobenzene was detected in sample OHL-3; its value was within the range for sanitary landfill leachate (Ref. 38). Samples OHL-5 through -8 did not contain any semivolatiles or TIC semivolatiles.

4.6.5.3 ***Pesticides/PCBs***. No pesticides or PCBs were found in any of the leachate samples taken at the Tow Path Road Landfill.

4.6.5.4 ***Metals and Cyanide***. Leachate sample OHL-1 had high amounts of iron (34,500 µg/l) and manganese (2180 µg/l); however, both metals were within the range for municipal landfill leachate (Ref. 36). Sample OHL-2 had low levels of iron (2200 µg/l) and fairly low levels of manganese (1050 µg/l). In contrast, sample OHL-3 had very high levels of iron (66,100 µg/l) and manganese (1590 µg/l), and also contained antimony at 33.4 µg/l, lead at 4.2 µg/l, and zinc at 27.2 µg/l. OHL-4 had low levels of iron and manganese (5490 and 443 µg/l, respectively), but also had 10.6 µg/l of zinc and 4 µg/l of copper. Leachate samples OHL-2 and -4 were located next to one another, which probably explains their similar compositions. Leachate seep OHL-5, near the entrance to the peninsula, had low levels of iron (8400 µg/l) but fairly high levels of manganese (1920 µg/l). The sample also contained copper at 95.6 µg/l, cobalt at 11.4 µg/l, lead at 10.8 µg/l, and nickel at 58.1 µg/l. The MSD taken at this site showed good correlation with all of the above metals. However, other metals detected in the MSD were not detected in the sample. These included antimony at 24.9 µg/l, cadmium at 3.8 µg/l, mercury at 0.22 µg/l, vanadium at 8.92 µg/l, and zinc at 933.4 µg/l. Except for zinc, the concentrations were fairly low; however, with a zinc value of close to 1000 µg/l in the MSD, the finding of no zinc in the sample must be considered suspicious. All of the concentrations found were within the range for municipal landfill leachate (Refs. 36 and 38).

OHL-6 had high levels of iron (20,500 µg/l) and low levels of manganese (558 µg/l), antimony (33 µg/l), zinc (50.1 µg/l), and lead (10.7 µg/l). OHL-7 had similar quantities of iron (20,700 µg/l), moderate levels of manganese (976 µg/l), and low levels of lead (5 µg/l) and zinc (160 µg/l). The last leachate sample (OHL-8) had high levels of iron (43,700 µg/l) and manganese (1400 µg/l) and low levels of lead (4.8 µg/l) and zinc (16.6 µg/l). These values were all within the range of municipal leachate concentrations (Refs. 36 and 38). Aluminum was found in this sample at a concentration of 159 µg/l.

Cyanide was not found in any of the leachate samples.

4.6.5.5 ***Miscellaneous Analyses***. The conventional pH, TSS, TDS, and COD analyses were run on the leachate samples. Values for pH ranged from a low of 6.2 to a high of 6.7, all within the range for typical landfill leachate (Ref. 36). Specific conductance did not vary widely, ranging from 622 to 1228 µmhos/cm, within the range for municipal leachate of 80 to 72,500 µmhos/cm (Ref. 38). The TDS values also did not vary widely (408 to 693 mg/l), with the higher numbers corresponding to the samples with the higher specific conductance. TSS results indicated low levels of solids in most samples (13 to 72 mg/l). Two samples (OHL-1 and -8) had higher TSS values (96 and 118 mg/l, respectively). However, all values were significantly lower than the upper range in municipal (26,500 mg/l) leachate (Ref. 36). The organic content of the leachate as measured by COD was extremely low, ranging from 23 mg/l in OHL-7 to 85 mg/l in OHL-3. These numbers were close to the low end of the range for municipal (40 mg/l) leachate (Ref. 36).

Corrosivity, ignitability, and reactivity analyses were run on each of the leachate samples; results were either nondetected or greater than the flashpoint temperature (in the case of ignitability), indicating that the leachate is not hazardous by RCRA standards.

4.6.6 Soil Sample Data

Eighteen shallow soil samples were collected during the soil gas survey and analyzed on-site for PCBs. Sample locations are shown on Figures 4-1A to 4-1K and the data are summarized on Table 4-11. Samples OHSS-1 to -6, -8, -9, -11, and -14 to -18 had no detectable levels of

TABLE 4-11

SOIL DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSS-1	OHSSI-2	OHSS-3	OHSS-4	OHSS-5	OHSS-6	OHSS-7	OHSS-8	OHSS-9
PCBs (mg/kg)									
Aroclor 1242	ND	ND	ND	ND	ND	ND	BQL	ND	ND

PARAMETER	OHSS-10	OHSS-11	OHSS-12	OHSS-13	OHSS-14	OHSS-15	OHSS-16	OHSS-17	OHSS-18
PCBs (mg/kg)									
Aroclor 1242	BQL	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	ND	ND	BQL	ND	ND	ND	ND	ND	ND
Aroclor 1260	ND	ND	ND	BQL	ND	ND	ND	ND	ND

ND - Not detected at analytical detection limit. (Ref. 43).
BQL - Compound detected below minimum quantitation limit.

any PCBs. Aroclor 1242, at a concentration below the minimum quantitation limit (BQL), was found in the sample at OHSS-7, taken at the location of soil gas point OHSG-97, where 12,000 $\mu g/m^3$ of chlorobenzene was detected.

Aroclor 1242 was also found at BQL in the soil sample at OHSS-10. This sample was collected in the vicinity of soil gas point OHSG-130, where a water sample had 2100 µg/l of chlorobenzene. Aroclor 1254 was found at BQL in OHSS-12.

OHSS-13 had BQL of Aroclor 1260; this sample was collected near soil gas point OHSG-276 where 800 $\mu g/m^3$ of chlorobenzene was detected and in the general area where PCBs were detected in the surface water in the bay area of the Mohawk River.

4.6.7 **Waste Sample Data (September 1992)**

After the initial investigation of the Tow Path Road Landfill was completed, a work plan was developed for additional sampling at the site. On the basis of the magnetometry data collected during the initial investigation and the soil gas survey conducted in August 1992, 16 additional locations for test trenches were selected. A sample of the waste material in each test trench was collected at each location. These waste samples were analyzed for full TCL and TAL compounds, ignitability, corrosivity, reactivity, and toxicity characteristic leaching procedure (TCLP) VOCs, semivolatiles, pesticides, herbicides, and metals. At three of the test trenches relatively intact drums were found; a sample was taken from each of the drums and analyzed for the same parameters (provided that enough sample was available). The results from this sampling are shown on Table 4-12 and summarized graphically on Figures 4-1B to 4-1I.

4.6.7.1 ***Volatile Organic Compounds.*** The first trench, OHT-1B, was dug near the eastern end of the site where a relatively high concentration of aromatic hydrocarbons (benzene, chlorobenzene, and xylenes) was found during the soil gas survey. Sample OHTB-1, collected from a depth of 10-11 ft, contained 2-butanone (also known as methyl ethyl ketone [MEK]) in the reanalyzed sample at a concentration of 0.022 mg/kg. MEK is a common solvent in nitrocellulose coating and vinyl film manufacturing, in smokeless tobacco manufacture, in

TABLE 4-12 (Page 1 of 21)

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-1 (10-11 ft)	RE OHTB-1 (10-11 ft)	OHTB-2 (11-12 ft)	OHTB-3 (10-11 ft)	OHTB-4 (12-13 ft)	RE OHTB-4 (12-13 ft)	OHTB-5 (10-11 ft)	RE OHTB-5 (10-11 ft)	OHTB-6 (6 ft)
VOLATILE ORGANICS (mg/kg)									
Methylene chloride	0.003 b j	0.003 b j	0.003 b j	0.002 b j	0.002 b j	0.002 b j	0.004 b j	0.004 b j	0.002 b j
Acetone	0.041	0.069 b	0.063 b	0.028 b	0.014	0.015 b	0.043	0.071 b	0.023 b
2-Butanone	ND	0.022	ND	ND	ND	ND	0.017	0.026	ND
Tetrachloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	0.002 j
Chlorobenzene	0.014 j	0.017	0.012 j	ND	ND	ND	0.041	0.027	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (total)	ND	ND	ND	ND	ND	ND	0.039	0.035	ND
Tentatively Identified Compounds									
Unknown terpene	0.024 j	0.032 j	ND	ND	ND	ND	0.043 j	0.068 j	ND

b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
ND - Not detected at analytical detection limit. (Ref. 43).
RE - Reextracted analysis.

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-7 @ (8 ft)	MS OHTB-7 @ (8 ft)	MSD OHTB-7 @ (8 ft)	OHTB-8 (4-5 ft)	OHTB-9 (12 ft)	OHTB-9-D1 @ (12 ft)	DL OHTB-9-D1 @ (12 ft)	OHTB-10 (12 ft)	OHTB-11 (16 ft)	RE OHTB-11 (16 ft)	OHTB-12 (16 ft)
VOLATILE ORGANICS (mg/kg)											
Methylene chloride	8.7 b j	0.57 b j	0.29 b j	0.003 b j	0.003 b j	2,100 b j	55,000 b d j	0.003 b j	0.002 b j	0.003 b j	0.003 b j
Acetone	ND	ND	ND	0.016 b	0.033 b	9,700 j	190,000 b d j	0.022 b	0.11 b	0.20 b	0.02 b
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.003 j	ND
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	0.048	0.083	0.009 j
Benzene	ND	*	*	ND	0.002 j	1,900 j	ND	0.003 j	0.004 j	0.005 j	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	71[1]	*	*	0.005 j	0.068	320,000 b	530,000 d	0.036	0.16	0.35 e	0.003 j
Chlorobenzene	ND	*	*	0.009 j	0.044	ND	ND	0.007 j	0.10	0.11	0.02
Ethylbenzene	29	7.7	4.5	ND	ND	ND	ND	ND	0.003 j	0.003 J	ND
Xylene (total)	190	56	33	ND	0.007 j	ND	ND	0.022	0.026	0.026	0.063

@ - Medium-level analyses.
* - Spiking compound; data not representative of actual sample concentration.
1 - As a result of sample nonhomogeneity or toluene spike losses, toluene spike recoveries were very low in the MS/MSD; reported concentration is estimated and likely biased low.
b - Found in associated blanks.
d - Concentration recovered from diluted sample; reported concentrations are estimated.
e - Estimated concentration; exceeds GC/MS calibration range.
j - Estimated concentration; compound present below quantitation limit.
DL - Diluted sample analysis (Ref. 43).
MS - Matrix spike.
ND - Not detected at analytical detection limit. (Ref. 43).
RE - Reextracted analysis.
MSD - Matrix spike duplicate.

TABLE 4-12 (Page 3 of 21)

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-7 (8 ft)	MS OHTB-7 (8 ft)	MSD OHTB-7 (8 ft)	OHTB-8 (4-5 ft)	OHTB-9 (12 ft)	OHTB-9-D1 @ (12 ft)	DL OHTB-9-D1 @ (12 ft)	OHTB-10 (12 ft)	OHTB-11 (16 ft)	RE OHTB-11 (16 ft)	OHTB-12 (16 ft)
VOLATILE ORGANICS (mg/kg)											
Tentatively Identified Compounds											
Unknown terpene	ND	NR	NR	0.019 j	ND	ND	ND	0.014 j	ND	ND	ND
Unknown ethylmethylbenzene	202 (3) j	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND
Benzene, propyl-	50 j	NR	NR	ND	ND	ND	ND	ND	0.015 j	0.015 j	0.011 j
Unknown aromatic hydrocarbon	29 j	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND
Unknown dimethylethylbenzene	7.5 j	NR	NR	ND	0.021 j	ND	ND	ND	ND	ND	ND
Unknown C3-benzene	25 j	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND
Cyclohexane propyl	ND	NR	NR	ND	0.011 j	ND	ND	ND	ND	ND	ND
Unknown	ND	NR	NR	ND	0.015 j	ND	ND	ND	ND	0.011 j	ND
Cyclohexane, methyl-	ND	NR	NR	ND	ND	67,000 j	ND	ND	0.033 j	0.04 j	ND
Unknown alkane	ND	NR	NR	ND	ND	13,000 j	ND	ND	0.007 j	ND	ND
Hexane, 3-methyl	ND	NR	NR	ND	ND	56,000 j	ND	0.009 j	0.025 j	0.024 j	ND
Cyclotrisiloxane, hexamethyl	ND	NR	NR	ND	ND	21,000 j	ND	ND	ND	ND	ND
Polycyclohexane	ND	NR	NR	ND	ND	ND	ND	0.008 j	ND	ND	ND
Propylbenzene	ND	NR	NR	ND	ND	ND	ND	0.006 j	ND	ND	ND
Hexane, 2-methyl-	ND	NR	NR	ND	ND	ND	ND	ND	0.014 j	0.014 j	ND
Unknown dimethylcyclooctane	ND	NR	NR	ND	ND	ND	ND	ND	0.007 j	ND	0.008 j
Unknown hydrocarbon	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	0.012 j

@ - Medium-level analyses.
( ) - Number of compounds in total.
j - Estimated concentration; compound present below quantitation limit.
DL - Diluted sample analysis. (Ref. 43).
MS - Matrix spike.
ND - Not detected at analytical detection limit. (Ref. 43).
NR - Not run.
RE - Reextracted analysis.
MSD - Matrix spike duplicate.

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-13 (16-17 ft)	MS OHTB-13 (16-17 ft)	MSD OHTB-13 (16-17 ft)	OHTB-14 (17 ft)	OHTB-14-D1 (17 ft)	OHTB-15 (14 ft)	OHTB-15-D1 (13 ft)	DL OHTB-15-D1 (12 ft)	OHTB-16 (6 ft)	FIELD BLANK	TRIP BLANK
VOLATILE ORGANICS (mg/kg)											
Methylene chloride	0.002 b j	0.003 b j	0.003 b j	0.005 b j	0.23 b j	0.002 b j	23 b j	750 b d j	0.002 b j	0.001 b j	0.001 b j
Acetone	0.009 b j	0.011 j	ND	0.021 b	3.6	0.048 b	71 b j	1,300 b d j	0.008 b j	0.005 b j	0.006 b j
1,2-Dichloroethylene (total)	ND	ND	ND	ND	0.15 j	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	8.7	0.017	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	NU	0.002 j	ND	ND	0.6 j	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	*	*	ND	0.17 j	ND	ND	ND	ND	ND	ND
Benzene	0.021	*	*	ND	0.33 j	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	250	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND	0.25 j	ND	18 j	ND	ND	ND	ND
Toluene	0.016	*	*	ND	11.0	ND	15,000 e	65,000 d	0.005 j	ND	ND
Chlorobenzene	ND	*	*	ND	ND	0.007 j	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	6.5	ND	9.6	ND	760	950 d j	ND	ND	ND
Xylene (total)	0.051	0.048	0.058	ND	42.0	ND	2,900	3,600 d j	ND	ND	ND

@ - Medium-level analyses.
* - Spiking compound; data not representative of actual sample concentration.
b - Found in associated blanks.
d - Concentration recovered from diluted sample; reported concentrations are estimates.
e - Estimated concentration; exceeds GC/MS calibration range.
j - Estimated concentration; compound present below quantitation limit.
DL - Diluted sample analysis (Ref. 43).
MS - Matrix spike.
ND - Not detected at analytical detection limit (Ref. 43).
NU - Data for 1,1,1-TCA not usable; it was confirmed to be a laboratory contaminant.
MSD - Matrix spike duplicate.

TABLE 4-12 (Page 5 of 21)

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-13 (16-17 ft)	MS OHTB-13 (16-17 ft)	MSD OHTB-13 (16-17 ft)	OHTB-14 (17 ft)	OHTB-14-D1 (17 ft)	OHTB-15 (14 ft)	OHTB-15-D1@ (13 ft)	DL OHTB-15-D1@ (12 ft)	OHTB-16 (6 ft)	FIELD BLANK	TRIP BLANK
VOLATILE ORGANICS (mg/kg)											
Tentatively Identified Compounds											
Unknown ethylmethylbenzene	ND	ND	ND	ND	34 (2) j	ND	ND	ND	ND	ND	ND
Benzene, propyl-	ND	ND	ND	ND	17 j	ND	ND	ND	ND	ND	ND
Unknown aromatic hydrocarbon	ND	ND	ND	ND	11 j	ND	ND	ND	ND	ND	ND
Unknown dimethylethylbenzene	ND	ND	ND	ND	5.4 j	ND	ND	ND	ND	ND	ND
Unknown C3-benzene	ND	ND	ND	ND	11 j	ND	ND	ND	ND	ND	ND
Unknown methylpropylbenzene	ND	ND	ND	ND	4.1 j	ND	ND	ND	ND	ND	ND
Unknown cyclic hydrocarbon	ND	ND	ND	ND	13 j	ND	ND	ND	ND	ND	ND
Unknown polycyclic hydrocarbon	ND	ND	ND	ND	3.2 j	ND	ND	ND	ND	ND	ND
Unknown substituted benzene	ND	ND	ND	ND	36 j	ND	ND	ND	ND	ND	ND

@ - Medium-level analysis.
( ) - Number of compounds in total.
j - Estimated concentration; compound present below quantitation limit.
DL - Diluted sample analysis (Ref. 43).
MS - Matrix spike.
ND - Not detected at analytical detection limit (Ref. 43).
MSD - Matrix spike duplicate.

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-1 (10-11 ft)	OHTB-2 (11-12 ft)	OHTB-3 (10-11 ft)	OHTB-4 (12-13 ft)	OHTB-5 (10-11 ft)	OHTB-6 (6 ft)	OHTB-7 (6 ft)	OHTB-8 (4-5 ft)
SEMIVOLATILE ORGANICS (mg/kg)								
1,4-Dichlorobenzene	0.062 j	ND	ND	ND	ND	ND	ND	0.11 j
Naphthalene	0.054 j	0.032 j	ND	ND	0.027 j	ND	0.55 j	0.085 j
2-Methylnaphthalene	0.050 j	ND	ND	ND	ND	ND	ND	ND
Acenaphthene	ND	ND	ND	ND	ND	ND	ND	0.06 j
Fluorene	ND	0.03 j	ND	ND	ND	ND	ND	0.064 j
n-Nitrosodiphenylamine(¶)	ND	ND	ND	ND	0.088 j	ND	ND	ND
Phenanthrene	0.26 j	0.11 j	ND	0.093 j	0.074 j	ND	ND	0.1 j
Di-n-butylphthalate	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	0.21 j	0.27 j	ND	0.23 j	0.063 j	ND	ND	ND
Pyrene	0.19 j	0.14 j	ND	0.15 j	0.087 j	ND	ND	ND
Benzo(a)anthracene	ND	0.088 j	ND	0.094 j	0.074 j	ND	ND	ND
Chrysene	ND	0.084 j	ND	0.11 j	0.072 j	ND	ND	ND
bis(2-Ethylhexyl)phthalate	0.72 b	0.41 b j	0.034 b j	0.086 b j	0.64 b	0.034 b j	2.1 b j	0.22 b j
Di-n-octylphthalate	ND	ND	ND	ND	ND	ND	ND	ND
Benzo(b)fluoranthene	ND	0.15 j	ND	0.16 j	0.11 j	ND	ND	ND
Benzo(k)fluoranthene	ND	0.098 j	ND	0.14 j	ND	ND	ND	ND
Benzo(a)pyrene	ND	ND	ND	0.10 j	ND	ND	ND	ND
Indeno(1,2,3-c,d)pyrene	ND	ND	ND	0.065 j	ND	ND	ND	ND
Benzo(g,h,i)perylene	ND	ND	ND	0.060 j	ND	ND	ND	ND
Tentatively Identified Compounds								
Octadecane	1.5 j	ND	ND	ND	ND	ND	ND	ND
Unknown polycyclic hydroca	9.6 (5) j	0.49 j	ND	ND	ND	ND	ND	ND
Unknown phthalate	ND	0.48 j	ND	ND	ND	ND	6.0 j	10 j

( ) - Number of compounds in total.
¶ - Colelution compound; cannot be separated from diphenylamine.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
ND - Not detected at analytical detection limit (Ref. 43).

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-1 (10-11 ft)	OHTB-2 (11-12 ft)	OHTB-3 (10-11 ft)	OHTB-4 (12-13 ft)	OHTB-5 (10-11 ft)	OHTB-6 (6 ft)	OHTB-7 (6 ft)	OHTB-8 (4-5 ft)
SEMIVOLATILE ORGANICS (mg/kg)								
Tentatively Identified Compounds (Cont.)								
Unknown	11.8 (6) j	5.53 (6) j	1.32 (4) j b	2.73 (3) j	7.81 (7) j	2.31 (6) j b	16 j	1.35 (3) j
Heptadecane	1.9 j	ND	ND	0.46 j	0.51 j	ND	ND	ND
Pentadecane,2,6,10,14-tetram	ND	ND	ND	ND	ND	ND	ND	0.44 j
Hexadecane,2,6,10,14,-tentrame	ND	ND	ND	ND	ND	ND	ND	0.25 j
Docosane	ND	ND	ND	ND	ND	ND	ND	1.1 j
Unknown alkane	1.0 j	ND	ND	ND	ND	ND	ND	ND
Tricosane	ND	0.5 j	ND	0.32 j	0.47 j	ND	ND	1.9 j
Unknown C4-alkylphenanthrene	2.6 j	1.5 j	ND	0.29 j	1.3 j	ND	6.7 j	1.1 j
Tetracosane	1.0 j	ND	ND	ND	ND	0.1 j	ND	2.1 j
Pentacosane	2.0 j	0.77 j	ND	0.49 j	0.66 j	0.15 j	4.9 j	2.0 j
Hexacosane	ND	ND	ND	ND	ND	0.13 j	4.5 j	1.9 j
Heptacosane	1.5 j	1.1 j	ND	0.66 j	1.1 j	0.21 j	6.3 j	1.6 j
Octacosane	ND	0.46 j	ND	ND	0.46 j	0.11 j	5.6 j	1.3 j
Nonacosane	3.2 j	2.7 j	0.24 j	1.8 j	2.0 j	0.8 j	12.0 j	2.1 j
Triacontane	ND	0.63 j	ND	0.31 j	0.61 j	0.15 j	7.0 j	1.2 j
Unknown C31-alkane	1.7 j	1.6 j	0.21 j	1.2 j	0.75 j	0.68 j	8.0 j	1.7 j
Dotriacontane	ND	ND	ND	ND	ND	ND	4.2 j	0.55 j
Unknown aliphatic	ND	0.49 j	ND	0.21 j	0.8 j	0.19 j	ND	ND
Unknown C-33 alkane	ND	ND	ND	0.35 j	ND	ND	ND	0.44 j
Unknown aliphatic aldehyde	ND	0.65 j	ND	0.47 j	1.2 j	0.13 j	ND	ND
Unknown polyterpene derivati	ND	0.57 j	ND	0.64 (2) j	0.44 j	ND	ND	ND
Hexadecanoic acid	ND	ND	ND	0.24 j	ND	ND	ND	ND
Unknown phenanthrene derivat	ND	ND	ND	ND	2.0 j	ND	ND	ND

( ) - Number of compounds in total.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.

ND - Not detected at analytical detection limit (Ref. 43).

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-1 (10-11 ft)	OHTB-2 (11-12 ft)	OHTB-3 (10-11 ft)	OHTB-4 (12-13 ft)	OHTB-5 (10-11 ft)	OHTB-6 (6 ft)	OHTB-7 (8 ft)	OHTB-8 (4-5 ft)
SEMIVOLATILE ORGANICS (mg/kg)								
Tentatively Identified Compounds (Cont.)								
Perylene	ND	0.53 j	ND	0.42 j	ND	ND	ND	ND
2-Pentanone,4-hydro-4-meth	ND	ND	2.9 j b a	ND	ND	ND	ND	ND
Unknown decanedioate	ND	ND	0.21 j b a	ND	ND	0.13 j b	ND	ND
Unknown aliphatic ketone	ND	ND	ND	0.21 j	ND	ND	ND	ND
Octacosanoic acid, methyl est	ND	ND	ND	0.59 j	ND	ND	ND	ND
2-Pentanone,4-hydro-4-meth	ND	ND	ND	ND	ND	3.0 j b a	ND	ND
1,3-Benzodioole,5-(2-propen	ND	ND	ND	ND	ND	0.34 j	ND	ND
Benzene, (1-methylethyl)-	ND	ND	ND	ND	ND	ND	4.5 j	ND
Benzene, propyl-	ND	ND	ND	ND	ND	ND	21 j	ND
Benzene, 1-ethyl-3-methyl-	ND	ND	ND	ND	ND	ND	46 j	ND
Benzene,1,3,5-trimethyl	ND	ND	ND	ND	ND	ND	24 j	ND
Benzene,1-ethyl-2-methyl-	ND	ND	ND	ND	ND	ND	20 j	ND
Benzene,1,2,4-trimethyl-	ND	ND	ND	ND	ND	ND	86 j	ND
Benzene,1,2,3-trimethyl-	ND	ND	ND	ND	ND	ND	21 j	ND
IH-indene,2,3-dihydro-	ND	ND	ND	ND	ND	ND	4.8 j	ND
Benzene,1-methyl-3-propyl-	ND	ND	ND	ND	ND	ND	4.9 j	ND
Heneicosane	ND	ND	ND	ND	ND	ND	ND	0.38 j

a - Suspected aldol condensation product.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.

ND - Not detected at analytical detection limit (Ref. 43).

TABLE 4-12 (Page 9 of 21)

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-9 (12 ft)	OHTB-9-D1@ (12 ft)	OHTB-10 (12 ft)	OHTB-11 (16 ft)	OHTB-12 (16 ft)	OHTB-13 (16-17 ft)	MS OHTB-13 (16-17 ft)	MSD OHTB-13 (16-17 ft)	OHTB-14 (17 ft)	OHTB-14-D1@ (17 ft)
SEMIVOLATILE ORGANICS (mg/kg)										
1,4-Dichlorobenzene	0.077 j	ND	0.04 j	0.28 j	0.35 j	0.12 j	*	*	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	0.055 j	ND	ND	ND	ND	ND
Naphthalene	0.062 j	ND	0.074 j	1.4	0.54	0.15 j	0.05 j	0.029 j	ND	220 j
2-Methylnaphthalene	0.039 j	ND	0.038 j	0.054 j	0.047 j	0.032 j	ND	ND	ND	350 j
Acenaphthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diethylphthalate	ND	ND	0.029 j	ND	ND	0.110 j	ND	ND	ND	ND
Fluorene	0.044 j	ND	0.025 j	ND	ND	ND	ND	ND	ND	ND
n-Nitrosodiphenylamine(¶)	ND	ND	ND	0.04 j	ND	ND	ND	ND	ND	270 j
Phenanthrene	0.13 j	ND	0.066 j	0.04 j	0.028 j	0.031 j	ND	ND	0.12 j	82 j
Di-n-butylphthalate	0.11 j	ND	ND	ND	ND	0.047 j	0.085 j	0.033 j	ND	ND
Fluoranthene	0.16 j	ND	0.063 j	0.023 j	0.022 j	ND	ND	ND	0.15 j	ND
Pyrene	0.096 j	ND	0.069 j	0.025 j	ND	ND	*	*	0.19 j	ND
Benzo(a)anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ND	ND	ND	0.58 b	0.17 j	ND	ND	ND	0.11 j	ND
bis(2-Ethylhexyl)phthalate	1.4 b	ND	0.14 b j	ND	ND	0.21 j	ND	ND	ND	ND
Di-n-octylphthalate	0.091 j	ND	ND	ND	ND	ND	ND	ND	ND	ND

@ - Medium-level analysis.
* - Spiking compound; data not representative of actual sample concentration.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
MS - Matrix spike.
ND - Not detected at analytical detection limit (Ref. 43)
MSD - Matrix spike duplicate.

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-9 (12 ft)	OHTB-9-D1@ (12 ft)	OHTB-10 (12 ft)	OHTB-11 (16 ft)	OHTB-12 (16 ft)	OHTB-13 (16-17 ft)	MS OHTB-13 (16-17 ft)	MSD OHTB-13 (16-17 ft)	OHTB-14 (17 ft)	OHTB-14-D1@ (17 ft)
SEMIVOLATILE ORGANICS (mg/kg)										
Tentatively Identified Compounds (Cont.)										
Unknown	7.7 (3) j	2,000 j	.39 (2) j	.83 (4) j	2.0 (2) j	0.55 j	NR	NR	20.6 (9) j	ND
Heptadecane	ND	ND	0.77 j	ND	ND	ND	NR	NR	ND	13,000 j
Pentadecane,2,6,10,14-tetram	ND	ND	0.57 j	ND	0.000	ND	NR	NR	ND	6,300 j
Hexadecane,2,6,10,14,-tentrame	ND	ND	0.39 j	ND	ND	ND	NR	NR	ND	2,400 j
Docosane	ND	ND	0.41 j	ND	0.45 j	ND	NR	NR	ND	ND
Unknown alkane	ND	ND	1.2 j	ND	ND	0.25 j	NR	NR	1.4 j	7,000 (3) j
Tricosane	1.8 j	ND	0.87 j	0.49 j	0.87 j	0.32 j	NR	NR	ND	ND
Unknown C4-alkylphenanthrene	4.3 j	ND	1.5 j	1.5 j	0.69 j	1.7 j	NR	NR	ND	ND
Tentracosane	2.6 j	ND	1.3 j	0.68 j	1.0 j	0.4 j	NR	NR	ND	ND
Pentacosane	4.4 j	ND	2.1 j	0.95 j	1.1 j	0.76 j	NR	NR	4.3 j	ND
Hexacosane	4.5 j	ND	2.7 j	0.68 j	1.0 j	0.9 j	NR	NR	1.4 j	ND
Heptacosane	6.0 j	ND	3.2 j	1.1 j	1.1 j	1.3 j	NR	NR	1.6 j	ND
Octacosane	5.4 j	ND	3.1 j	0.61 j	0.66 j	1.4 j	NR	NR	ND	ND
Nonacosane	13.0 j	ND	4.8 j	3.4 j	5.1 j	4.5 j	NR	NR	6.2 j	ND
Triacontane	7.2 j	ND	3.3 j	0.96 j	0.7 j	2.9 j	NR	NR	ND	ND
Unknown C31-alkane	7.2 j	ND	3.1 j	2.9 j	2.4 j	2.6 j	NR	NR	2.1 j	ND
Dotriacontane	2.8 j	ND	1.5 j	0.54 j	ND	1.3 j	NR	NR	ND	ND
Unknown aliphatic	3.7 (2) j	ND	.95 (2) j	ND	ND	ND	NR	NR	7.4 (3) j	10,400 (2) j
Unknown C-33 alkane	ND	ND	ND	1.3 j	0.61 j	0.85 j	NR	NR	ND	ND
Unknown aliphatic aldehyde	ND	ND	ND	2.2 (3) j	1.1 (2) j	ND	NR	NR	ND	ND
Unknown polyterpene derivati	2.09 (2) j	ND	ND	0.45 j	ND	ND	NR	NR	1.2 j	ND
Hexadecanoic acid	ND	ND	ND	ND	0.61 j	0.45 j	NR	NR	ND	4,400 j
Unknown phenanthrene derivat	1.1 j	ND	ND	ND	0.56 j	0.20 j	NR	NR	ND	ND
1-Tetracosanol	ND	ND	ND	ND	1.0 j	ND	NR	NR	1.5 j	ND

@ - Medium-level analysis.
( ) - Number of compounds in total.
j - Estimated concentration; compound present below quantitation limit.
MS - Matrix spike.
ND - Not detected at analytical detection limit (Ref. 43).
NR - Not run.
MSD - Matrix spike duplicate.

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-8 (12 ft)	OHTB-9-D1@ (12 ft)	OHTB-10 (12 ft)	OHTB-11 (16 ft)	OHTB-12 (16 ft)	OHTB-13 (16-17 ft)	MS OHTB-13 (16-17 ft)	MSD OHTB-13 (16-17 ft)	OHTB-14 (17 ft)	OHTB-14-D1@ (17 ft)
SEMIVOLATILE ORGANICS (mg/kg)										
Tentatively Identified Compounds (Cont.)										
1-Hexacosanol	ND	ND	ND	ND	0.78 j	ND	NR	NR	ND	ND
Benzene,1,2,4-trimethyl-	ND	ND	ND	ND	ND	0.46 j	NR	NR	ND	ND
Unknown diethylbenzene	ND	ND	ND	ND	ND	0.21 j	NR	NR	ND	ND
Tetratriacontane	ND	ND	ND	ND	ND	0.37 j	NR	NR	ND	ND
Pentatriacontane	ND	ND	ND	ND	ND	0.27 j	NR	NR	ND	ND
Undecane	ND	ND	ND	ND	ND	ND	NR	NR	ND	1,600 j
Dodecane	ND	ND	ND	ND	ND	ND	NR	NR	ND	2,900 j
Tridecane	ND	ND	ND	ND	ND	ND	NR	NR	ND	3,900 j
Tetradecane	ND	ND	ND	ND	ND	ND	NR	NR	ND	5,000 j
Pentadecane	ND	ND	ND	ND	ND	ND	NR	NR	ND	6,900 j
Hexadecane	ND	ND	ND	ND	ND	ND	NR	NR	ND	8,600 j
Nonadecane	ND	ND	ND	ND	ND	ND	NR	NR	ND	3,100 j
Tetradecanoic acid	ND	ND	ND	ND	ND	ND	NR	NR	ND	1,400 j
Octadecane	ND	ND	ND	ND	ND	ND	NR	NR	ND	7,100 j
Eicosane	ND	ND	ND	ND	ND	ND	NR	NR	ND	1,100 j
1-Phenanthrenecarbocyclic aci	ND	ND	ND	ND	ND	ND	NR	NR	ND	1,000 j
Unknown phthalate	2.7 j	ND	ND	ND	ND	ND	NR	NR	ND	ND
Unknown alkylcyclohexane	ND	2,200 j	ND	ND	ND	ND	NR	NR	ND	ND

@ - Medium-level analysis.
j - Estimated concentration; compound present below quantitation limit.
MS - Matrix spike.
ND - Not detected at analytical detection limit (Ref. 43).
NR - Not run.
MSD - Matrix spike duplicate.

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-15 (14 ft)	OHTB-15-D1 @ (13 ft)	OHTB-16 (6 ft)	FIELD BLANK
SEMIVOLATILE ORGANICS (mg/kg)				
1,4-Dichlorobenzene	ND	ND	ND	ND
1,2-Dichlorobenzene	0.120 j	ND	ND	ND
Phenanthrene	0.038 j	ND	ND	ND
Di-n-butylphthalate	ND	4.5 j	ND	ND
Fluoranthene	0.056 j	ND	ND	ND
Pyrene	0.036 j	ND	ND	ND
Benzo(a)anthracene	0.034 j	ND	ND	ND
Chrysene	0.032 j	ND	ND	ND
bis(2-Ethylhexyl)phthalate	0.220 j	ND	0.045 j	ND
Tentatively Identified Compounds				
Hexanoic acid, ethyl ester	ND	110 j	ND	ND
Unknown 2-butenedioate	ND	160 j	ND	ND
2-Butenedioic acid (z)-, dieth	ND	260 j	ND	ND
Butenedioic acid, diethyl est	ND	230 j	ND	ND
2-Butenedioic acid (e)-,dieth	ND	1,200 j	ND	ND
Unknown hexanedioate	ND	350 j	ND	ND
Unknown methanoisbenzofuran	ND	380 j	ND	ND
1-Hexacosanol	0.370 j	ND	ND	ND
2-Pentanone,4-hydroxy-4-meth	ND	ND	6.20 a j b	ND
Unknown decanoate	0.55 j	ND	ND	ND
Unknown sitosterol	0.55 j	ND	ND	ND
Unknown cholestane derivativ	0.36 j	ND	ND	ND
Benzaldehyde	ND	ND	0.11 j b	ND
Unknown bromocompound	ND	ND	0.20 j b	ND
Unknown bromochlorocompound	ND	ND	0.13 j b	ND

@ - Medium-level analysis.
* - Spiking compound; data not representative of actual sample concentration.
a - Suspected aldol condensation product.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
ND - Not detected at analytical detection limit (Ref. 43).

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-15 (14 ft)	OHTB-15-D1@ (13 ft)	OHTB-16 (6 ft)	FIELD BLANK
SEMIVOLATILE ORGANICS				
Tentatively Identified Compounds (Cont.)				
Unknown	2.94 (5) j	8,120 (13) j	1.62 (3) j b	0.064 (3) j b
Unknown C4-alkylphenanthrene	1.4 j	ND	0.078 j	ND
Pentacosane	0.54 j	ND	ND	ND
Hexacosane	0.43 j	ND	ND	ND
Heptacosane	1.10 j	ND	ND	ND
Octacosane	0.29 j	ND	ND	ND
Nonacosane	2.40 j	ND	0.17 j	ND
Triacontane	0.31 j	ND	ND	ND
Unknown C31-alkane	1.0 j	ND	0.082 j	ND
Unknown aliphatic	ND	ND	1.10 (2) j b	ND
Unknown C-33 alkane	0.34 j	ND	ND	ND
Hexadecanoic acid	0.260 j	ND	ND	ND
Unknown phenanthrene derivat	3.00 j	ND	ND	ND

@ - Medium-level analysis.
( ) - Number of compounds in total.
b - Found in associated blanks.
j - Estimated concentration; compound present below quantitation limit.
ND - Not detected at analytical detection limit (Ref. 43).

WASTE SAMPLES DATA SUMMARY (SEPTEMBER1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-1 (10-11 ft)	OHTB-2 (11-12 ft)	OHTB-3 (10-11 ft)	OHTB-4 (12-13 ft)	OHTB-5 (10-11 ft)	OHTB-6 (6 ft)	OHTB-7 (8 ft)	OHTB-8 (4-5 ft)	OHTB-9 (12 ft)	OHTB-9 (14 ft)	OHTB-9-D1 (12 ft)	OHTB-10 (12 ft)
PESTICIDES/PCBs (mg/kg)												
4,4'-DDE	0.008 p	ND	ND	ND	ND	ND	0.004 j p	ND	0.002 j p	ND	ND	ND
4,4'-DDD	0.021 p	0.005	ND	ND	0.003 j	0.003 j p	0.015	0.002 j p	0.023	0.10	ND	0.003 j
Endosulfane sulfate	0.008	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin aldehyde	ND	0.004 j p	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
alpha-Chlordane	ND	0.004 p	ND	ND	ND	0.001 j	0.002 j p	ND	0.002 j p	ND	ND	ND
gamma-Chlordane	ND	ND	ND	ND	ND	ND	0.002 j p	ND	0.002 j p	ND	ND	ND
Aroclor 1242	0.2	0.130	ND	ND	ND	ND	0.230	0.098	0.150	0.190 j	ND	0.054
Aroclor 1248	ND	ND	ND	ND	0.037 j p	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	0.43	ND	ND	ND	ND	0.031 j	0.10	ND	0.076	ND	ND	ND
Aroclor 1260	ND	ND	ND	ND	ND	ND	0.046 j	ND	ND	ND	ND	0.039

@ - Medium-level analysis.
j - Estimated concentration; compound present below quantitation limit.
p - Pesticide/Aroclor target analyte has >25% difference for the detected compound.
ND - Not detected at analytical detection limit (Ref. 43).

TABLE 4-12 (Page 15 of 21)

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-11 (16 ft)	OHTB-12 (16 ft)	OHTB-13 (16-17 ft)	MS OHTB-13 (16-17 ft)	MSD OHTB-13 (16-17 ft)	OHTB-14 (17 ft)	OHTB-14-D1@ (17 ft)	OHTB-15 (14 ft)	OHTB-15-D1@ (14 ft)	OHTB-16[2] (6 ft)	FIELD BLANK
PESTICIDES/PCBs (mg/kg)											
gamma-BHC (lindane)	ND	ND	ND	*	*	ND	ND	ND	ND	0.002 j p	ND
4,4'-DDE	0.007	0.002 j p	ND	ND	0.002 j p	0.016	ND	0.003 j p	ND	ND	ND
Endrin	ND	ND	ND	*	*	ND	ND	ND	ND	0.003 j p	ND
Endosulfan II	ND	ND	ND	ND	ND	0.066	ND	ND	ND	ND	ND
4,4'-DDD	0.014	0.003 j p	0.012 p[3]	0.0096[3]	0.014 p[3]	ND	ND	0.003 j p	ND	0.020	ND
Endrin aldehyde	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.003 j	ND
alpha-Chlordane	ND	ND	0.004 j	0.002	ND	ND	ND	ND	ND	ND	ND
gamma-Chlordane	ND	ND	0.003 j p	0.001 j p	ND	ND	ND	ND	ND	ND	ND
Aroclor 1242	0.057	0.049	0.120	0.094	0.069	0.031 j p	ND	0.046 j	ND	ND	ND
Aroclor 1248	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1254	0.028 j	0.022 j	0.089	0.022 j	0.047	ND	ND	ND	ND	ND	ND
Aroclor 1260	ND	ND	0.230	0.022 j	0.044	ND	ND	ND	ND	ND	ND

@ - Medium-level analysis.
* - Spiking compound; data not representative of actual sample concentration.
2 - Reported concentrations are biased low because the extraction was performed 9 days beyond the allowable holding time (5 days); in addition, a shipping problem caused a 4-day delay in laboratory receipt of the sample.
3 - Reported concentrations are estimated biased high due to interference.
j - Estimated concentration; compound present below quantitation limit.
p - Pesticide/Aroclor target analyte has >25% difference for the detected compound; reported concentrations are estimates.
MS - Matrix spike.
ND - Not detected at analytical detection limit (Ref. 43).
MSD - Matrix spike duplicate.

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-1J+ (10-11 ft)	OHTB-2+ (11-12 ft)	OHTB-3+ (10-11 ft)	OHTB-4+ (12-13 ft)	OHTB-5 (10-11 ft)	OHTB-6+ (6 ft)	OHTB-7+ (8 ft)	DL OHTB-7+ (8 ft)	OHTB-8+ (4-6 ft)	TCLP REGULATORY LEVEL
TCLP VOLATILE ORGANICS (mg/l)										
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	200
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	100
TCLP SEMIVOLATILE ORGANICS (mg/l)										
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	NR	0.002 j	7.5
2-Methylphenol (o-cresol)	ND	ND	ND	ND	ND	ND	0.006 j	NR	ND	200
3&4-Methylphenol (m&p-cresol)	ND	ND	ND	ND	ND	ND	0.005 j	NR	ND	200
TCLP PESTICIDES (mg/l)	ND	ND	ND	ND	ND	ND	NR	ND	ND	-
TCLP HERBICIDES (mg/l)	ND	ND	ND	ND	ND	ND	NR	ND	ND	-

\+ - The acid fraction of the TCLP semivolatiles of these samples should be regarded as estimates as they were associated with surrogates with very low recoveries; the data are usable to show that acid compounds exceeding the TCLP requlatory level are not present.
j - Estimated concentration; compound present below quantitation limit.
DL Diluted sample analysis (Ref. 43).
ND - Not detected at analytical detection limit (Ref. 43).
NR - Not run.

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-9+ (12 ft)	OHTB-9-D1 (12 ft)	OHTB-10+ (12 FT)	OHTB-11 (10 ft)	OHTB-12+ (15 ft)	OHTB-13+ (16-17 ft)	OHTB-14+ (17 FT)	OHTB-14-D1 (17 ft)	OHTB-15+ (14 FT)	OHTB-15-D1 (13 ft)	OHTB-16 (6FT)	TCLP REGULATORY LEVEL
TCLP VOLATILE ORGANICS (mg/l)												
2-Butanone	0.009 j	ND	ND	0.010	ND	ND	ND	0.510	ND	1.1	ND	200
Benzene	ND	3	ND	ND	ND	0.002 j	ND	0.006 j	ND	ND	ND	0.5
Chlorobenzene	0.003 j	ND	ND	0.005 j	ND	ND	ND	ND	ND	ND	ND	100
TCLP SEMIVOLATILE ORGANICS (mg/l)												
1,4-Dichlorobenzene	ND	ND	ND	0.004 j	0.005 j	ND	ND	0.170	ND	ND	ND	7.5
2-Methylphenol(o-cresol)	ND	0.005 j	ND	ND	ND	ND	ND	0.081 j	ND	ND	ND	200
3&4-Methylphenol (m&p-cresol)	ND	0.004 j	ND	ND	ND	ND	ND	ND	ND	1.20	ND	200
TCLP PESTICIDES (mg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
TCLP HERBICIDES (mg/l)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	-

\+ - The acid fraction of the TCLP semivolatiles of these samples should be regarded as estimates as they were associated with surrogates with very low recoveries; the data are usable to show that acid compounds exceeding the TCLP regulatory level are not present.

j - Estimated concentration; compound present below quantitation limit.

ND - Not detected at analytical detection limit (Ref. 43).

TABLE 4-12 (Page 18 of 21)

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-1 (10-11 ft)	OHTB-2 (11-12 ft)	OHTB-3 (10-11 ft)	OHTB-4 (12-13 ft)	OHTB-5 (10-11 ft)	OHTB-6 (6 ft)	OHTB-7 (8 ft)	OHTB-8 (4-5 ft)	OHTB-9 (12 ft)	OHTB-10 (12 ft)	REGULATORY LEVELS
CONVENTIONALS											
Solids, total (%w/w)	66.3	58.9	79.9	74.5	61.3	82.2	55.5	70.6	55.1	85.0	-
Ignitability (°F)	110	110	128	124	110	118	100	120	105	115	1
Reactivity description	NRXN	NRXN	NRXN	NRXN	NRXN	NRXN	NRXN	NRXN	NRXN	NRXN	-
Reactivity cyanide (mg/kg)	45	59	<35	51	<35	<35	166	193	109	<35	250
Reactivity sulfide (mg/kg)	<48	<48	<48	<48	<48	<48	101	114	68	<48	500
Corrosivity by pH	6.85	7.03	7.19	6.94	7.14	6.43	6.96	6.87	6.79	8.36	<2 or 12>

PARAMETER	OHTB-11 (16 ft)	OHTB-12 (16 ft)	OHTB-13 (16-17 ft)	OHTB-14 (17 ft)	OHTB-14-D1 (17 ft)	OHTB-15 (14 ft)	OHTB-15-D1 (13 ft)	OHTB-16 (6 ft)	REGULATORY LEVELS
CONVENTIONALS									
Solids, total (%w/w)	76.4	81.7	75.2	58.6	NR	69.7	45.5	84.2	-
Ignitability (°F)	120	128	120	105	115	118	70	128	1
Reactivity description	NRXN	NRXN	NRXN	NRXN	NRXN	NRXN	NRXN	NRXN	-
Reactivity cyanide (mg/kg)	<35	<35	<35	117	<70	<35	<35	<35	250
Reactivity sulfide (mg/kg)	<48	<48	<48	256	<96	<48	<48	<48	500
Corrosivity by pH	6.88	6.80	7.06	6.91	5.90	6.54 j	4.23	7.10 j	<2 or 12>

1 - It is not a liquid and is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture, or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard.

NRXN - No reaction.

TABLE 4-12 (Page 19 of 21)

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-1 (10-11 ft)	OHTB-2 (11-12 ft)	OHTB-3 (10-11 ft)	OHTB-4 (12-13 ft)	OHTB-5 (10-11 ft)	OHTB-6 (6 ft)	OHTB-7 (8 ft)	OHTB-8 (4-5 ft)	OHTB-9 (12 ft)	TCLP REGULATORY LEVEL
TCLP METALS (mg/l)										
Arsenic, total	<1	<1	<1	<1	<1	<1	<1	<1	<1	5.0
Barium, total	<10	<10	<10	<10	<10	<10	<10	<10	<10	100.0
Cadmium, total	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.0
Chromium, total	<1	<1	<1	<1	<1	<1	<1	<1	<1	5.0
Lead, total	<1	<1	<1	<1	<1	<1	<1	<1	<1	5.0
Mercury, total	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.2
Selenium, total	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.0
Silver, total	<1	<1	<1	<1	<1	<1	<1	<1	<1	5.0

PARAMETER	OHTB-9-D1 (12 ft)	OHTB-10 (12 ft)	OHTB-11 (16 ft)	OHTB-12 (16 ft)	OHTB-13 (16-17 ft)	OHTB-14 (17 ft)	OHTB-14-D1 (17 ft)	OHTB-15 (14 ft)	OHTB-15-D1 (13 ft)	OHTB-16 (6 ft)	TCLP REGULATORY LEVEL
TCLP METALS (mg/l)											
Arsenic, total	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	5.0
Barium, total	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	100.0
Cadmium, total	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.0
Chromium, total	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	5.0
Lead, total	<1	<1	<1	<1	<1	<1	16.0	<1	<1	<1	5.0
Mercury, total	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.2
Selenium, total	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1.0
Silver, total	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	5.0

TABLE 4-12 (Page 20 of 21)

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-1 (10-11 ft)	OHTB-2 (11-12 ft)	OHTB-3 (10-11 ft)	OHTB-4 (12-13 ft)	OHTB-5 (10-11 ft)	OHTB-6 (6 ft)	OHTB-7 (8 ft)	OHTB-8 (4-5 ft)	OHTB-9 (12 ft)	OHTB-9-D (12 ft)
TAL METALS (mg/kg)										
Aluminum	340	13,400	3,840	15,400	6,420	16,700	11,100	17,900	10,300	NR
Antimony	ND N	ND N	ND N	ND	ND	ND N	ND N	ND N	ND N	NR
Arsenic	7.3	6.6	1.3 B	4.3	6.2	3.2	6.1	7.7	8.7	NR
Barium	67.0	129	20.1 B	99.7	99.4	60.8	321	106	203	NR
Beryllium	0.47 B	0.70 B	0.24 B	0.83	0.40 B	0.73 B	0.54 B	1.0	0.46 B	NR
Cadmium	ND	1.1 B	ND	ND	1.2	ND	1.9	0.67 B	3.0	NR
Calcium	5,090	8,400	1,220	3,520	24,800	1,290	5,610	3,380	8,310	NR
Chromium	25.6	25.8	4.9	19.1	28.9	21.5	25.4	25.5	162	NR
Cobalt	13.3	8.8 B	3.3 B	10.3	6.3 B	13.2	7.4 B	13.3	7.8 B	NR
Copper	107	39.0	5.1	18.2	26.5	21.7	34.4	29.3	47.1	NR
Iron [4]	36,000	29,000	7,170	25,900	21,600	31,900	44,200	34,600	57,000	NR
Lead	112 N R	149 N R	6.4 R	33.6 N R	108 N R	17.5 R	150 N R	30.7 N R	244 N R	NR
Magnesium	2,890	4,070	1,310	4,810	3,370	5,860	2,950	5,590	2,450	NR
Manganese	417 R	411 R	62.7 R	263 R	214 R	321 R	466 R	348 R	584 R	NR
Mercury	0.24	0.36	0.02 B	0.07 B	0.23	0.07 B	0.34	0.19	4.1	NR
Nickel	25.4	23.8	5.6 B	22.0	14.0	26.4	22.2	44.5	23.7	NR
Potassium	1,430	2,040	698 B	1,580	804 B	1,640	1,760	3,290	1,600	NR
Selenium	ND N	0.33 B W N	ND N	ND W N	ND N	ND W N	1.0 B N	ND W N	ND N	NR
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR
Sodium	111 B	194 B	ND	103 B	106 B	ND	ND	156 B	ND	NR
Thallium	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR
Vanadium	21.5	27.9	8.7	27.5	17.5	22.3	23.5	60.9	26.9	NR
Zinc	133	436	22.3	84.1	366	76.2	517	468	1,150	NR
Cyanide	ND	ND	ND	ND	ND	ND	ND	ND	3.1	ND

4 - Due to poor surrogate recovery and duplicate correlation, reported lead concentrations qualified with an "N" and/or "R" are unreliable and are only usable to indicate the presence of lead.

B - Value less than contract-required detection limit but greater than instrument detection limit.

N - Spiked sample recovery not within control limits.

R - Duplicate analysis not within control limits.

W - Post-digestion spike out of control limits; sample absorbance is less than 50% of spike absorbance.

ND - Not detected at analytical detection limit (Ref. 43).

NR - Not run.

TABLE 4-12 (Page 21 of 21)

WASTE SAMPLES DATA SUMMARY (SEPTEMBER 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHTB-10 (12 ft)	OHTB-11 (16 ft)	OHTB-12 (16 ft)	OHTB-13 (16-17 ft)	DUP OHTB-13 (16-17 ft)	OHTB-14 (17 ft)	OHTB-14-D1 (17 ft)	OHTB-15-D1 (13 ft)	OHTB-15 (14 ft)	OHTB-16 (6 ft)
TAL METALS (mg/kg)										
Aluminum	7,040	14,300	13,800	16,600	16,380	16,200	NR	287	15,200	5,080
Antimony	ND N	ND N	ND N	ND N	ND	ND N	NR	ND N	ND	ND
Arsenic	3.4	3.8	3.9	6.0	5.6	11.3	NR	3.0 B	6.8	1.4 B
Barium	38.5	87.5	61.0	95.5	82.7	119	NR	30.7 B	96.7	33.5 B
Beryllium	0.37 B	0.66 B	0.61 B	0.83	0.83 B	0.93 B	NR	ND	0.66 B	0.24 B
Cadmium	ND	0.67 B	ND	ND	ND	0.95 B	NR	1.6 B	1.0 B	ND
Calcium	8,130	3,880	1,600	3,260	2,890	6,290	NR	714 B	3,360	804 B
Chromium	9.8	20.7	19.1	22.7	21.7	32.6	NR	34.9	28.7 B	6.9 E
Cobalt	4.9 B	8.0 B	10.9	12.6	13.3	15.0	NR	1.7 B	10.2 B	2.8 B
Copper	15.8	18.1	21.0	35.1	34.9	62.9	NR	91.0	33.8 E	11.0 E
Iron [4]	17,000	22,800	26,300	36,400	33,280	33,800	NR	30,200	33,600	8,740
Lead	36.4 N R	30.3 N R	16.7 N R	113 N R	22.2 R	105 N R	NR	1,120 N R	174	3.3
Magnesium	3,360	3,960	4,890	6,720	6,140	6,330	NR	263 B	4,310	1,590
Manganese	299 R	359 R	281 R	615 R	920 R	356 R	0.08	109 R	384	67.5
Mercury	0.07 B	0.12	0.06 B	0.09 B	0.06 B	0.11 B	NR	1.6	0.34	ND
Nickel	12.0	17.8	22.9	30.1	30.0	32.1	NR	7.8 B	23.9	7.7
Potassium	1,050	1,990	1,510	2,080	2,850	1,950	NR	772 B	967 B	366 B
Selenium	ND N	ND W N	ND W N	ND W N	ND	ND N	NR	ND N	0.91 B	ND
Silver	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND
Sodium	62.1 B	ND	ND	89.8 B	ND	153 B	NR	ND	138 B	ND
Thallium	ND	ND	ND	ND	ND	ND	NR	ND W	ND	ND
Vanadium	15.7	25.6	22.4	26.7	25.5	29.3	NR	2.2 B	23.6	9.4 B
Zinc	88.5	99.7	117	102	90	234	NR	1,380	173	21.9
Cyanide	ND	ND	ND	ND	ND	1.7	240	ND	1.3	ND

4 - Due to poor surrogate recovery and duplicate correlation, reported lead concentrations qualified with an "N" and/or "R" are unreliable and are only usable to indicate the presence of lead.

B - Value less than contract-required detection limit but greater than instrument detection limit.

E - Value estimated due to interference.

N - Spiked sample recovery is not within control limits.

R - Duplicate analysis not within control limits.

W - Post-digestion spike out of control limits; sample absorbance is less than 50% of spike absorbance.

ND - Not detected at analytical detection limit (Ref. 43).

NR - Not run.

DUP - Duplicate sample analysis.

cements and adhesives, and in the dewaxing of lubricating oils. In addition, it is used as an intermediate in drug manufacture (Ref. 51). The sample also had 0.017 mg/kg of chlorobenzene, which was also detected in the soil gas analyzed in the area. Chlorobenzene is used in the manufacture of aniline, phenol, and chloronitrobenzene and is used as an intermediate in the manufacture of dyestuffs and many pesticides (Ref. 51). Two other compounds, methylene chloride and acetone, were also detected in the sample, but were also found in the blank, indicative of laboratory contamination. One TIC, an unknown terpene, was found at a concentration of 0.024 mg/kg.

The second trench, OHT-2B, was dug approximately 600 ft to the west of OHT-1B in an area where high concentrations of benzene, chlorobenzene, toluene, and xylenes were found in the soil gas. One sample, OHTB-2, was collected from a depth of 11-12 ft. The sample had 0.012 mg/kg of chlorobenzene and no TICs. Methylene chloride and acetone were detected, but at levels suggesting laboratory contamination. Trench OHT-3B was located approximately 100 ft south of trench OHT-2 and 75 ft west of trench OHT-3, both excavated in November 1991. The area had high concentrations of chlorobenzene and xylene and moderate concentrations of benzene in the soil gas samples. A sample was taken from the 10-11 ft depth in the trench; no VOCs (other than methylene chloride and acetone) or TICs were found in this sample.

OHT-4B was dug along Tow Path Road opposite Whites Road in an area of high chlorobenzene and xylene levels in the soil gas. Sample OHTB-4, collected from a depth of 12-13 ft, had no VOCs other than methylene chloride and acetone and no TICs in the reanalyzed sample. The fifth trench was constructed opposite the location of surface water sample OHSW-6, in an area where one soil gas point had high concentrations of chlorobenzene, ethylbenzene, and xylene. The sample was collected from a depth of 10-11 ft and had 0.026 mg/kg of MEK, 0.027 mg/kg of chlorobenzene, and 0.035 mg/kg of xylenes as well as methylene chloride and acetone in the reanalyzed sample. One TIC, an unknown terpene at 0.068 mg/kg, was also found in the sample.

Trench OHT-6B was dug between two private homes on the west side of the canal. This trench location was selected based on the recommendation of the on-site NYSDEC

representative. Sample OHTB-6, collected from a depth of 6 ft, had no TICs and an estimated quantity of 0.002 mg/kg of tetrachloroethylene. Acetone and methylene chloride were also detected, but are most likely associated with laboratory contamination. OHT-7B was dug opposite the yacht club, approximately 300 ft northwest of Tow Path Road. It is the point of the canal's maximum width. Sample OHTB-7 was collected from a depth of 8 ft; an MS/MSD was also taken from this location. The sample had 71 mg/kg of toluene, 29 mg/kg of ethylbenzene, and 190 mg/kg of xylenes. The sample also had 8.7 mg/kg of methylene chloride; although also found in the blank, the concentration is too high to be attributed to laboratory contamination alone. The MS and MSD results indicated lower levels of all compounds. The combination of the toluene, ethylbenzene, and xylenes in the sample is most likely indicative of gasoline contamination or other fuel products. OHT-8B was dug opposite the peninsula, approximately 100 ft northeast of three private homes. This location was selected because of the finding of high concentrations of tetrachloroethylene in the soil gas. Sample OHTB-8, collected from a depth of 4-5 ft, had an estimated quantity of 0.005 mg/kg of toluene and 0.009 mg/kg of chlorobenzene. Methylene chloride and acetone were also detected, but are most likely due to laboratory contamination. One TIC, an unknown terpene, was found at a concentration of 0.019 mg/kg.

Trench OHT-9B was dug opposite the southern end of the peninsula, approximately 200 ft north of trench OHT-6 dug in November 1991. The location of this trench was based on the finding of high concentrations of chlorobenzene, ethylbenzene, and xylene in the soil gas. Sample OHTB-9 was collected from a depth of 12 ft, where a drum was also found and sampled (OHTB-9-D1). The waste sample had 0.068 mg/kg of toluene, 0.044 mg/kg of chlorobenzene, and an estimated quantity of benzene and xylenes at 0.002 and 0.007 mg/kg, respectively. The sample also had methylene chloride and acetone, which were also detected in the blank, indicative of laboratory contamination. The sample had three TICs totaling 0.047 mg/kg. The drum sample was run using a medium level analysis; it had to be diluted to determine the quantities of some of the compounds. The diluted sample had 55,000 mg/kg of methylene chloide, 190,000 mg/kg of acetone, and 530,000 mg/kg of toluene. Methylene chloride and acetone were also detected in the blank, but at these levels cannot be attributed entirely to laboratory contamination. The toluene level represents a 53% concentration, indicating an almost pure product. The undiluted sample had 1900 mg/kg of benzene.

Benzene and toluene are often found together; in fact, toluene is used to manufacture benzene (Ref. 41). TICs detected in the undiluted sample totaled 157,000 mg/kg, mostly alkanes. The diluted sample had no TICs.

Trench OHT-10B was dug 100 ft northeast of trench OHT-9 and 150 ft southwest of trench OHT-8, both dug in November 1991, in an area where high concentrations of chlorobenzene, toluene, and xylene were found in the soil gas. The sample was collected from a depth of 12 ft and had 0.036 mg/kg of toluene, 0.022 mg/kg of xylenes, and estimated quantities of benzene (0.003 mg/kg) and chlorobenzene (0.007 mg/kg). Methylene chloride and acetone were also found in the sample, but are most likely associated with laboratory contamination. TICs totaling 0.037 mg/kg were detected in the sample. The next trench, OHT-11B, was dug 100 ft southwest of the November 1991 trench (OHT-9) and a sample was collected from a depth of 16 ft. This location was also selected because of the finding of high concentrations of chlorobenzene, toluene, and xylene in the soil gas. The sample had methylene chloride and acetone, which are probably associated with laboratory contamination; 0.083 mg/kg of MEK; 0.350 mg/kg of toluene; 0.110 mg/kg of chlorobenzene; and 0.026 mg/kg of xylenes. The reanalyzed sample had estimated quantities of chloroform (0.003 mg/kg), benzene (0.005 mg/kg), and ethylbenzene (0.003 mg/kg). The toluene value exceeded the calibration range of the instrument and may in fact be higher. The reanalyzed sample had 0.104 mg/kg of TICs.

Trench OHT-12B was dug west of leachate sample OHL-4 on the west side of Tow Path Road in an area where high concentrations of chlorobenzene, ethylbenzene, toluene, and xylene were found in the soil gas. Sample OHTB-12, collected from a depth of 12 ft, had 0.020 mg/kg of chlorobenzene, 0.063 mg/kg of xylenes, and estimated quantities of MEK at 0.009 mg/kg and toluene at 0.003 mg/kg along with methylene chloride and acetone. TICs found in the sample totaled 0.031 mg/kg. OHT-13B was dug on the west side of Tow Path Road approximately 150 ft north of the intersection of Clam Steam Road in an area where high levels of benzene, chlorobenzene, toluene, and xylene were detected in the soil gas. The sample was collected from a depth of 16-17 ft and had 0.021 mg/kg of benzene, 0.016 mg/kg of toluene, and 0.051 mg/kg of xylenes as well as methylene chloride and acetone, the latter two associated with laboratory contamination. No TICs were found in this sample. The MS and MSD samples collected at this location had similar quantities except for the finding of

6.5 mg/kg of ethylbenzene in the MSD sample, which was not detected in either the MS or the sample.

Trench OHT-14B was dug southeast of the Clam Steam Restaurant, approximately 50 ft from the river. This location was selected because of the finding of relatively high levels of benzene, chlorobenzene, toluene, and xylenes in the soil gas. A sample (OHT-14) was collected at a depth of 17 ft, where a drum was found and also sampled (OHT-14-D1). The waste sample had no VOCs (other than methylene chloride and acetone) and no TICs. The drum sample had 8.7 mg/kg of MEK, 11.0 mg/kg of toluene, 9.6 mg/kg of ethylbenzene, and 42.0 mg/kg of xylenes. Estimated quantities of 1,2-dichloroethylene at 0.15 mg/kg, 1,1,1-trichloroethane at 0.6 mg/kg, trichloroethylene at 0.17 mg/kg, benzene at 0.33 mg/kg, and tetrachloroethylene at 0.25 mg/kg were also found in the drum sample. Except for the benzene, all are chlorinated solvents. Methylene chloride and acetone were also detected in the sample, but the acetone concentration (3.6 mg/kg) is too high to be associated only with laboratory contamination. TICs in the drum sample totaled 134.7 mg/kg and consisted mostly of aromatic hydrocarbons.

OHT-15B was dug at the southern end of the site near the double telephone poles where relatively high concentrations of tetrachloroethylene were found in the soil gas. A sample (OHTB-15) was collected from a depth of 14 ft; a drum found at a depth of 13 ft was also sampled (OHTB-15-D1). The waste sample had 0.017 mg/kg of MEK and an estimated quantity of chlorobenzene at 0.007 mg/kg as well as acetone and methylene chloride, which were found in the blank. No TICs were found in this sample. The drum sample was analyzed using a medium level analysis; the sample had to be diluted because the toluene concentration exceeded the calibration range of the instrument. The diluted sample had 65,000 mg/kg of toluene, 950 mg/kg of ethylbenzene, and 3600 mg/kg of xylenes as well as methylene chloride at 750 mg/kg and acetone at 1300 mg/kg. The latter two compounds were also found in the blank, indicating that a portion of the concentration may be due to laboratory contamination. The undiluted sample had 250 mg/kg of 4-methyl-2-pentanone, also known as methyl isobutyl ketone (MIBK), and an estimated quantity of tetrachloroethylene at 18 mg/kg. MIBK is used as a solvent (Ref. 51). No TICs were found in the drum sample.

The final trench, OHT-16B, was dug 200 ft north of surface water sample OHSW-4 and 300 ft southwest of surface water sample OHSW-5. The area is off the peninsula and near the bay area where PCBs were detected in the sampling effort. Sample OHTB-16, collected at a depth of 6 ft, had an estimated quantity of 0.005 mg/kg toluene as well as methylene chloride and acetone, associated with laboratory contamination. No TICs were found in this sample.

4.6.7.2 ***Semivolatile Organic Compounds.*** The sample from trench OHT-1B had estimated quantities of 1,4-dichlorobenzene at 0.062 mg/kg, naphthalene and naphthalenelike substances at 0.104 mg/kg, and PAHs at 0.66 mg/kg. PAHs are normally associated with petroleum and asphalt products and 1,4-dichlorobenzene is used mainly as an air deodorant and insecticide (Ref. 51). Bis(2-ethylhexyl)phthalate was found at a concentration of 0.72 mg/kg; it was also found in the blank, however, and its presence is most likely due to laboratory contamination. TICs in this sample totaled 37.8 mg/kg and consisted mostly of unknowns and high carbon content alkanes. Sample OHTB-2 had estimated quantities of naphthalene (0.032 mg/kg), PAHs (0.97 mg/kg), and bis(2-ethylhexyl)phthalate at 0.41 mg/kg; the latter was also found in the blank. TICs in this sample totaled 18.000 mg/kg.

OHTB-3 had only one semivolatile target compound, bis(2-ethylhexyl)phthalate, at an estimated concentration of 0.034 mg/kg, most likely due to laboratory contamination since it was also detected in the blank. TICs totaling 4.880 mg/kg were found in this sample. The total PAHs detected in sample OHTB-4 were 1.202 mg/kg; bis(2-ethylhexyl)phthalate was found at a concentration of 0.086 mg/kg. Sample OHTB-5 had 0.027 mg/kg of naphthalene, 0.480 mg/kg of PAHs, 0.088 mg/kg of n-nitrosodiphenylamine (all at estimated concentrations), and 0.64 mg/kg of bis(2-ethylhexyl)phthalate, which is due to laboratory contamination. The total of TICs in this sample was 20.110 mg/kg.

OHTB-6 had an estimated bis(2-ethylhexyl)phthalate concentration of 0.034 mg/kg, probably associated with laboratory contamination. TICs totaled 8.43 mg/kg in this sample. OHTB-7 had 0.55 mg/kg of naphthalene and 2.1 mg/kg of bis(2-ethylhexyl)phthalate, both at an estimated concentration. TICs were found in this sample at a total concentration of 313.400 mg/kg. OHTB-8 had 0.11 mg/kg of 1,4-dichlorobenzene, 0.085 mg/kg of naphthalene, and

0.124 mg/kg of PAHs, all at estimated concentrations. Bis(2-ethylhexyl)phthalate was also found, at 0.22 mg/kg, but its finding is most likely due to laboratory contamination. TICs in this sample totaled 31.410 mg/kg.

Sample OHTB-9 had 0.077 mg/kg of 1,4-dichlorobenzene, 0.101 mg/kg of naphthalene and naphthalenelike substances, 0.430 mg/kg of PAHs, and 1.601 mg/kg of PAEs, of which 1.4 mg/kg was bis(2-ethylhexyl)phthalate, probably due to laboratory contamination. PAEs are often found in landfills because of their association with plastics and plasticizers. The sample also had 76.490 mg/kg of TICs. The drum sample at this location, OHTB-9-D1, had no semivolatiles and 4200 mg/kg of TICs.

Sample OHTB-10 from trench OHT-10B had 0.04 mg/kg of 1,4-dichlorobenzene, 0.212 mg/kg of naphthalene and naphthalenelike substances, 0.223 mg/kg of PAHs, and 0.0.169 mg/kg of PAEs. TICs totaling 34.150 mg/kg were found in this sample. OHTB-11 had 0.28 mg/kg of 1,4-dichlorobenzene, 1.454 mg/kg of naphthalene and naphthalenelike substances, 0.04 mg/kg of n-nitrosodiphenylamine, and 0.668 mg/kg of PAHs. TICs in this sample totaled 19.590 mg/kg. All of the results in these last two samples were at estimated quantities.

OHTB-12 had 0.35 mg/kg of 1,4-dichlorobenzene, 0.055 mg/kg of 1,2-dichlorobenzene, 0.587 mg/kg of naphthalene and naphthalenelike substances, and 0.220 mg/kg of PAHs, all at estimated concentrations. 1,2-Dichlorobenzene is used as a process solvent in the manufacture of toluene diisocyanate, and as an intermediate in the synthesis of dyestuffs, herbicides, and degreasers (Ref. 51). A total of 21.730 mg/kg of TICs was found in this sample. OHTB-13 had 0.12 mg/kg of 1,4-dichlorobenzene, 0.182 mg/kg of naphthalene and naphthalenelike substances, 0.031 mg/kg of PAHs, and 0.367 mg/kg of PAEs; 0.21 mg/kg is due to laboratory contamination by bis(2-ethylhexyl)phthalate. TICs were found at a total concentration of 21.690 mg/kg. The MS and MSD results from this sample showed similar levels of contaminants.

OHTB-14 had only 0.570 mg/kg of PAHs and 47.700 mg/kg of TICs, all at estimated quantities. The drum sample from this location, OHTB-14-D1, had 570 mg/kg of naphthalene and naphthalenelike substances, 270 mg/kg of n-nitrosodiphnylamine, and 82 mg/kg of PAHs,

all at estimated quantities. TICs in the drum sample totaled 86,100 mg/kg, mostly high carbon chain aliphatics. OHTB-15 had 0.120 mg/kg of 1,2-dichlorobenzene, 0.196 mg/kg of PAHs, and 0.220 mg/kg of PAEs, all at estimated concentrations. TICs totaled 15.840 mg/kg in this sample. A drum sample was also collected at this location. The sample, OHTB-15-D1, had an estimated concentration of 4.5 mg/kg of di-n-butyl phthalate, a PAE, and 10,810 mg/kg of TICs. Sample OHTB-16 had 0.045 mg/kg of bis(2-ethylhexyl)phthalate and 9.690 mg/kg of TICs.

4.6.7.3 ***Pesticides/PCBs.*** Sample OHTB-1 had several pesticides, including 4,4'-DDE at 0.008 mg/kg, 4,4'-DDD at 0.021 mg/kg, and endosulfan sulfate at 0.008 mg/kg; PCBs totaled 0.63 mg/kg. OHTB-2 also had low concentrations of several pesticides (0.005 mg/kg of 4,4'-DDD, 0.004 mg/kg of endrin aldehyde, and 0.004 mg/kg of alpha-chlordane) and one PCB (Aroclor 1242) at 0.130 mg/kg. Samples OHTB-3 and -4 had no pesticides or PCBs, whereas OHTB-5 had one pesticide, 4,4'-DDD, at 0.003 mg/kg and one PCB, Aroclor 1248, at 0.037 mg/kg. OHTB-6 had two pesticides, 4,4'-DDD at 0.003 mg/kg and alpha-chlordane at 0.001 mg/kg, and one PCB, Aroclor 1254, at 0.037 mg/kg. OHTB-7 had a fairly wide distribution of pesticides, totaling 0.0.023 mg/kg, as well as a fairly high concentration of PCBs, totaling 0.376 mg/kg.

OHTB-8 had 0.098 mg/kg of Aroclor 1242 and 0.002 mg/kg of 4,4'-DDD. Two samples were collected at test trench location OHT-9B. The first sample, collected at a depth of 12 ft, had a total of 0.029 mg/kg of pesticides and 0.226 mg/kg of PCBs; the second sample, collected at a depth of 14 ft, had one pesticide, 4,4'-DDD, at 0.10 mg/kg, and one PCB, Aroclor 1242, at 0.190 mg/kg. The drum sample taken at this location had no pesticides or PCBs. OHTB-10 had one pesticide, 4,4'-DDD, at 0.003 mg/kg, and two PCB Aroclors, 1242 and 1260, at 0.054 and 0.039 mg/kg, respectively.

OHTB-11 had low levels of pesticides totaling 0.021 mg/kg and PCBs totaling 0.085 mg/kg; OHTB-12 had 0.005 mg/kg of total pesticides and 0.071 mg/kg of total PCBs. Pesticides found in sample OHTB-13 included 4,4'-DDD and alpha- and gamma-chlordane, with a total concentration of 0.019 mg/kg; three PCB Aroclors were also detected in this sample (1242,

1254, and 1260), with a total concentration of 0.439 mg/kg. The MS and MSD results taken from this sample indicated fairly good correlation.

The drum sample taken from trench OHT-14B had no pesticides or PCBs; however, the waste sample taken from the same location had 0.016 mg/kg of 4,4'-DDE, 0.066 mg/kg of endosulfan II, and 0.031 mg/kg of Aroclor 1242. Pesticides detected in the waste sample at trench location OHT-15B were 4,4'-DDE at 0.003 mg/kg and 4,4'-DDD at 0.003 mg/kg; PCBs totaled 0.046 mg/kg at this location. Neither pesticides nor PCBs were detected in the drum sample. Pesticides in the last trench sample, OHTB-16, totaled 0.028 mg/kg; there were no PCBs.

4.6.7.4 ***Metals and Cyanide.*** The sample from test trench OHT-1B had high levels of iron (36,000 mg/kg), lead (112 mg/kg), and zinc (133 mg/kg). The presence of fuel-related compounds (PAHs, naphthalene, and naphthalenelike substances) in the sample could relate to the lead in the sample. Sample OHTB-2 had high levels of aluminum (13,400 mg/kg), iron (29,000 mg/kg), and zinc (436 mg/kg), and also had cadmium present at a concentration of 1.1 mg/kg. Metal water tanks were found in the trench, which probably accounts for the metals found in the waste.

OHTB-3 had moderate levels of aluminum at 3840 mg/kg and iron at 7170 mg/kg; the fact that no obvious metal waste was found during digging of the trench at this sample location is the probable explanation for the moderate levels. OHTB-4 had high levels of aluminum (15,400 mg/kg) and iron (25,900 mg/kg); a crushed metal drum in the trench may be the source of the metals. Test trench OHT-5B contained a large percentage of household metal and refrigerator parts, which accounts for the detection of high levels of aluminum (6420 mg/kg), iron (21,600 mg/kg), lead (108 mg/kg), zinc (366 mg/kg), and cadmium (1.2 mg/kg). OHTB-6 had high aluminum at 16,700 mg/kg and iron at 31,900 mg/kg, probably because of the finding of large amounts of household waste in the fill material at this location.

OHTB-7 had several metals at fairly high levels in the sample. These included aluminum at 11,100 mg/kg, iron at 44,200 mg/kg, zinc at 517 mg/kg, lead at 150 mg/kg, and cadmium at 1.9 mg/kg. The source of the metals is most likely the refuse found in the trench. OHT-8B was dug near the northeastern end of the canal and had high levels of aluminum (17,900 mg/kg),

iron (34,600 mg/kg), and zinc (468 mg/kg) in the sample. A drum was found in trench OHT-9B but not enough sample was available to run a metals analysis. Cyanide, however, was analyzed for and was not detected. The waste sample from this trench, OHTB-9, had high levels of aluminum (10,300 mg/kg), iron (57,000 mg/kg), zinc (1150 mg/kg), lead (244 mg/kg), mercury (4.1 mg/kg), cadmium (3.0 mg/kg), and cyanide (3.1 mg/kg). Metallic debris and crushed drums found in the trench are the probable source of the metals in the waste. Cyanides are used in the extraction of ores, electroplating, metal treatment, and other manufacturing processes, which tends to indicate the likely association with the metals (Ref. 51).

OHTB-10 had high levels of aluminum (7000 mg/kg) and iron (17,000 mg/kg), most likely due to the finding of metallic waste and several crushed drums in the trench. OHTB-11 also had high levels of aluminum and iron at 14,200 and 22,800 mg/kg, respectively, with the results probably due to the metallic waste found in the trench. OHTB-12 contained high quantities of aluminum at 13,800 mg/kg, iron at 26,300 mg/kg, and zinc at 117 mg/kg. The finding of house refuse and metal in the trench is the likely source of the metals.

Trench OHT-13B contained a crushed drum as well as other refuse, which is the likely source of the high aluminum (16,600 mg/kg), iron (36,400 mg/kg), lead (113 mg/kg), and zinc (102 mg/kg) found in the sample (OHTB-13). OHTB-14 had high levels of aluminum, lead, iron, zinc, and cyanide at 16,200, 105, 33,800, 234, and 1.7 mg/kg, respectively. A drum found at this location was also sampled, but only for mercury and cyanide as there was not enough sample. These results were 0.08 and 240 mg/kg, respectively. A drum found and sampled in trench OHT-15B had high levels of iron (30,200 mg/kg), lead (1120 mg/kg), cadmium (1.6 mg/kg), and zinc (1380 mg/kg). The lead result is qualified because of the poor surrogate recoveries and duplicate correlation and is presented only to indicate that lead exists in the sample. The waste sample from this trench (OHTB-15) had high levels of aluminum (15,200 mg/kg), iron (33,600 mg/kg), lead (174 mg/kg), cadmium (1.0 mg/kg), zinc (173 mg/kg), and cyanide (1.3 mg/kg).

4.6.7.5 ***Miscellaneous Analyses.*** As noted previously, the waste samples and drum samples collected from the trenches were analyzed for the TCLP organics and inorganics and the

hazardous waste characteristics of ignitability, reactivity, and corrosivity. With the exception of the drum sample (OHTB-9-D1) from trench OHT-9B, none of the samples had TCLP organics exceeding the regulatory level. OHTB-9-D1 had benzene at a concentration of 3 mg/l, which exceeded the limit of 0.5 mg/l. The drum sample originally had 1900 mg/kg of benzene. It should be noted that this drum had over 53% toluene, but toluene is not on the regulatory list of TCLP volatiles. In addition, with the exception of the drum sample collected from trench OHT-14B, no TCLP metals were detectable. The drum sample, OHTB-14-D1, had 16.0 mg/l of TCLP lead, which exceeds the limit of 5 mg/l. The actual sample could not be analyzed for lead because there was not enough sample.

All of the samples from the 1992 trenches, including the drum samples, had flash points of <140°F, with results ranging from a low of 70°F in drum sample OHTB-15-D1 to a high of 128°F in the samples from OHTB-3, -12, and -16. Most of the results were in the 100-128°F range. Flash point is the minimum temperature at which sufficient vapor is given off to form an ignitable mixture with the air near the surface of the liquid or within the vessel used. A source of ignition must be provided for the mixture to flash. By RCRA definition, a substance is considered ignitable if it is a liquid and has a flash point of <140°F. If it is a solid, it is considered ignitable if it is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture, or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard (Ref. 52). It should be noted that there was insufficient sample in OHTB-9-D1 to run flash point. Because the drum contained over 53% toluene, and toluene has a flash point of 40°F, it is highly likely that the sample would have had a flash point approaching 40°F. Only two of the samples (potentially OHTB-9-D1 and -15-D1) had flash points at room temperature (70°F or less).

In accordance with the 6NYCRR Part 371 Regulations, none of the samples tested can be defined as hazardous due to ignitability.

None of the samples showed any reaction or contained reactive cyanide or sulfide in quantities exceeding the 250 mg/kg limits for cyanide and 500 mg/kg for sulfide. None of the samples were corrosive, i.e., pH >12 or <2.

4.6.8 Soil Gas Water Data

As described in Section 3.5, 413 soil gas points were installed on the Tow Path Road Landfill site. Of these, 80 were installed below the water table, within the canal refuse. A sample of the water in each of these points was collected and analyzed for VOCs by the on-site mobile laboratory. Although the quality assurance/quality control (QA/QC) was not of the same level as that required for the TCL and TAL analyses, the data are useful in terms of assessing the quality of the water contained within the canal and in contact with the refuse. These data are presented in Table 4-13, which also shows the groundwater standards for a rough comparison only. Exceedances of the groundwater standard for benzene of 0.7 µg/l occurred in eight of the samples, with results ranging from 6.5 µg/l in OHSG-75 to 280 µg/l in OHSG-217. Xylenes above the standard of 5 µg/l were also found at eight locations and ranged in concentration from 21 µg/l at OHSG-119 to 3100 µg/l at OHSG-120. Toluene and ethylbenzene were found above the standard of 5 µg/l for each compound in two and three samples, respectively. The chlorinated solvents, tetrachloroethylene, trichloroethylene, and 1,2-dichloroethylene, were found above the groundwater standard of 5 µg/l for each compound in one sample, OHSG-118. Chlorobenzene was found above the groundwater standard of 5 µg/l in a majority of samples (41), with results ranging from a low of 7.0 µg/l in OHSG-269 to a high of 2100 µg/l in OHSG-130. A leachate seep sample, OHL-6, taken in the vicinity of soil gas point OHSG-130, showed toluene, chlorobenzene, and benzene. The water sample from OHSG-130 had low levels of benzene and ethylbenzene, moderate levels of xylenes, and high levels of chlorobenzene, indicative of a correlation between the water in the fill and the quality of the leachate. No other soil gas water samples were taken near leachate seeps to provide a comparison.

TABLE 4-13 (Page 1 of 5)

WATER FROM SOIL GAS POINTS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-6	OHSG-10	OHSG-12	OHSG-21	OHSG-23	OHSG-24	OHSG-25	OHSG-26	NYSDEC CLASS GA STANDARDS
VOLATILE ORGANICS (ug/l)									
Benzene	ND	ND	BQL	ND	BQL	ND	ND	ND	0.7
Chlorobenzene	30	ND	30	ND	39	53	16	12	5.0

PARAMETER	OHSG-30	OHSG-37	OHSG-64	OHSG-70	OHSG-72	OHSG-73	OHSG-75	OHSG-79	NYSDEC CLASS GA STANDARDS
VOLATILE ORGANICS (ug/l)									
Benzene	ND	ND	BQL	BQL	42	BQL	6.5	29	0.7
Chlorobenzene	28	ND	ND	ND	ND	ND	ND	ND	5.0

ND - Not detected at analytical detection limit (Ref. 43).
BQL - Compound detected below minimum quantitation limit.

TABLE 4-13 (Page 2 of 5)

WATER FROM SOIL GAS POINTS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-84	OHSG-89	OHSG-100	OHSG-102	OHSG-104	OHSG-105	OHSG-114	OHSG-116	NYSDEC CLASS GA STANDARDS
VOLATILE ORGANICS (ug/l)									
Benzene	ND	BQL	BQL	BQL	BQL	BQL	ND	13	0.7
Chlorobenzene	ND	ND	19	200	150	350	73	20	5.0
Xylene (total)	ND	ND	ND	ND	ND	ND	ND	180	5.0

PARAMETER	OHSG-118	OHSG-119	OHSG-120	OHSG-124	OHSG-126	OHSG-127	OHSG-128	OHSG-130	NYSDEC CLASS GA STANDARDS
VOLATILE ORGANICS (ug/l)									
1,2-Dichloroethane	170	ND	ND	ND	ND	ND	ND	ND	5.0
Trichloroethylene	17	ND	ND	ND	ND	ND	ND	ND	5.0
Benzene	ND	ND	8.2	ND	31	ND	BQL	BQL	0.7
Tetrachloroethylene	24	ND	BQL	ND	ND	ND	ND	ND	5.0
Chlorobenzene	60	ND	62	22	57	ND	9.0	2,100	5.0
Ethylbenzene	17	ND	29	ND	ND	ND	ND	27	5.0
Xylene (total)	40	21	3,100	ND	98	ND	ND	430	5.0

ND - Not detected at analytical detection limit (Ref. 43).
BQL - Compound detected below minimum quantitation limit.

TABLE 4-13 (Page 3 of 5)

WATER FROM SOIL GAS POINTS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-137	OHSG-138	OHSG-142	OHSG-143	OHSG-146	OHSG-148	OHSG-149	OHSG-150	NYSDEC CLASS GA STANDARDS
VOLATILE ORGANICS (ug/l)									
Benzene	ND	BQL	ND	ND	ND	ND	ND	ND	0.7
Chlorobenzene	ND	76	ND	38	30	32	11	ND	5.0

PARAMETER	OHSG-152	OHSG-153	OHSG-154	OHSG-158	OHSG-164	OHSG-166	OHSG-168	OHSG-169	NYSDEC CLASS GA STANDARDS
VOLATILE ORGANICS (ug/l)									
Chlorobenzene	18	ND	ND	8.7	ND	13	21	15	5.0

ND - Not detected at analytical detection limit (Ref. 43).
BQL - Compound detected below minimum quantitation limit.

TABLE 4-13 (Page 4 of 5)

WATER FROM SOIL GAS POINTS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-171	OHSG-172	OHSG-175	OHSG-176	OHSG-177	OHSG-182	OHSG-183	OHSG-185	NYSDEC CLASS GA STANDARDS
VOLATILE ORGANICS (ug/l)									
Chlorobenzene	ND	ND	ND	ND	11	ND	ND	ND	5.0

PARAMETER	OHSG-188	OHSG-190	OHSG-195	OHSG-199	OHSG-200	OHSG-217	OHSG-222	OHSG-227	NYSDEC CLASS GA STANDARDS
VOLATILE ORGANICS (ug/l)									
Benzene	ND	ND	ND	BQL	ND	280	21	24	0.7
Chlorobenzene	ND	ND	ND	BQL	ND	25	50	28	5.0
Ethylbenzene	ND	ND	ND	BQL	ND	ND	ND	ND	5.0
Toluene	ND	ND	ND	11	ND	230	ND	ND	5.0
Xylene (total)	ND	ND	ND	25	ND	200	ND	ND	5.0

ND - Not detected at analytical detection limit (Ref. 43).
BQL - Compound detected below minimum quantitation limit.

TABLE 4-13 (Page 5 of 5)

WATER FROM SOIL GAS POINTS DATA SUMMARY (AUGUST 1992)

Tow Path Road Landfill NYSDEC I.D. No. 546013

PARAMETER	OHSG-253	OHSG-254	OHSG-256	OHSG-257	OHSG-258	OHSG-260	OHSG-261	OHSG-263	NYSDEC CLASS GA STANDARDS
VOLATILE ORGANICS (ug/l)									
Chlorobenzene	ND	ND	ND	9.3	ND	18	15	21	5.0

PARAMETER	OHSG-264	OHSG-265	OHSG-266	OHSG-267	OHSG-268	OHSG-269	OHSG-270	OHSG-271	NYSDEC CLASS GA STANDARDS
VOLATILE ORGANICS (ug/l)									
Chlorobenzene	ND	35	ND	44	ND	7.0	37	ND	5.0

ND - Not detected at analytical detection limit (Ref. 43).
BQL - Compound detected below minimum quantitation limit.

4.7 CONCLUSIONS

This section presents conclusions of the Phase II investigation conducted for the Tow Path Road Landfill. The section is subdivided into a discussion of each medium sampled as part of the investigation.

4.7.1 Waste

Twenty-three trenches were dug as part of the Phase II investigation, with four waste samples collected from nine trenches in November 1991 and 16 waste samples collected from 16 trenches in September 1992. In 1992 three drum samples were also collected and analyzed. The conclusions of the waste sampling program are provided geographically from north to south, i.e., from the Route 9 bridge to the I-87 bridges.

Test trench sample OHTB-1, collected in 1992, had low levels of chlorobenzene, which was also found in high levels in the soil gas point (OHSG-51) at this location. The sample also had low levels of PAHs, 1,4-dichlorobenzene, naphthalene and naphthalenelike substances, several pesticides, PCBs, and high levels of iron, lead, and zinc. The high levels of lead may be related to possible gasoline or other fuel contamination, as indicated by the naphthalene and naphthalenelike substances.

Test trench sample OHTB-2, collected in 1992, was dug in an area where high levels of aromatic hydrocarbons were detected during the soil gas survey (OHSG-60 and -61). The sample had only chlorobenzene; none of the other aromatics were present in the sample. The sample had low levels of PAHs, naphthalene, several pesticides, and PCBs as well as high levels of aluminum, iron, cadmium, and zinc.

The sample from test trench OHT-4, collected in 1991, had over 3.5% toluene; the sample was taken from and around a drum (labeled GE) that smelled strongly of toluene and contained a rubbery substance. The sample contained other aromatics (benzene, ethylbenzene, and xylenes) at fairly high levels, but no chlorobenzene. The soil gas point (OHSG-71) installed in 1992 at this location had high benzene, chlorobenzene, and xylenes

but no toluene. It should be noted that the drum containing the toluene waste was overpacked and placed in test trench OHT-7 in 1991. No sample was obtained from trench OHT-7, and the soil gas point (OHSG-310) drilled near OHT-7 had no aromatics detected in the sample, indicating that the overpack was retaining the waste material. Sample OHT-04-A also had low levels of PAHs; their presence was most likely associated with coal tars and low levels of PAEs, which are present in the form of plastics and plasticizers. Also found in this sample were naphthalene and naphthalenelike substances, possibly the result of diesel fuel, and 4-methylphenol, which is a disinfectant. This sample had low levels of PCBs some metals contamination, chiefly iron and aluminum, and no RCRA hazardous characteristics or metals or organics that were EP toxic. Test trench OHT-4 was situated in the vicinity of surface water/sediment sample OHSW-7/OHSD-7. There is no correlation between the high concentration of toluene and other VOCs in the waste sample and what was found in the surface water/sediment near this location, indicating that the VOCs are not leaching into the river at this point. However, the presence of bis(2-ethylhexyl)phthalate in both the waste and the sediment may be indicative of some correlation.

The sample from test trench OHT-2, collected in 1991, had low levels of PAHs and PAEs as well as 4-methyphenol, naphthalene and naphthalenelike substances, and 1,4-dichlorobenzene, which is used as an air deodorant and insecticide. The sample also contained low levels of PCBs and an insecticide (4,4'-DDD), possibly an explanation of the presence of the 1,4-dichlorobenzene. The sample had high levels of iron and aluminum, most likely due to a crushed drum in the vicinity of the sample. No RCRA characteristic or EP toxic chemicals were found in the sample. The soil gas points (OHSG-88 and -89) installed at this location in 1992 had low levels of aromatics, although the test trench sample indicated no aromatics.

Test trench sample OHTB-3, collected in 1992, had no organics not also detected in the blank, but had high levels of aluminum and iron; the soil gas point (OHSG-90) installed at this location had very high (25,000 $\mu g/m^3$) levels of chlorobenzene. OHTB-4, collected in 1992, also had no VOCs not also detected in the blank, but did have high PAHs, aluminum, and iron in the sample. The soil gas point (OHSG-97) had high levels of chlorobenzene and xylenes.

Sample OHTB-5, collected in 1992, had low levels of MEK, chlorobenzene, xylenes, naphthalene, PAHs, n-nitrosodiphenylamine, PCBs, pesticides, aluminum, iron, lead, zinc, and cadmium; the soil gas point (OHSG-122) near this location had very high quantities of chlorobenzene, ethylbenzene, and xylenes. The sample at test trench OHT-6B, collected in 1992, had low levels of tetrachloroethylene, PCBs, pesticides, aluminum, and iron in the sample. The soil gas point (OHSG-141) also had high levels of tetrachloroethylene (2800 $\mu g/m^3$).

Test trench sample OHTB-7, collected in 1992, was located near soil gas point OHSG-207, where high levels of aromatics, including chlorobenzene, ethylbenzene, and xylenes were found. The sample had the highest levels of aromatics found in any nondrum sample: toluene, ethylbenzene, and xylenes. Other compounds found included low levels of naphthalene, PCBs, and pesticides and moderate aluminum, iron, zinc, lead, and cadmium.

Test trench sample OHTB-8, collected in 1992, had low levels of toluene, chlorobenzene, 1,4-dichlorobenzene, naphthalene, PAHs, PCBs, pesticides, aluminum, iron, and zinc. The soil gas point (OHSG-228) at this location had moderate levels of tetrachloroethylene and low levels of trichloroethylene and 1,1,1-trichloroethane.

Test trench OHT-1 was dug in 1991 near the bay by the peninsula in an area of ponded leachate. The sample from this location had high levels of PAHs, with dibenzofuran (indicative of coal tars), PAEs (indicating the presence of plastics and plasticizers in the waste), naphthalene and naphthalenelike substances (indicative of diesel fuel), and phenol (which may indicate the presence of disinfectant or medical products). Sample OHT-01-A had the highest levels of semivolatiles of any of the waste samples collected and the highest quantity of PCBs. The sample had high levels of iron, manganese, aluminum, mercury, and zinc. The iron was almost an order of magnitude higher than the next closest 1991 waste sample. The manganese and zinc concentrations were approximately four times higher than the next closest 1991 waste sample; mercury was not found in any of the other 1991 waste samples. The sample was not EP toxic for any organics or metals and did not contain any RCRA hazardous characteristics. Surface water samples OHSW-4 and -5, sediment samples OHSD-4 and -5, and leachate sample OHL-5 were located in the general vicinity of this waste

sample. The sediment contained semivolatiles similar in composition to those found in the waste sample, i.e., PAHs with dibenzofuran and naphthalene and naphthalenelike substances. This could indicate that some of the waste material from this general area is being leached into the river. OHSD-5 had the highest iron, manganese, and aluminum values, showing a possible similarity with the waste sample. Surface water samples OHSW-3 and -5 and sediment sample OHSD-5 contained mercury, which was also found in the waste sample. Leachate sample OHL-5 also had moderately high iron and high manganese and aluminum. Soil gas points (OHSG-248 and -250) installed at this location in 1992 had no aromatic hydrocarbons even though the test trench sample had low levels of toluene, ethylbenzene, xylenes, and chlorobenzene.

Soil gas point OHSG-265 was drilled near test trench sample OHTB-16, which was collected in 1992. The waste sample had low levels of toluene, PAEs, pesticides, aluminum, and iron; the soil gas point had low levels of chlorobenzene.

Test trench sample OHTB-9, collected in 1992, was collected near soil gas point OHSG-301, where high levels of chlorobenzene, ethylbenzene, and xylenes were detected. The waste sample had low levels of benzene, toluene, chlorobenzene, xylenes, 1,4-dichlorobenzene, naphthalene, PAHs, PAEs, PCBs, pesticides, aluminum, iron, zinc, lead, mercury, cadmium, and cyanide. A second sample was collected and analyzed for pesticides/PCBs only; this sample, collected at a depth of 14 ft, had low levels of PCBs and pesticides. A drum was also found in the test trench and analyzed. The sample had extremely high, i.e., 53%, toluene, and high levels of MEK and benzene; it also had levels of TCLP benzene that exceeded the EPA standard.

Test trench OHT-8, dug in 1991, was situated along the north side of Tow Path Road west of the "No Dumping" sign. It had low levels of PAEs, 1,4-dichlorobenzene, and benzoic acid as well as low levels of iron, manganese, and aluminum. No RCRA hazardous characteristics were found nor were any compounds determined to be EP toxic. The trench was located upstream of OHSW-5/OHSD-5 and downstream of OHSW-2/OHSD-2 and OHL-4. There does not appear to be any real correlation between these three samples and the waste

material. The soil gas points (OHSG-324 and -328) installed in 1992 at this location had no aromatics, although toluene was found in the waste sample.

OHTB-10, collected in 1992, had low levels of benzene, toluene, chlorobenzene, xylenes, 1,4-dichloroethylene, naphthalene, PAHs, PAEs, PCBs, pesticides, aluminum, and iron. The soil gas point (OHSG-332) at this location had moderate levels of benzene, chlorobenzene, toluene, and xylenes. Test trench sample OHTB-11, collected in 1992, had low levels of MEK, benzene, toluene, chlorobenzene, ethylbenzene, xylenes, 1,4-dichlorobenzene, naphthalene, n-nitrosodiphenylamine, PAHs, PCBs, pesticides, aluminum, and iron. The soil gas point installed at this location (OHSG-341) had high levels of toluene and tetrachloroethylene.

Test trench sample OHTB-12, collected in 1992, had low levels of MEK, toluene, chlorobenzene, xylenes, dichlorobenzenes, naphthalene, PAHs, PCBs, pesticides, aluminum, iron, and zinc. Soil gas points OHSG-349 and -350 were installed in the vicinity of this test trench and had high levels of benzene, ethylbenzene, toluene, and xylenes and very high (36,000 and 49,000 $\mu g/m^3$) levels of chlorobenzene and tetrachloroethylene, respectively. It is interesting to note that no tetrachloroethylene was found in the sample even though the sample was collected at the bottom of the canal.

Test trench sample OHTB-13 was collected in 1992 near soil gas point OHSG-362, which had very high levels of chlorobenzene, ethylbenzene, and xylenes and high levels of toluene. The waste sample had low levels of benzene, toluene, xylenes, 1,4-dichlorobenzene, naphthalene, PAEs, PAHs, PCBs, pesticides, aluminum, iron, lead, and zinc. Soil gas point OHSG-376 was drilled near test trench sample OHTB-14, which was collected in 1992. The waste sample had low levels of PAHs, PCBs, pesticides, aluminum, iron, lead, zinc, and cyanide; the soil gas had moderate levels of toluene. A drum found and sampled at this location had very high levels of acetone, MEK, toluene, ethylbenzene, xylenes, naphthalene, n-nitrosodiphenylamine, PAHs, cyanide, and low levels of benzene, 1,2-dichloroethylene, 1,1,1-trichloroethane, trichloroethylene, and tetrachloroethylene, and had TCLP lead that exceeded the standard.

Test trench sample OHTB-15, collected in 1992, had low levels of MEK, chlorobenzene, 1,2-dichlorobenzene, PAHs, PCBs, PAEs, pesticides, aluminum, iron, lead, cadmium, zinc, and cyanide. A drum sampled at this location had very high levels of toluene and high levels of methyl isobutyl ketone (MIBK), tetrachloroethylene, ethylbenzene, xylenes, acetone, methylene chloride, PAEs, iron, lead, cadmium, zinc, and cyanide. The soil gas point (OHSG-409) had high levels of 1,1,1-trichloroethane and tetrachloroethylene.

In addition to the four waste samples collected in 1991, other test trenches were dug in 1991 but were not sampled. An attempt was made to correlate the soil gas readings with the information available on the test trenches that were not sampled in 1991. No soil gas points were installed near test trench OHT-3. Soil gas point OHSG-18, installed in the vicinity of test trench OHT-5, had 490, 3300, and 3800 $\mu g/m^3$ of benzene, chlorobenzene, and xylenes, respectively, indicating that although the material did not appear to warrant sampling (PID readings were at background levels), there may have been some waste in the trench. OHT-6 was dug in the area of soil gas point OHSG-310, which had high levels of tetrachloroethylene (2600 $\mu g/m^3$). Soil gas point OHSG-336 near OHT-9 had high levels of toluene and xylenes.

All of the waste samples and all but one of the drum samples collected in 1992 had flash points of <140°F. One of the drum samples was not analyzed for flash point because of the insufficient amount of sample. Because this was the sample that had extremely high levels of toluene, it is suspected that the waste would have a low flash point (approximately 40°F). Most of the flash points were over the 100°F mark, with one waste sample from a drum, OHTB-15-D1, having a flash point of 70°F. This sample had high levels (65,000 mg/kg) of toluene. The flash point at some of the other locations can be attributed to the TICs found in the sample, which consisted of substituted benzenes, including trimethylbenzenes associated with fuels.

The 1991 waste samples were collected from within the trench at locations where high readings on instruments were obtained. Most of the 1992 waste samples were collected at the interface of the bottom of the canal and fill, unless a drummed waste or material that had high meter readings was encountered at a shallower depth. The objective of the deep samples was to check the interface of the waste with natural soils. Since the aromatic

hydrocarbons are not as dense as water, these compounds will tend to float, not sink, which the chlorinated solvents are prone to do. This could be a partial explanation for the lack of high levels of aromatics in most of the waste samples, especially the ones in which water was found in the trench. Another theory is that the aromatics have leached from the waste into the pore spaces in the soil and volatilized to the atmosphere once they were exposed during excavation of the trench. Conversely, the chlorinated solvents were not found at high levels in the bottom of the trench, where they would be most likely to be found because of their dense nature. The fact that the waste samples were taken at the bottom of the canal may also explain the apparent lack of correlation with the soil gas data.

Groundwater was found in four of the nine 1991 trenches and in nine of the 16 1992 trenches, at depths ranging from 1 ft in OHT-16B to 14 ft at OHT-13B. The total depth of the water (from the canal bottom to the top of the water table) varied from 1 ft at OHT-9B to 7 ft at OHT-14B. Test trenches found without water were OHT-3, -3B, -4, -6, -6B, -7, -8B, -9, -10B, -11B, -12B, and -15B. Since the canal was originally designed to hold water, the area of the canal where these latter test trenches were constructed has developed a leak, thus permitting any contamination found to possibly leach to the groundwater. This may be especially true in trenches OHT-3B, -6B, and -12B, where high levels of aromatics or chlorinated solvents were found in the soil gas and not in the waste samples. Bedrock was encountered at four locations (OHT-5B, -6B, -14B, and -15B). Water was encountered at two of these locations, indicating that the material at the bottom of the canal (silty clay) was capable of holding water.

4.7.2 Surface Water and Sediment

None of the surface water samples contained any significant volatiles or semivolatiles. PCBs were detected in several of the samples from the bay area and in the sample from west of the peninsula. The levels exceeded both the aquatic standard of 0.001 µg/l and the human health standard of 0.01 µg/l. The finding is attributed to the presence of PCBs at a fairly high concentration in a test trench located near these samples. In the metals fraction the background, upstream sample had violations of the aluminum and iron standards. Proceeding in a downstream direction, the highest quantities of metals were found in the bay area where

flow was stagnant. In general, violations of the iron and aluminum standards occurred in most samples; however, aluminum was either not detected or below the standard in the bay area samples. The bay area samples also had violations in manganese, mercury, and zinc. Beyond the bay area, the concentrations of iron and aluminum decreased from those found along the river above the bay area. Three samples were also collected perpendicular to the shoreline out into the river. In general, these samples showed decreasing concentrations of iron and manganese from the shoreline out into the river.

The sediment samples were taken at the same locations as the surface water samples and showed little VOC contamination. The background, upstream sample and the first sample taken in the vicinity of the landfill showed no detections of semivolatiles, whereas the next downstream sample had low levels of PAEs. The first sample taken from the bay area had low levels of PAEs. The second sample had PAHs, PAEs, and naphthalene and naphthalene-like chemicals. The third or easternmost sample had no detections of semivolatiles. As stated previously, the semivolatiles found in the middle sample could be related to the waste found in the trench excavated onshore near this location. Two of the remaining three sediment samples along the shoreline had no detectable semivolatiles. One sample, OHSD-7, had low levels of PAEs, which may be related to the waste found in the test trench at this location. The three samples taken perpendicular to the shoreline showed some PAHs and PAEs. Most of these compounds were not detected in the sample from along the shoreline, indicating that their presence may not be due to the landfill.

The metals in the upstream background sediment sample were very high, i.e., the second highest of all the samples collected for iron, manganese, and aluminum. The highest manganese concentration was found in the sample taken from farthest out into the river, whereas the highest iron and aluminum values were found in the sample farthest east in the bay. The iron and aluminum concentrations were 4.5 and 3 times greater, respectively, than those in the background sample. The manganese concentrations were similar for both the background sample and the offshore sample. The finding of the high concentrations of these three metals in the upstream sediment indicates an upstream source not related to the landfill. As these three metals are extremely common, it is not surprising that they are found in such high concentrations in the background sample relative to the downstream samples.

4.7.3 **Leachate**

The leachate samples showed little VOC contamination, with two samples containing benzene and/or toluene, chemicals indicative of gasoline contamination. The leachate seep containing the toluene was not in the vicinity of the waste sample that had the high toluene value. No significant semivolatiles contamination was found in any of the leachate samples taken from this site. The leachate samples tended to have high levels of iron and manganese, with some samples having other metals, such as lead, antimony, copper, mercury, and zinc.

4.7.4 **Soil Gas**

A total of 413 soil gas points were installed in August 1992 as part of the Phase II investigation. In general, two classes of compounds, aromatic hydrocarbons and chlorinated aliphatic hydrocarbons, were found in the soil gas. The former consisted of benzene, toluene, ethylbenzene, chlorobenzene, and xylenes; the latter, trichloroethylene, tetrachloroethylene, 1,1,1-trichloroethane, carbon tetrachloride, and 1,2-dichloroethylene.

High levels (>1000 $\mu g/m^3$) of aromatic hydrocarbons were found at 12 areas throughout the site. The majority of these areas had >1000 $\mu g/m^3$ each of chlorobenzene and xylenes. Based on the finding of these high levels, test trenches were dug at eight out of the 12 locations.

Chlorinated hydrocarbons were detected at low levels throughout most of the landfill, with widely scattered areas having levels over 1000 $\mu g/m^3$ of tetrachloroethylene. One of these areas was near a Tow Path Road residence, where 2800 $\mu g/m^3$ of tetrachloroethylene was found in one soil gas point. A test trench was dug near this location. Areas of high tetrachloroethylene concentrations were also found elsewhere on the site and test trenches were generally dug near these areas. The highest concentration of tetrachloroethylene (49,000 $\mu g/m^3$) was found in the southern part of the site to the north of Clam Steam Tavern; a test trench was also dug at this location.

An attempt was made to correlate the soil gas survey results with those obtained in the 1991 program. In the 1991 program leachate sample OHL-1 had 6 µg/l of chlorobenzene in the sample; the soil gas point at this location, OHSG-380, had 5700 µg/m^3 of chlorobenzene, showing good correlation. No soil gas points were installed at leachate samples OHL-2, -3, and -4. However, samples OHL-3 and -4 were downgradient of two of the areas where high levels of aromatics were found; both samples had chlorobenzene in the leachate, indicating that it is coming from the landfill. OHL-2 was located downgradient of an area of relatively low levels of aromatics and did not have any detectable concentrations in the leachate. OHL-5 was also not collected in an area where soil gas points were installed; however, the soil gas point drilled upgradient of the leachate seep had 9.3 µg/l of chlorobenzene (the point contained water; therefore, the sample was a water sample). The leachate sample had no detectable levels of chlorobenzene. OHL-6, located at the end of a culvert, had detectable levels of toluene, benzene, and chlorobenzene. Two of the soil gas points drilled in the vicinity of the culvert contained water that had benzene at levels below the minimum quantitation limit and chlorobenzene at a high of 2100 µg/l, indicating that the fill is leaching into the river. OHL-7 had low levels of chlorobenzene and was at a location where the water in the soil gas point also had low levels (25 µg/l) of chlorobenzene. OHL-8 had no detectable VOCs and the soil gas point installed at this location (OHSG-110) also had no VOCs.

In general, although the leachate data tend to indicate correlation with the soil gas survey data, the results from the test trench investigation do not appear to present a strong correlation. It is possible that the chemicals in the waste material may already be partitioned from the soil and into the void spaces in the soil, and when exposed to the air during the excavation are volatilized into the air.

4.7.5 **Soil Samples**

Eighteen soil samples were collected and analyzed on-site for PCBs during the soil gas survey. None had quantifiable levels of PCBs.

4.7.6 Soil Gas Water Data

The data acquired from the soil gas points that contained water provide an overall picture of the quality of the water confined within the canal. The data indicate that the aromatic hydrocarbons (benzene, toluene, ethylbenzene, xylenes, and chlorobenzene) are found in quantities that violate the groundwater standard. Chlorinated solvents are also found above the groundwater standard at one location. The fact that the chlorinated solvents are heavier than water and may "sink" through the water column may account for their not being found at other locations, since the soil gas points were not drilled to the bottom of the canal. The data show that where breaches in the canal bottom have occurred, i.e., in those areas where water was not found, any water entering the refuse may dissolve the contaminants and carry them into the bedrock aquifer or to the river.

4.7.7 Summary of Conclusions

The surface water and leachate data indicate metals (aluminum, iron, and manganese) typical of municipal landfill leachate but no significant quantities of volatile or semivolatile organic chemicals. The sampling results do not indicate that hazardous chemicals possibly found in the landfill are overly affecting the river. PCBs were detected in the surface water at low levels in the area of the bay. The results appear to be related to the finding of PCBs in the test trench in this area. The surface water and sediment from this area also had high mercury, which was also found in the nearby test trench. The sediment samples also have high metals concentrations, particularly aluminum, iron, and manganese; however, the second highest concentration of the three metals was found in the upstream sample, indicating a source other than the landfill is contributing to the contamination of the sediments. The low levels of semivolatiles found in some of the sediments is indicative of some leaching of contaminants from the landfill. These compounds, chiefly PAHs and PAEs, are common municipal landfill contaminants. The finding of these contaminants in the sediments out in the river could indicate that they have another source or that sediments are being scoured from the near shore out into the river.

The test trench digging in November 1991 uncovered several intact drums buried in the landfill. Only one sample indicated the presence of a hazardous substance (toluene). Because the analysis showed over 3.5% toluene in that sample, and the sample itself appeared to be a rubbery substance, disposal of nonmunicipal waste in the landfill is indicated. One waste sample had fairly high levels of PAHs with dibenzofuran, indicative of coal tars. Coal tars are used for waterproofing, pipe coatings, roads, roofing, sealants, and insulation. Compounds indicative of diesel fuel (naphthalene and naphthalenelike substances) were also detected, as were PAEs indicative of plastics and plasticizers. None of these chemicals is necessarily indicative of the disposal of hazardous waste.

The test trench sampling program conducted in September 1992 uncovered several buried drums that contained hazardous or potentially hazardous waste. Two of the samples can be classified as hazardous based on the finding of TCLP lead and benzene. High levels of toluene were found in all three drums, with one drum containing material that was over 50% toluene. There appeared to be no significant correlation between the soil gas survey results and the results from the test trenches.

The soil gas survey conducted in August 1992 indicated the presence of high levels of aromatic hydrocarbons, including benzene, toluene, ethylbenzene, xylenes, and chlorobenzene. Chlorinated solvents, especially tetrachloroethylene, were also found in fairly high concentrations in the soil gas. An attempt made to correlate the soil gas data with the August 1991 leachate and test trench sampling indicated fairly good correlation with the leachate data and little correlation with the test trench sampling.

Groundwater was found in more than half the trenches, indicating that any chemicals leaching into the water may be held within the confines of the canal and not be leaching into the groundwater. At several trenching areas no water was found within the canal; this could indicate a breach in the bottom of the canal that allows contamination to enter the groundwater. Bedrock was also encountered at several locations, suggesting a potential conduit for the contamination to enter the groundwater in the bedrock, which is used as the drinking water source for local residents.

Several water samples were collected from the soil gas points located within the refuse. These data indicate violations of groundwater standards, chiefly for the aromatic hydrocarbons. These results provide further evidence that the bedrock aquifer may be affected in areas where contamination may have seeped through the bottom of the canal.

In summary, the data and the site history from the Phase II investigation indicate that hazardous waste was disposed of in the landfill; however, there do not appear to be any large concentrations of buried drums with hazardous waste; rather, the drums, often crushed, are spread throughout the landfill. This confirms the local history of the landfill, i.e., drums were delivered and disposed of at the site, but were often crushed, with the drum and waste material inside dumped in the canal in a random matter. The hazardous waste questionnaire filled out by the Norton Company suggests that hazardous waste consisting of toluene, xylenes, MIBK, MEK, and ethyl alcohol may have been disposed of at the Tow Path Road Landfill. The fact that all of these chemicals (with the exception of ethyl alcohol, which would biodegrade very quickly) were found in portions of the landfill lends credence to this theory. The unanswered questions concern how many were dumped, the amount of hazardous waste, and to what extent the environment has been impacted. The Phase II investigation suggests that contamination may have leached into the bedrock. The leachate samples had chemicals contained in the soil gas, indicating that some of the contamination may be discharging to the river. Culverts placed in the fill to divert runoff may also be acting as natural conduits for the contamination to get into the river. Although not found in the surface water sampling program, the volatile contaminants may be diluted by the volume of river water, making them nondetectable, or they may have been volatilized to the atmosphere. Also, because of the age of the landfill, much of the contamination may already have been flushed out into the river and therefore would not be detected.

4.8 RECOMMENDATIONS

Based on the findings of the Phase II investigation of the Tow Path Road Landfill site, LMS recommends that additional studies be conducted on the site to determine the significance to the environment of any potential impacts of the hazardous wastes found in the landfill.

The following studies are suggested: a human exposure assessment, hydrogeological studies, and an aquatic assessment.

The human exposure assessment, currently proposed to be conducted by NYSDOH, will evaluate the potential impacts of the landfill on the residences near Tow Path Road. This assessment will include:

- Sampling and full chemical analysis of well water from all residences in this area that will allow sampling. After initial sampling is conducted, annual monitoring should be conducted as needed.

- Sampling of the air inside residences located on the fill or close to the areas with elevated concentrations of volatile compounds found in the soil vapor.

A hydrogeological investigation should be done to determine the impact of the waste material on the groundwater.

- LMS suggests that an investigation be conducted to determine the extent of the contamination that may have leached to the bedrock and thus into the aquifer used by the residential wells. Several options are available to do this study, including the installation of paired (overburden and bedrock) monitoring wells upgradient and downgradient of the fill material, Shelby tube sampling to determine whether a confining layer exists, piezometer installations both in and out of the fill material, and a seasonal water elevation study to determine whether contamination in the fill material is leaching out only during certain times of the year. Installation of monitoring wells downgradient of the landfill can be done only in selected sites due to (1) the proximity of the fill material to the river in combination with (2) the length of the landfill, which makes it impossible to monitor the groundwater downgradient of the entire landfill. However, several strategically placed wells may provide enough information to determine whether the bedrock aquifer is being impacted by the landfill.

  A fracture trace analysis of the bedrock may also be necessary to determine the potential pathway of contaminants from the bottom of the canal to the bedrock groundwater. A complete topographic survey of the site, including all groundwater, canal water, river water, and waste elevations, should be conducted to obtain a better understanding of the hydrogeology of the site.

  A probe sampling of the groundwater in the canal may also provide valuable information on the level of contaminants in these waters. Groundwater probes are similar in concept to soil gas sampling in that they provide an instantaneous method for sampling the groundwater. The additional advantage is that a probe can be driven to 15-25 ft and discrete samples can be collected at

different depths. At the Tow Path Road Landfill site, this will allow samples of the canal water to be collected and analyzed from the top to the bottom of the water column, and even in the areas where the level is low. The ability to collect more water will also allow for multiple analyses if needed.

An aquatic assessment should be done to determine the impact on the fauna in the river system.

- Low levels of PCBs found in the surface water collected from the bay area may have resulted from a source in the landfill that was discovered during digging of one of the test trenches near the bay area. In addition, five metals (aluminum, iron, manganese, mercury, and zinc) were detected above the aquatic surface water standards. Mercury, which has the worst environmental impact, was detected above 1 mg/kg in the bay area sediment and above the surface water guidance value for aquatic organisms in the surface water samples. Both PCBs and mercury are major bioaccumulators; because the Mohawk River and the area near the site are recreational areas with significant fishing usage, we recommend a biomonitoring sampling program to determine the possible impact on the environment.

  Prior to initiation of this program, LMS recommends a literature search of the quantity of mercury and PCBs found in the Mohawk River and the types of species that inhabit the river. Because the bay area is sheltered, some of the biota in the area will probably not be transients. LMS recommends a preliminary biota sampling collection program in which 10 to 15 samples of up to three different species would be collected from both the bay area and an upstream location. The samples would be analyzed for both PCBs and mercury. The purpose of this program is to determine the best organism to use for the biomonitoring study and to calculate the mean, standard deviation, and coefficient of variance of both population sets to calculate the number of samples required to determine whether there is a statistical difference between the two populations. Figure 4-5 is a graphical presentation of how the number of samples needed depends on the coefficient of variance (CV) and the desired percent differences (a ratio of means of 1.8 results in a difference of 80%). At that ratio (1.8) and with an assumed CV of 0.3, 70 samples at each location will have to be collected.

  It has been assumed that invertebrates, such as crayfish, and benthos inhabitants, such as worms, leeches, and insect larvae, inhabit these waters. In addition, it has been assumed that fish such as bass, bullhead, and carp also live in these waters; however, fish are most likely transient. LMS recommends the use of traps to catch crayfish, electrofishing equipment to capture the fish, and a ponar or similar type of dredge to catch the benthos. Based on the number of specimens collected, up to three separate species should be analyzed for mercury and PCBs; a graph similar to the one in Figure 4-5 should be developed for each species to determine the best one to use for the final test and the number of samples required. If the results indicate a significant

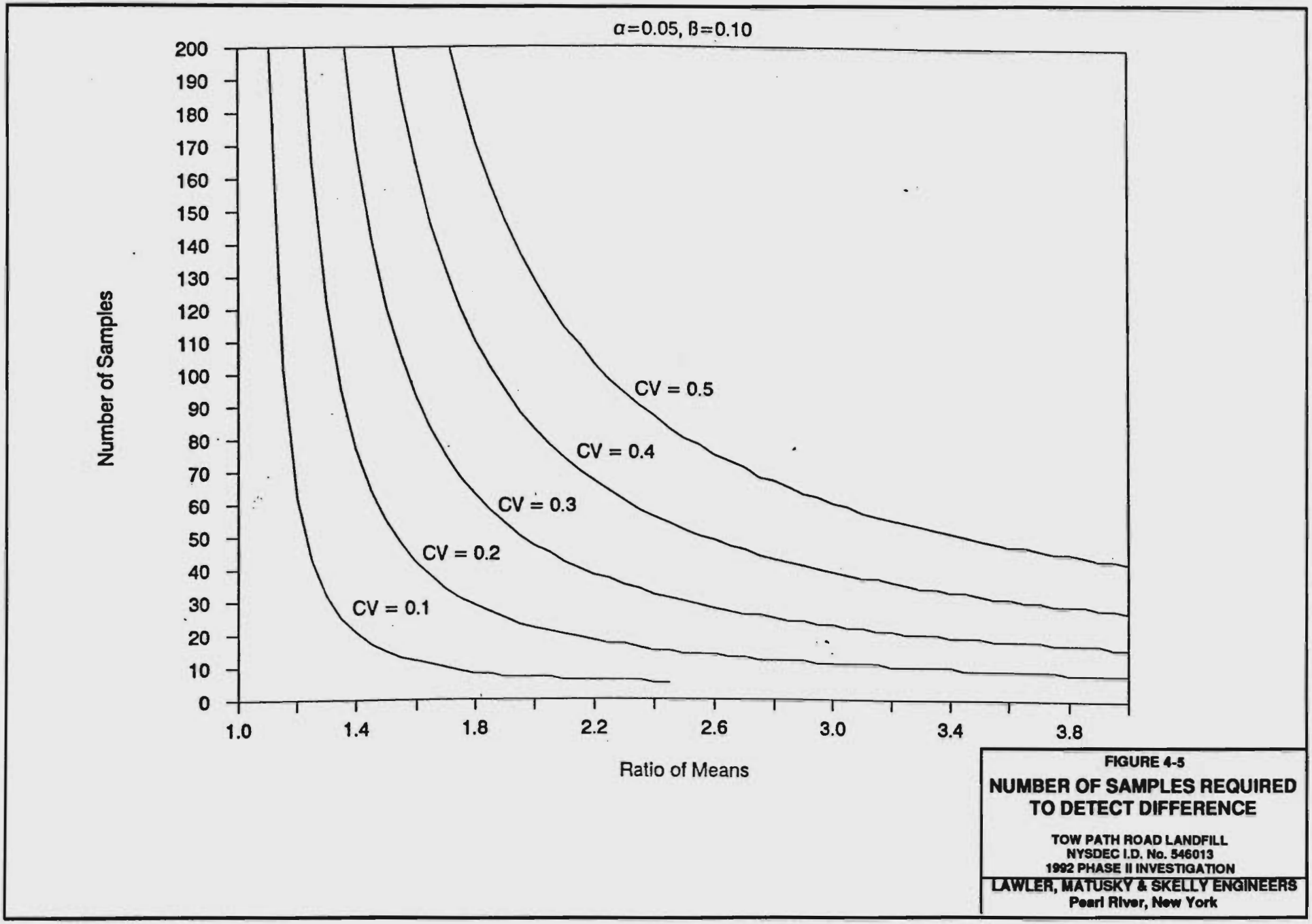


FIGURE 4-5

NUMBER OF SAMPLES REQUIRED TO DETECT DIFFERENCE

TOW PATH ROAD LANDFILL
NYSDEC I.D. No. 546013
1992 PHASE II INVESTIGATION

LAWLER, MATUSKY & SKELLY ENGINEERS
Pearl River, New York

potential difference between the two populations, LMS recommends collection of additional samples to determine the complete statistics. It is envisioned that up to 150 additional samples may be required to accurately calculate the statistics. A preliminary analysis performed prior to collection of the large number of samples needed for this study may produce enough data to indicate that the additional work is unnecessary.

If additional biota samples *are* necessary, LMS recommends collecting surface water and sediment samples in the vicinity of the biota sampling and analyzing them for both PCBs and mercury. Four samples from the bay area and one sample from the upstream station should be sufficient for characterization. The surface water samples should be analyzed for low-level PCBs by NYSDOH's Wadsworth Laboratory.

A seasonal leachate sampling program is recommended to monitor the location, volume, and the water quality of the leachate flowing into the river.

In addition to these studies, the area from Clam Steam Road north to the end of the peninsula (where houses are located, on the west side of Tow Path Road) should be fenced to prevent additional dumping and as a safety measure since debris is exposed and presents a physical hazard (slip/trip) to children that may play in this area.

REFERENCES CITED

[1] Site inspection report.

[2] Site photographs.

[3] Health and safety plan.

[4] Magnetometry data.

[5] Benson, R., R.A. Glaccum, and M.R. Noel. 1988. *Geophysical Techniques for Sensing Buried Wastes and Waste Migration*. Dublin, OH: National Water Well Association.

[6] 1991 Test trench logs. [Appendix A]

[7] Soil gas survey.

[8] 1992 Test trench logs. [Appendix A]

[9] Surface water/sediment sampling logs.

[10] Leachate sampling logs.

[11] Air monitoring data.

[12] Field Trip Guide of the Canal Society of New York State. 1988. pp. 2-8, 10, 16, 18, 45, 46.

[13] U.S. Lake Survey, Chart No. 180, New York State Barge Canal System, Erie Canal. 1967. U.S. Army Corps of Engineers. [Appendix C]

[14] Chronology of Events - Halfmoon Town Landfill.

[15] EPA Potential Hazardous Waste Site Inspection Report. 4 June 1980. [Appendix C]

[16] U.S. Lake Survey, Chart No. 180, New York State Barge Canal System, Cayuga-Seneca, Oswego, Erie and Champlain Canals. 1970. U.S. Army Corps of Engineers. [Appendix C]

[17] New York State Barge Canal System, Erie Canal. 1985. U.S. Department of Commerce, National Oceanic and Atmosphere Administration, National Ocean Service. [Appendix C]

[18] Memo from Brian Fears, NYSDOH Glens Falls District Office, to Dr. William Stasiuk, NYSDOH Division of Environmental Health, regarding Old Halfmoon Landfill site history and recommended course of action.

REFERENCES CITED
(Continued)

[19] EPA Potential Hazardous Waste Site Identification and Preliminary Assessment. 13 December 1979.

[20] NYSDOH Hazardous Waste Disposal Sites Report Format. 7 April 1980.

[21] Memo from David J. Cesareo, EPA Region II Environmental Engineer, to Richard D. Spear, EPA Chief of Surveillance and Monitoring Branch, regarding analyses of water samples taken from Old Halfmoon Landfill. 6 August 1980.

[22] EPA Potential Hazardous Waste Site Final Strategy Determination. 29 September 1980.

[23] Phase I investigation report, Old Halfmoon Landfill. 1987. Prepared by Wehran Engineering, P.C.

[24] NYSDEC Division of Solid and Hazardous Waste Quality Assurance Work Plan. 31 August 1987.

[25] NYSDEC Sampling Report. 1 December 1987.

[26] Letter from Gerald McDonald, NYSDOH Senior Public Health Sanitarian, to Mike Komoroske, NYSDEC, regarding analysis of water samples and site information.

[27] Memo From Mike Komoroske, NYSDEC, to John Swartwout, NYSDEC, regarding site history and recommended course of action.

[28] Interview. [Appendix C]

[29] Hazardous Waste Questionnaire. [Appendix C]

[30] Heath, P.C., F.K. Mack, and J.A. Tannenbaum. 1963. Groundwater Studies in Saratoga County, NY. U.S. Geological Survey. NYSDEC Water Resources Commission.

[31] Halberg, H.N., O.P. Hunt, and F.H. Dauszek. 1964. Water Resources of the Albany-Schenectady-Troy Area New York: Water Resources of Industrial Areas. Geological Survey Water Supply Paper 1499-D.

[32] Cadwell, D.H., and R.J. Dineen. 1987. Surficial Geological Map of New York. New York State Museum and Science Service. Map and chart series No. 40.

[33] Arnow, T. 1949. The Groundwater Resources of Albany County, NY. U.S. Geological Survey. NYSDEC Water Power and Control Commission.

[34] Existing data.

REFERENCES CITED
(Continued)

[35] Dragun, J. 1988. *The Soil Chemistry of Hazardous Materials*. Silver Spring, MD: Hazardous Materials Control Research Institute. pp. 76-79, 421-433.

[36] Cheremisinoff, P.N., and K.A. Gigliello. 1983. *Leachate From Hazardous Waste Sites*. Lancaster, PA: Technomic Publishing Co., Inc. pp. 21, 24.

[37] Shuckrow, A.J., A.P. Pajak, and C.J. Touhill. 1982. *Hazardous Waste Leachate Management Manual*. Park Ridge, NJ: Noyes Data Corporation. pp. 12-22.

[38] NUS Corporation (NUS). Leachate baseline report: Determination of municipal landfill leachate characteristics, volume II of VII. Prepared for the U.S. Environmental Protection Agency, Office of Solid Waste.

[39] New York State Atlas of Water System Sources. 1982. New York State Department of Health, Division of Environmental Protection, Bureau of Public Water Supply Protection.

[40] APHA, AWWA, WPCF. 1992. *Standard Methods for the Examination of Water and Wastewater*. 18th ed. Washington, DC: American Public Health Association. p. 2-53.

[41] Sawyer, C.N., and P.L. McCarty. 1967. *Chemistry for Sanitary Engineers*. 2nd ed. New York: McGraw-Hill Book Company. p. 349.

[42] Memo from Al Klauss, NYSDEC, to Dave O'Toole, NYSDEC, regarding classification of hazardous waste.

[43] Phase II Analytical Data Package.

[44] Phase II Data Validation Report.

[45] Data usability summary. [Appendix B]

[46] Sax, N.I., and R.J. Lewis, Sr. *Dangerous Properties of Industrial Materials*. 7th ed. Volume III. New York: Van Nostrand Rheinhold Co. p. 3287.

[47] Sax, N.I., and R.J. Lewis, Sr. *Hawley's Condensed Chemical Dictionary*. 11th ed. New York: Van Nostrand Rheinhold Co. p. 1163.

[48] The Merck Index. 1983. An encyclopedia of chemicals, drugs and biological. Edited by M. Windholz, S. Budavari, R.F. Blumetti, E.S. Otterbein. Rahway, NJ: Merck & Co., Inc. p. 9354.

[49] CFR 40, Part 700 to End. Revised as of July 1, 1988. pp. 233, 235-237; Figure 2, Decontamination Standards From PCB Spill Cleanup Policy.

REFERENCES CITED
(Continued)

[50] NYCRR. 1982. Title 6, Environmental Conservation.

[51] NYSDOH Wadsworth Laboratory Data.

[52] Sittig, M. 1985. *Handbook of Toxic and Hazardous Chemicals and Carcinogens, 2nd ed.* Park Ridge, NJ: Noyes Publications.

[53] Resources Conservation and Recovery Act (RCRA). 1985. Environmental Protection Agency Regulations for Identifying Hazardous Waste.

LIST OF SUPPORTING DOCUMENTATION

I REFERENCE DOCUMENTATION

Benson, R., R.A. Glaccum, and M.R. Noel. 1988. *Geophysical Techniques for Sensing Buried Wastes and Waste Migration*. Dublin, OH: National Water Well Association. [Ref 5]

Field Trip Guide of the Canal Society of New York State. 1988. pp. 2-8, 10, 16, 18, 45, 46. [Ref 12]

Chronology of Events - Halfmoon Town Landfill. [Ref 14]

Memo from Brian Fears, NYSDOH Glens Falls District Office, to Dr. William Stasiuk, NYSDOH Division of Environmental Health, regarding Old Halfmoon Landfill site history and recommended course of action. [Ref 18]

EPA Potential Hazardous Waste Site Identification and Preliminary Assessment. 13 December 1979. [Ref 19]

NYSDOH Hazardous Waste Disposal Sites Report Format. 7 April 1980. [Ref 20]

Memo from David J. Cesareo, EPA Region II Environmental Engineer, to Richard D. Spear, EPA Chief of Surveillance and Monitoring Branch, regarding analyses of water samples taken from Old Halfmoon Landfill. 6 August 1980. [Ref 21]

EPA Potential Hazardous Waste Site Final Strategy Determination. 29 September 1980. [Ref 22]

Phase I investigation report, Old Halfmoon Landfill. 1987. Prepared by Wehran Engineering, P.C. [Ref 23]

NYSDEC Division of Solid and Hazardous Waste Quality Assurance Work Plan. 31 August 1987. [Ref 24]

NYSDEC Sampling Report. 1 December 1987. [Ref 25]

Letter from Gerald McDonald, NYSDOH Senior Public Health Sanitarian, to Mike Komoroske, NYSDEC, regarding analysis of water samples and site information. [Ref 26]

Memo From Mike Komoroske, NYSDEC, to John Swartwout, NYSDEC, regarding site history and recommended course of action. [Ref 27]

Heath, P.C., F.K. Mack, and J.A. Tannenbaum. 1963. Groundwater Studies in Saratoga County, NY. U.S. Geological Survey. NYSDEC Water Resources Commission. [Ref 30]

I (*Continued*)

Halberg, H.N., O.P. Hunt, and F.H. Dauszek. 1964. Water Resources of the Albany-Schenectady-Troy Area New York: Water Resources of Industrial Areas. Geological Survey Water Supply Paper 1499-D. [Ref 31]

Cadwell, D.H., and R.J. Dineen. 1987. Surficial Geological Map of New York. New York State Museum and Science Service. Map and chart series No. 40. [Ref 32]

Arnow, T. 1949. The Groundwater Resources of Albany County, NY. U.S. Geological Survey. NYSDEC Water Power and Control Commission. [Ref 33]

Existing data. [Ref 34]

Dragun, J. 1988. *The Soil Chemistry of Hazardous Materials*. Silver Spring, MD: Hazardous Materials Control Research Institute. pp. 76-79, 421-433. [Ref. 35]

Cheremisinoff, P.N., and K.A. Gigliello. 1983. *Leachate From Hazardous Waste Sites*. Lancaster, PA: Technomic Publishing Co., Inc. pp. 21, 24. [Ref 36]

Shuckrow, A.J., A.P. Pajak, and C.J. Touhill. 1982. *Hazardous Waste Leachate Management Manual*. Park Ridge, NJ: Noyes Data Corporation. pp. 12-22. [Ref 37]

NUS Corporation (NUS). Leachate baseline report: Determination of municipal landfill leachate characteristics, volume II of VII. Prepared for the U.S. Environmental Protection Agency, Office of Solid Waste. [Ref 38]

New York State Atlas of Water System Sources. 1982. New York State Department of Health, Division of Environmental Protection, Bureau of Public Water Supply Protection. [Ref 39]

APHA, AWWA, WPCF. 1992. *Standard Methods for the Examination of Water and Wastewater*. 18th ed. Washington, DC: American Public Health Association. p. 2-53. [Ref 40]

Sawyer, C.N., and P.L. McCarty. 1967. *Chemistry for Sanitary Engineers*. 2nd ed. New York: McGraw-Hill Book Company. p. 349. [Ref 41]

Memo from Al Klauss, NYSDEC, to Dave O'Toole, NYSDEC, regarding classification of hazardous waste. [Ref 42]

Sax, N.I., and R.J. Lewis, Sr. *Dangerous Properties of Industrial Materials*. 7th ed. Volume III. New York: Van Nostrand Rheinhold Co. p. 3287. [Ref 46]

Sax, N.I., and R.J. Lewis, Sr. *Hawley's Condensed Chemical Dictionary*. 11th ed. New York: Van Nostrand Rheinhold Co. p. 1163. [Ref 47]

I *(Continued)*

The Merck Index. 1983. An encyclopedia of chemicals, drugs and biological. Edited by M. Windholz, S. Budavari, R.F. Blumetti, E.S. Otterbein. Rahway, NJ: Merck & Co., Inc. p. 9354. [Ref 48]

CFR 40, Part 700 to End. Revised as of July 1, 1988. pp. 233, 235-237; Figure 2, Decontamination Standards From PCB Spill Cleanup Policy. [Ref 49]

NYCRR. 1982. Title 6, Environmental Conservation. [Ref 50]

Sittig, M. 1985. *Handbook of Toxic and Hazardous Chemicals and Carcinogens, 2nd ed.* Park Ridge, NJ: Noyes Publications. [Ref 52]

Resources Conservation and Recovery Act (RCRA). 1985. Environmental Protection Agency Regulations for Identifying Hazardous Waste. [Ref 53]

II SUBCONTRACTOR OR SUBCONSULTANT REPORTS

- II.i Geophysics Survey
- II.ii Soil Gas Survey
- II.iii Data Validation Report
- II.iv Analytical Data Package

III HEALTH AND SAFETY PLAN

IV SITE INSPECTION REPORT

V SAMPLING REPORT

APPENDIX A

1991 AND 1992 TEST TRENCH LOGS

REFERENCE 6

LAWLER, MATUSKY & SKELLY ENGINEERS PAGE 1 OF 1
CREW CHIEF REPORT

1. CREW CHIEF: JM Gurzenich
CREW MEMBER(S): Seth Piker
2. CLIENT: NYSDEC
3. SURVEY: Old Halfmoon Ldfl Surf H_2O/Sed. / Leachate
5. JOB NO: 576-044
6. PROJ. MGR: Ed Maikish
7. VEHICLE USED: Cube Van
8. BOAT(S) USED: 12' Jon Boat

B. CREW CHIEF REPORT (COMPLETE AFTER SURVEY.)

1. SURVEY START/END DATE — 12.3 / 12.6
2. SURVEY START/END TIME — ~0600 / 2200
3. DESCRIBE DETAILS IN SECTION C:
   (a) SAMPLING GEAR WORKING PROPERLY — (Y) N
   (b) METERS FIELD CALIBRATED: (1)WATER QUALITY — (Y) N
   (2)AIR MONITOR(HNU,OVA,CGI) — ~~Y/N~~
   (FIELD CALIB.MUST BE ATTACHED TO ORIG. C.C. REPORT & SENT TO QA/QC)
   (c) WAS DOWNTIME INCURRED? #HRS? — Y (N)
   (d) ANY INCIDENTS, ACCIDENTS, PERTINENT OBSER. — Y (N)
4. WERE FOLLOWING REPORTS COMPLETED & SUBMITTED?
   (a) WEATHER CONDITIONS LISTED ON FIELD DATA SHEETS — (Y) N
   (b) RADIO LOGS — ~~Y/N~~
   (c) ~~EQUIPMENT USAGE~~ — (Y) N
   (d) (BOAT/VEHICLE) LOGS — (Y) N
5. BOAT USAGE
   (a) ENGINE HOURS — ____ TO ____
   (b) RADIO LOGS — ____ TO ____
   (c) BOAT LOCATION — Mohawk River 12.4
6. CHAIN OF CUSTODY COMPLETED. SAMPLES SIGNED OVER. — (Y) N 0900 1300

COMMENTS/OBSERVATIONS

Survey went very well. * See Field Log Book for sampling specific

* We did not need engine for the boat work

- NYSDEC DRT 15c Turb meter did not hold a charge well @ all (prob. due to cold weather)
- filtering of PCB samples (2+2 / SW location + 3 MS/MSD) consumed quite a bit of time (1 person ... 0.5 - 2.0 hrs / sample)
- It helped quite a bit that Dan Eaton was willing to drive me to sample locations while Seth was filtering
- We had some problems w/ Fed-X switching coolers (sending them to the wrong labs)

NOTE: SEND ORIGINAL CREW CHIEF REPORT TO QA/QC WITHIN 5 DAYS OF SURVEY COMPLETION
SEND YELLOW COPY TO WAREHOUSE. RETAIN PINK COPY FOR C.C. FILE.

C.C. SIGNATURE John M Gurzenich DATE: 12.11.91

USE ADDITIONAL SHEET(S), IF NECESSARY.

Date: 12.6.91
Crew: JG SP
Site: Old Halfmoon Landfill
Operation: Surf H2O / Sed. / Leachate

LAWLER, MATUSKY & SKELLY ENGINEERS
FIELD DATA SHEET FOR SURFACE WATER/LEACHATE

Job No: 576-044

pH No: DEC Orion #4776 / DEC Hydac
Therm. No: 894 / 894
Turbidity Meter No: DEC DRT 15c
Cond ~~Velocity~~ Meter No: DEC YSI #560 / DEC Hydac

STATION No.	SAMPLE DEPTH (ft)	TOTAL DEPTH (ft)	TIME (HHMM)	TEMP (°C)	pH	COND. (µmhos/cm)	* TURB. (NTUs)	FLOW MEAS.	SAMPLE BOTTLES				COMMENTS
									SAMPLE PARAMETERS	BOT. Nos.	SAMPLE PARAMETERS	BOT. Nos.	
OHL-2	—	—	0710	6.5°	6.8/7.0	992	20	1l/110 sec	VOCs TCL+10	02	Cyanide	01	Location marked by Mike Komoroske did not have any flow, we found a location nearby (Location 599) where there is flow into the river. sample has slight leachate odor, clear
									BNAs TCL+20	01	COD	01	
									TCL Pest/PCBs EPTox Pest/Herbs	01	TSS, TDS, pH, SpC	01	
									TAL metals EPTox metals	01	Reac, Ignit, Corr	↓	
OHL-5	—	—	0830	4.9°	6.6/6.7	815	30	1l/28 sec	VOCs TCL+10	02	Cyanide	01	Collected @ base of culvert on river side of road Used s/s tube set-up Rather clear no noticeable odor
									BNAs TCL+20	01	COD	01	
									TCL Pest/PCBs EPTox Pest/Herbs	01	TSS TDS pH SpCond	01	
									TAL metals EPTox Metals	01	Reac, Ignit., Corr	↓	
OHL-5 MS & MSD	↓	↓	↓	↓	↓	↓	↓	↓	VOC TCL+10	04	Cyanide	02	↓
									BNAs TCL+20	02			
									Pest/PCBs TCL	02			
									Metals TAL	02			
OHSW-6	Surf	0.5'	0915	0.6°	7.7	334	12	—	VOCs TCL+10	02	Cyanide	01	Collected off shore where there was enough water under ice to collect sample It is located down river from OHL-6
									BNAs TCL+20	01	COD / TSS, TDS pH, SpCond	01/01	
									Pest/PCBs TCL	01	LL PCBs (Total)	01	
									TAL Metals	01	LL PCBs (Diss.)	01	
OHSW-7	Surf	0.5'	1025	0.3°	8.0	317	09	—	VOCs TCL+10		Cyanide	01	Collected just off bank (5' out) across stream from red house
									BNAs TCL+20		COD / TSS TDS pH, SpCond	01/01	
									Pest/PCBs TCL		LL PCBs (Total)	01	
									TAL metals		LL PCBs (Diss.)	01	

* These samples were run 12.7/1930 due to meter problems (cold weather) on 12.6.91 (meter indicated low battery shortly after it was turned on)

John M Gerzeski

Date: 12.6.91
Crew: JG SP
Site: Old Hallowell Landfill
Operation: Surf H2O/Sed/Leachate

LAWLER, MATUSKY & SKELLY ENGINEERS
FIELD DATA SHEET FOR SURFACE WATER/LEACHATE
Job No: 576-044

pH No: DEC Orion # 4776 / DEC Hydac
Therm. No: 994 / 894
Turbidity Meter No: DEC DRT 15 C
Velocity Meter No: DEC TSI #560 / DEC Hydac

STATION No.	SAMPLE DEPTH (ft)	TOTAL DEPTH (ft)	TIME (HHMM)	TEMP (°C)	pH	COND. (µmhos/cm)	TURB.* (NTUs)	FLOW MEAS.	SAMPLE BOTTLES				COMMENTS
									SAMPLE PARAMETERS	BOT. Nos.	SAMPLE PARAMETERS	BOT. Nos.	
OHL-6	—	—	1135	3.6°	7.2	1119	84	1 l / 14 sec	VOCs TCL+10	02	Cyanide	01	Collected where leachate "stream" runs into river (location No noticeable odor
									BNAs TCL+20	01	COD	01	
									TCL Pest/PCBs EPTox Pest/Herbs	01	TSS, TDS, pH, SpC	01	
									TAL metals EPTox Metals	01	Reac, Ignit, Corr	↓	
OHL-8	—	—	1230	4.4°	7.1	Sp Cond 875 / uncorr 501 / 530 @ 3.7°	30	1 l / 34 sec	VOCs TCL+10	02	Cyanide	01	Collected where leachate "stream" runs into River) Clear leachate odor (location near LMS 57 too)
									BNAs TCL+20	01	COD	01	
									TCL Pest/PCBs EPTox Pest/Herbs	01	TSS, TDS, pH SpC	01	
									TAL metals EPTox Metals	01	Reac, Ignit, Corr	↓	
OHSW-8	Surf.	0.5'	1220	0.4°	8.0	431	06	—	VOCs TCL+10	02	Cyanide	01	Collected off shore where there was a break in ice (~50' out) Location is up river from "Cable Crossing" sign
									BNAs TCL+20	01	COD / TSS, TDS pH Sp Cond	01 / C1	
									Pest/PCBs TCL	01	LL PCBs (Total) / LL PCBs (Total) ng/l MSD	01 / 01	
									Metals TAL	01	LL PCBs (Diss.) / LL PCBs (Diss.) ng/l MSD	01 / 01	
OHL-7	—	—	1445	7.4° / 7.4°	6.9	329	31	* ~1 gal / 6 sec	VOCs TCL+10	02	Cyanide	01	Collected from culvert where it empties into river, Rather clear w/ leachate odor
									BNAs TCL+20	01	COD	01	
									TCL Pest/PCBs EPTox Pest/Herbs	01	TSS, TDS, pH, SpC	01	
									TAL metals EPTox Metals	01	Reac, Ignit., Corr	↓	
								↓ * This is a very rough estimate Water flowing out of culvert @ a good pace					

* See note on page 1

John M Lawler
12.7.91

ate: 12.6.91
rew: JG SP
ite: Old Halfmoon Ldfl

LAWLER, MATUSKY & SKELLY ENGINEERS
FIELD DATA SHEET FOR SOIL/SEDIMENT SAMPLES
Job No: 576-044

Oper: Surf H_2O/Sed/Leachate
Thermometer No: —

TA. O.	TIME	SMPL DPTH	METHOD	TEXT.	CLR.	OLOR	SAMPLE BOTTLES: SAMPLE PARAMETERS	BOT. Nos.	SAMPLE PARAMETERS	BOT. Nos.	COMMENTS
HSD-6	0935	0-3"	S/S Spoon	Creamy smooth silty mud w/ a lot of org material	Brn w/ some Blk	None Noticed	VOCs TCL+10	02			Collected off shore where there is enough water to collect SW
							BNAs TCL+20, Pest/PCBs TCL	01			
							TAL metals, Cyanide	↓			
HSD-7	1050	0-3"	S/S Spoon	fn-Cs Sand w/ some silt, rocks, cm stones	Brn, Gray mottled	None Noticed	VOCs TCL+10	02			Collected just off shore (~5') across from red house
HSD-8	1210	0-3	S/S Spoon	med-fn sand + silt, some org. material	Brn + Grey	None Noticed	VOCs TCL+10	02			Collected off shore (~50') where there was enough water under ice to collect SW sample Station is up river from "Cable Crossing" sign
							BNA's TCL+20, Pest/PCBs TCL	4 vials	*		
							TAL Metals, Cyanide	↓			
HSD-7	1250 *	See OHSD-7 1050	—	—	—	→	TCL+20 BNAs, TCL Pest/PCBs	4 vials	*		* we did not have enough sed. Jars so we used VOA vials. We returned to collect BNA's etc samples
							Metals TAL, Cyanide	↓			

* We were not supplied with enough soil jars for BNAs etc so we used 4 40ml vials for each of the last 2 stations

John M Gruzenski
12.6.91

Date: 12-4-91
Crew: JG SF
Site: OU Hattiesburg Landfill
Operation: Surf H2O/Sed., Leachate

LAWLER, MATUSKY & SKELLY ENGINEERS
FIELD DATA SHEET FOR SURFACE WATER/LEACHATE

Job No: 576-044

pH No: DEC Orion 4776 / DEC Hydac
Therm. No: 894
Turbidity Meter No: DEC DRT-15C
Cond. Velocity Meter No: DEC TEC #560 / DEC Hydac

STATION No.	SAMPLE DEPTH (ft)	TOTAL DEPTH (ft)	TIME (HHMM)	TEMP (°C)	pH	COND. (µmhos/cm)	TURB. (NTUs)	FLOW MEAS.	SAMPLE BOTTLES				COMMENTS
									SAMPLE PARAMETERS	BOT. Nos.	SAMPLE PARAMETERS	BOT. Nos.	
Field Blank	—	—	0940	—	—	—	—	—	VOCs TCL+TIC	02	COD / Cyanide	01/01	FB Performed on Bailer #4/1 before sampling OHSW-12
									BNA TCL+25	01	TSS TDS pH SpC	01	
									Pest/PCBs TCL	01	LL PCBs Total	01	
									Metals TAL	01	LL PCBs Diss.	01	
OHSW-12	mid	1.5'	1000	0.8°	7.4/7.4	325	06	—	VOCs TCL+10	02	COD/Cyanide	01/01	Sample collected with Bailer #4/1 sample taken from shore (~2')
									BNAs TCL+20	01	TSS, TDS, pH, SpC.	01	
									Pest/PCBs TCL	01	LL PCBs Total	01	
									Metals TAL	01	LL PCBs Diss.	01	
OHSW-11	mid	2.0'	1105	1.4°	7.5	316	05	—	VOCs TCL+10	02	COD/Cyanide	01/01	150' from shore (OHSW-2) Samples collected directly into sample bottles
									BNAs TCL+20	01	TSS, TDS, pH, SpC	01	
									Pest/PCBs TCL	01	LL PCBs Total	01	
									Metals TAL	01	LL PCBs Diss	01	
OHSW-10	mid	2.0'	1130	1.3°	7.3	342	06	—	VOCs TCL+10	02	COD/Cyanide	01/01	50' from shore (OHSW-3) sample collected directly into bottles
									BNAs TCL+20	01	TSS, TDS, pH SpC	01	
									Pest/PCBs TCL	01	LL PCBs Total	01	
									Metals TAL	01	LL PCBs Diss	01	
OHSW-2	Surf	0.5'	1450	2.4°	7.1	SP Cond 571 Uncorr 317/344 @ 25°C	16	—	VOCs TCL+10	02	COD/Cyanide	01/01	Sample collected just off bank immed. down river from OHL-4 Slight Leachate-type odor
									BNAs TCL+20	01	TSS, TDS, pH SpC	01	
									Pest/PCBs TCL	01	LL PCBs Total	01	
									Metals TAL	01	LL PCBs Diss	01	

John M Genzmick 12.4.91

2 of 2

Date: 12.4.91
Crew: JG SP
Site: Old Halfmoon Landfill
Operation: Surf H2O / Leachate / Seep

LAWLER, MATUSKY & SKELLY ENGINEERS
FIELD DATA SHEET FOR SURFACE WATER/LEACHATE

Job No: 576-044

pH No: DEC Orion 4776
Therm. No: 894
Turbidity Meter No: DEC D RT-152
Velocity Meter No: DEC TLC #560

STATION No.	SAMPLE DEPTH (ft)	TOTAL DEPTH (ft)	TIME (HHMM)	TEMP (°C)	pH	COND. (µmhos/cm)	TURB. (NTUs)	FLOW MEAS.	SAMPLE BOTTLES				COMMENTS
									SAMPLE PARAMETERS	BOT. Nos.	SAMPLE PARAMETERS	BOT. Nos.	
OHL-4	—	—	1535	8.0°/8.0°	6.9	804	12	1l/40sec	VOCs TCL+10	02	Cyanide	01	Leachate-type odor sampled directly into bottles through s/s tube set-up (see photos)
									BNAs TCL+20	01	COD	01	
									TCL Pest/PCBs EPTox Pest/Herbs	01	TSS, TDS, pH SpC	01	
									TAL Metals EPTox Metals	01	Ignit, Reac, Corr.	↓	
OHL-3	—	—	1655	10.9°	6.6	1364	06	1l/13sec	VOCs TCL+10	02	Cyanide	01	Slight leachate type odor sampled directly into bottles through s/s tube set-up
									BNAs TCL+20	01	COD	01	
									TCL Pest/PCBs EPTox Pest/Herbs	01	TSS, TDS, pH SpC	01	
									TAL Metals EPTox Metals	01	Reac, Ignit, Corr	↓	
Trip Blank	—	—	—	—	—	—	—	—	VOCs TCL+10	02			* both vials have small bubbles

John Guzenski 12.4.91

Date: 12-4-91
Crew: JG SP
Site: Hartmoon Landfill

LAWLER, MATUSKY & SKELLY ENGINEERS
FIELD DATA SHEET FOR SOIL/SEDIMENT SAMPLES
Job No: 576-044

Oper: Sediment collection
Thermometer No: 894

STA. NO.	TIME	SMPL DPTH	METHOD	TEXT.	CLR.	ODOR	SAMPLE BOTTLES: SAMPLE PARAMETERS	BOT. Nos.	SAMPLE PARAMETERS	BOT. Nos.	COMMENTS
OHSD-12	1025	0-3"	S/S Pan & S/S spoon	Creamy smooth w/organic matter	Dark Brown	NONE Noticed	TCL+10 VOA's	2 vials			Sample collected 300 ft from shore (OHSD-2)
							TCL+20, BNA, TCL, Pest., PCB's, TAL, Metals,	1 Jar			
							CN	↓			
OHSD-11	1120	0-3"	"	"	"	"	TCL+10 VOA's	2 vials			Sample collected 150 ft. from shore OHSD-2 layer of veg. matter
							TCL+20 BNA TCL	1 Jar			
							Pest PCB's, TAL metal	1			
							CN	↓			
OHSD-10	1140	0-3"	"	"	"	"	TCL+10 VOA's	2 vials			on top Sample collected 50 ft. from shore 1 layer of veg matter
							TCL+20 BNA, TCL	1 Jar			
							Pest PCB's, TAL metals	1			
							CN	↓			
OHSD-2	1520	0-3"	S/S Spoon	fn-med Sand w/ some silt & sm stones	lt-med brn w/ some red orange staining	None Noticed	TCL+10 VOAs	02			on top. Sample collected just off bank immediately downriver from OHL-4
							TCL+20 BNAs, TCL Pest/PCBs	01			
							TAL Metals, Cyanide	↓			

John M Gegenwirth 12.4.91

Date: 12.5.91
Crew: JG SP
Site: Old Halfmoon Landfill
Operation: Surf H2O/Sed, Leachate

LAWLER, MATUSKY & SKELLY ENGINEERS
FIELD DATA SHEET FOR SURFACE WATER/LEACHATE

Job No: 576-044

pH No: DEC Orion # 4776 / DEC Hydac
Therm. No: 994 /
Turbidity Meter No: DEC DRT 15-C
Cond ~~Velocity~~ Meter No: DEC TLC #560

STATION No.	SAMPLE DEPTH (ft)	TOTAL DEPTH (ft)	TIME (HHMM)	TEMP (°C)	pH	COND. (µmhos/cm)	TURB.* (NTUs)	FLOW MEAS.	SAMPLE BOTTLES				COMMENTS
									SAMPLE PARAMETERS	BOT. Nos.	SAMPLE PARAMETERS	BOT. Nos.	
OHSW-1	Surf.	1.0'	0830	1.8°	7.5	343	15	—	VOCs TCL+10	02	Cyanide/COD	01/01	Sample collected from area along bank where water not frozen. It appears that there may be inflow from base of bank. There is no red-orange staining but the sediment here appears light tan compared to surrounding sediment
									BNAs TCL+20	01	TSS, TDS, pH, SpC	01	
									Pest/PCBs TCL	01	LL PCBs Total	01	
									Metals TAL	01	LL PCBs Diss	01	
OHSW-1 MS/MSD	↓	↓	↓	—	—	—	—	—	VOCs TCL+10	04	Cyanide	02	
									BNAs TCL+20	02			
									Pest/PCBs TCL	02			
									Metals TAL	02			
OHL-1	—	—	1145	11.6°	6.9	1460	160**	12/24 sec	VOCs TCL+10	02	Cyanide	01	Collected a base of cattails down infront of Clam Steam House. Leachate-type odor, bacteria-type staining. Collected sample w/ tube sed.
									BNAs TCL+20	01	COD	01	
									Pest IPCBs TCL EPTox Pest/Herbs	01	TSS, TDS, pH SpC	01	
									TAL Metals EPTox Metals	01			
OHSW-9	Surf.	1.0'	1035	2.4°	8.0/8.1	293	06	—	VOCs TCL+10	02	Cyanide/COD	01/01	Sample collected upriver from Rt 87 bridges. Samples collected directly into jars
									BNAs TCL+20	01	TSS, TDS, pH SpC	01	
									Pest/PCBs TCL	01	LL PCBs Total	01	
									Metals TAL	01	LL PCBs Diss	01	
OHSW-5	Surf	0.5'	1300	1.8°	7.1	635	35		VOCs TCL+10	02	LL PCBs Total LL PCBs Total MS/MSD	01 01	Cut hole in ice & used dip bucket to collect samples. Sampled ~ 25-30' off shore where there was sufficient water
									BNAs TCL+20	01	LL PCBs Diss LL PCBs Diss MS/MSD	01 01	
									Pest/PCBs TCL	01	Cyanide/COD	01/01	
									Metals TAL	01	TSS, TDS, pH, SpC	01	

* Due to temp conditions we decided to run turbidities @ hotel @ end of day, ** OHL-1 was rather clear when collected but appears to have oxidized & turned light tan w/ some precipitant

John M Dugan 12.5.91

Date: 12.5.91
Crew: JG SP
Site: old Heltmoon LDFl
Operation: Surf H_2O/Sed/Leachate

LAWLER, MATUSKY & SKELLY ENGINEERS
FIELD DATA SHEET FOR SURFACE WATER/LEACHATE

Job No: 376-044

pH No: DEC Orion #4776 / DEC Hydac
Therm. No: #994 / 894
Turbidity Meter No: DEC DRT 15C
Cond ~~Velocity~~ Meter No: DEC TLC #560 / DEC Hydac

STATION No.	SAMPLE DEPTH (ft)	TOTAL DEPTH (ft)	TIME (HHMM)	TEMP (°C)	pH	COND. (µmhos/cm)	TURB. (NTUs)	FLOW MEAS.	SAMPLE BOTTLES				COMMENTS
									SAMPLE PARAMETERS	BOT. Nos.	SAMPLE PARAMETERS	BOT. Nos.	
OHSW-4	Surf	0.5'	1420	2.2°	7.2	525	50	—	VOCs TCL+10	02	Cyanide / COD	01/01	sample collected from area where culvert runs under road into "bay". There is a lot of orange staining in this area. Sample collected w/ a teflon dip bucket
									BNAs TCL+20	01	TSS, TDS, alk, SpC	01	
									Pest/PCBs TCL	01	LL PCBs Total	01	
									Metals TAL	01	LL PCBs Diss.	01	
OHSW-3	Surf	0.5'	1600	1.5°/1.5°	7.1/7.1	Sp Cond 521 uncorr 296/302 @ 3.4°	31	—	VOCs TCL+10	02	LL PCBs Total / LL PCBs Total ms/msD	01 / 01	Sample collected just off bank along area accross from "No Dumping" sign. It was collected where water was not freezing. There is no orange staining in this area. Sample collected w/ teflon dip bucket
									BNAs TCL+20	01	LL PCBs Diss / LL PCBs Diss ms/msD	01 / 01	
									Pest/PCBs TCL	01	Cyanide / COD	01/01	
									Metals TAL	01	TSS TDS pH SpCond	01	
													* Note: Dan Eaton of DEC collected PCB samples from all surface water sample locations today. He also collected a sample from OHSW-2 which we sampled yesterday

John M Dezenski 12.5.91

Date: 12.5.91
Crew: JG SP
Site: Old Halfmoon Landfill

LAWLER, MATUSKY & SKELLY ENGINEERS
FIELD DATA SHEET FOR SOIL/SEDIMENT SAMPLES
Job No: 576-044

Oper: surf H2O / sed. / Leachate
Thermometer No: —

STA. NO.	TIME	SMPL DPTH	METHOD	TEXT.	CLR.	ODOR	SAMPLE BOTTLES: SAMPLE PARAMETERS	BOT. Nos.	SAMPLE PARAMETERS	BOT. Nos.	COMMENTS
OHSD-1	1015	0-3"	S/S Spoon	md. fn sand + silt w/ small rocks & cobbles	Light tan	None	TCL+10 VOCs	02			Collected @ edge of bank where water not freezing from inflow from base of bank
							BNAs TCL+20, Pest/PCBs TCL	01			
							TAL Metals, Cyanide	↓			
OHSD-1 MS/MSD	↓	↓	↓		↓	↓	TCL+10 VOCs MS	02	TCL+10 VOCs MSD	02	↓
							BNAs TCL+20 Pest/PCBs TCL	01	BNAs TCL+20	01	
							TAL Metals, Cyanide ↓	↓	Pest/PCBs TCL	↓	
									TAL Metals, Cyanide ↓	↓	
OHSD-9	1110	0-2"	S/S Spoon	Creamy Smooth fine silt (Cs-fn sand underneath)	Brn	None	TCL+10 VOCs	02			Collected upriver from Rt 87 bridges
							BNAs TCL+20, Pest/PCBs TCL	01			
							TAL Metals, Cyanide	↓			
OHSD-5	1325	0-3"	S/S Ladle	Creamy Smooth Alot of Org matter (leaves etc)	Drk Brn-Black	None	TCL+10 VOCs	02			Cut hole in ice + collected sample through ice
							BNAs TCL+20	01			
							Pest/PCBs TCL	↓			
							TAL Metals, Cyanide	↓			
OHSD-4	1435	0-3"	S/S Ladle	fn-cs sand w/ some silt, small rocks & organic material	Brn	None	TCL+10 VOCs	02			Sampled from area next to culvert that runs into bay
							BNAs TCL+20	01			
							Pest/PCBs TCL	↓			
							TAL Metals, Cyanide	↓			
OHSD-3	1635	0-3"	S/S Spoon	Silty muck w/ alot of organic material	Blk	None	TCL+10 VOCs	02			Sampled 5' off bank in area where water is not freezing
							BNAs TCL+20	01			
							Pest/PCBs TCL	↓			
							TAL Metals, Cyanide	↓			

John M Guyenick 12.5.91

REFERENCE 8

TEST PIT AND PERC TEST LOG

DATE STARTED 9/22/92 TIME 900 A.M. JOB No. 576-067

DATE FINISHED _____ TIME _____ TEST PIT No. 1B

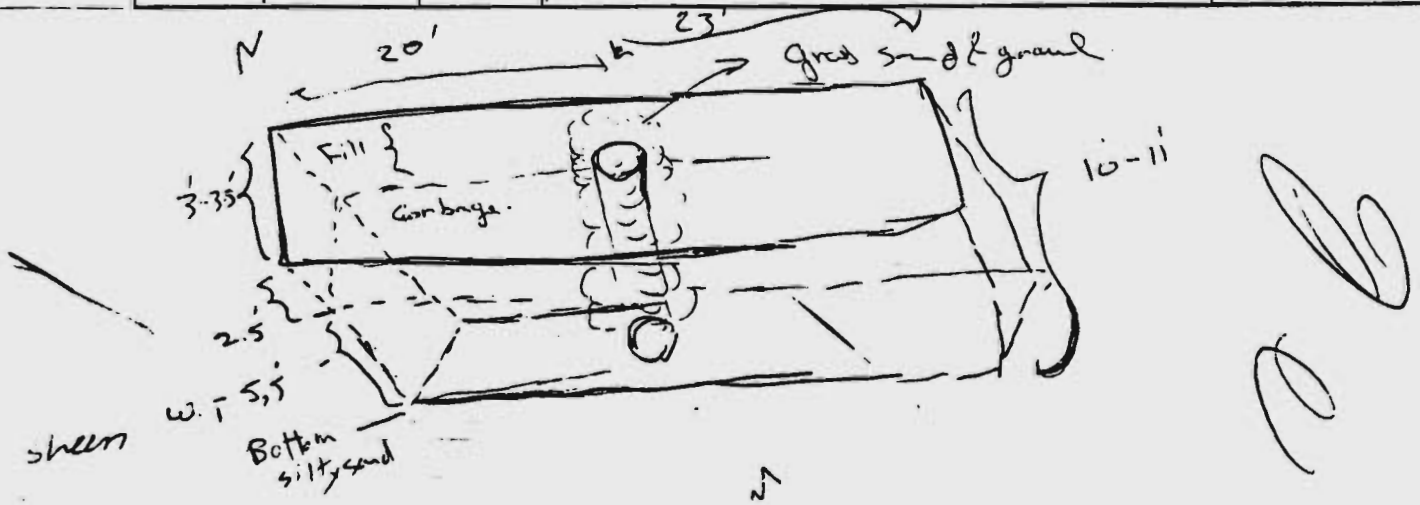
CLIENT NYSDEC SITE _____

SURFACE ELEVATION _____ EXCAVATOR _____

DATUM _____ EQUIPMENT _____

WATER ELEVATION _____ INSPECTOR _____

DEPTH (ft)	LITHOLOGIC SYMBOL	MOIST.	DESCRIPTION OF SOIL	STONES
0			Covered w/ Top Grass, To 0.01' Dark Brown to Light Brown silty sand (Dry)	
1			Brown silty v.f. sand; little f. sand.	
2			Black soil garbage. Rubbers, Bottles, plastics (Blacks, wires, wood	Hit max reading 95 PPM
3				
4				
5				OVA 300 methane, 0-1
			Black water, no sheen on water.	@ 5.5 W. Table
			some sheen on water surface.	
			Alot of wood pieces, Bottol	
			* Bottom of the Garbage a bout 9' deep. silty sand at the bottom.	
			* Tires, Car parts,	
10			* Hole 4'3 x 3.5' X 10:11' Dimensions.	
			* Samples were collected at the bottom	9'-10'
			* no extra ordenary material was found.	
			*	



TEST PIT AND PERC TEST LOG

DATE STARTED _____ TIME _____ JOB No. _____

DATE FINISHED _____ TIME _____ TEST PIT No. TP. 2B

CLIENT _____ SITE _____

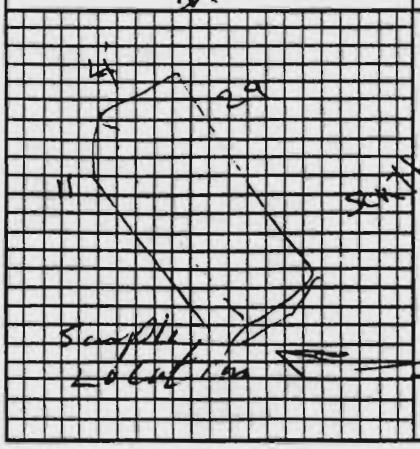
SURFACE ELEVATION _____ EXCAVATOR _____

DATUM _____ EQUIPMENT _____

WATER ELEVATION _____ INSPECTOR _____

DEPTH (ft)	LITHOLOGIC SYMBOL	MOIST.	DESCRIPTION OF SOIL	STONES
0			Grass, Brown Top Soil 0-1'	
			Smelly Garbage, Blackish, wood, wire, Plastic, Bottles, Paper, mixed with silt. (Orange Dry Cheese. at 5 Ft Deep 10 gal Drum (800 DUA) 50 meter, 600 another Compounds	
5	Water Table.		* Parts of Refrigerator, wood, Tires, Some sheen, Product on the water surface.	
			2" Water Tank,	
			bottom at 11 ft silty Clay to v.f. sandy silt. Percentage of moisture is very High Samples were collected from 11' deep Clay material at the bottom.	
10				

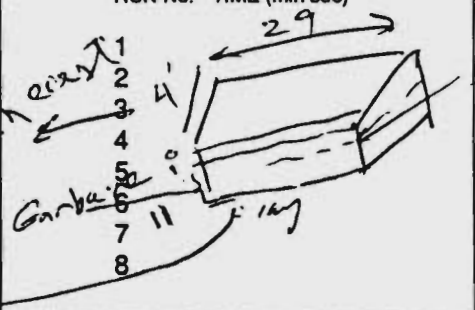
TEST PIT LOCATION:



PERC TEST No. 1 DEPTH

RUN No. TIME (min sec)

1
2
3
4
5
6
7
8



PERC TEST No. 2 DEPTH

North west

RUN No. TIME (min sec)

5-5 Water Table

1
2
3
4
5
6
7
8

LAWLER, MATUSKY & SKELLY ENGINEERS
Environmental Science & Engineering Consultants

TEST PIT AND PERC TEST LOG

DATE STARTED 9/23/94 TIME 8 Am JOB No. 576-067

DATE FINISHED _____ TIME _____ TEST PIT No. TP-3B

CLIENT _____ SITE _____

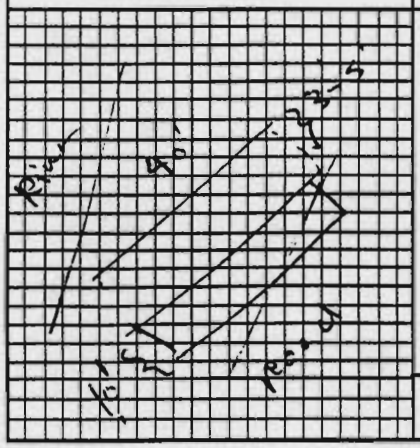
SURFACE ELEVATION _____ EXCAVATOR _____

DATUM _____ EQUIPMENT _____

WATER ELEVATION _____ INSPECTOR _____

DEPTH (ft)	LITHOLOGIC SYMBOL	MOIST.	DESCRIPTION OF SOIL	STONES
0	0 - 1	Dry	Top soil & grass. (Brown)	
	1 - 3		Garbage: Cloth, Glass, Clothes wires, mixed with Brown Fill	
	3 - 4'		One foot of gray silty clay layer it could be the boundary for second left	
5	4 - 6		Garbage.; Bottles, Cloths Logs. Piece of Rock — Trees stems large size	
W.T - 6'			Gray water at 6' depth.	
			Bottom at 10 ft. Gray ft. sand. & some Gray clay..	
10			Sample were collected at 10 depth from sandy interface.	

TEST PIT LOCATION:



PERC TEST No. 1 DEPTH

RUN No. TIME (min sec)

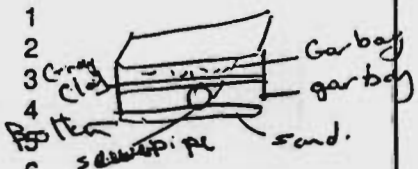
1 River
2
3
4
5
6
7
8

Road

PERC TEST No. 2 DEPTH

RUN No. TIME (min sec)

1
2
3 Gray Clay
4
5 Bottom
6
7
8



LAWLER, MATUSKY & SKELLY ENGINEERS
Environmental Science & Engineering Consultants

TEST PIT AND PERC TEST LOG

DATE STARTED _____ TIME _____ JOB No. _____

DATE FINISHED _____ TIME _____ TEST PIT No. TB-4B

CLIENT _____ SITE _____

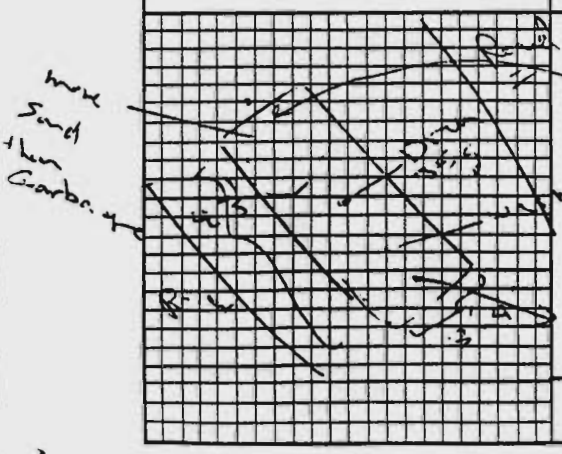
SURFACE ELEVATION _____ EXCAVATOR _____

DATUM _____ EQUIPMENT _____

WATER ELEVATION _____ INSPECTOR _____

DEPTH (ft)	LITHOLOGIC SYMBOL	MOIST.	DESCRIPTION OF SOIL	STONES
0				
0 - 2			0-2 3 mm Top. Soil; Grass - more silty at deeper depth	
2 - 12'			Garbage mixed with gray silty sand. There is a group of multilayer garbage and alternative	
5			at water Table one crushed drum was found No high readings was detected at	
10			Test Pit Direction southeast - NW	

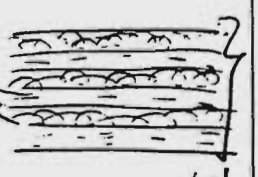
TEST PIT LOCATION:



PERC TEST No. 1 DEPTH

RUN No. TIME (min sec)

1
2
3
4
5
6
7
8



PERC TEST No. 2 DEPTH

RUN No. TIME (min sec)

1
2
3
4
5
6
7
8

LAWLER, MATUSKY & SKELLY ENGINEERS
Environmental Science & Engineering Consultants

TEST PIT AND PERC TEST LOG

DATE STARTED _____ TIME ~~1:30~~ JOB No. 576-067

DATE FINISHED _____ TIME _____ TEST PIT No. T.P.5B

CLIENT _____ SITE _____

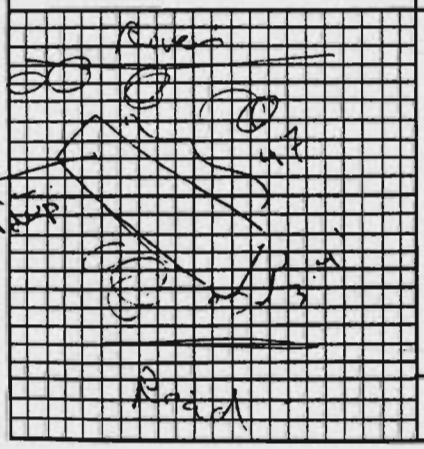
SURFACE ELEVATION _____ EXCAVATOR _____

DATUM _____ EQUIPMENT _____

WATER ELEVATION _____ INSPECTOR _____

DEPTH (ft)	LITHOLOGIC SYMBOL	MOIST.	DESCRIPTION OF SOIL	STONES
0				
0-0.5'	0.5'-		Topsoil & Brown silty sand fill	
			Garbage - Papers, metals, (Refrigerator...	
			wood, plastic, glass, mixed with sand	
			more appliances junk,	
			metal pipes, methane gas puplin	
			from garbage bottom.	
5'				
W.T 6'			Grayish Brown water, no sheen	
			smelly garbage	
			southeast Trench direction.	
			bedrock at 12' deep	
			gray - silty clay; some V.F. sand at	
			the bottom	
10				

TEST PIT LOCATION:



PERC TEST No. 1 DEPTH		PERC TEST No. 2 DEPTH	
RUN No.	TIME (min sec)	RUN No.	TIME (min sec)
1	45	1	
2	4	2	
3		3	
4	2	4	
5	Silty sandy clay. Bedrock	5	
6		6	
7		7	
8		8	

LAWLER, MATUSKY & SKELLY ENGINEERS
Environmental Science & Engineering Consultants

TEST PIT AND PERC TEST LOG

DATE STARTED _____ TIME _____ JOB No. _____

DATE FINISHED _____ TIME _____ TEST PIT No. TP-6B

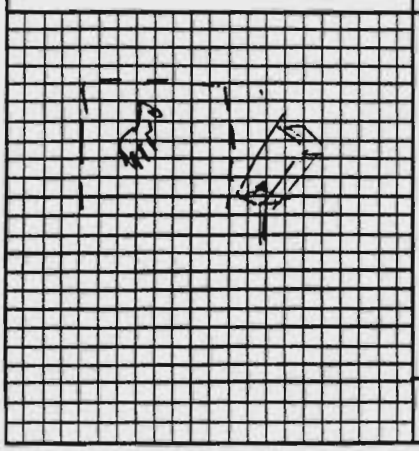
CLIENT _____ SITE _____

SURFACE ELEVATION _____ EXCAVATOR _____

DATUM _____ EQUIPMENT _____

WATER ELEVATION _____ INSPECTOR _____

DEPTH (ft)	LITHOLOGIC SYMBOL	MOIST.	DESCRIPTION OF SOIL	STONES
0	0-.4'	Dry	Topsoil + grass (Brown silty sand	low odor ~~no~~ ~~high~~ dry no water Table
	0.4-6		Garbage mixed with silty brown sand.. Plastic, glass, wires, paper	
	6-10'		Natural material of greenish yellow silty clay with roots in it no water (only trapped into fractures)	
5	10'-		hit Refusal. it may be a blocks of Rock.	
			No ground water was detected at 10' deep.	
10				

TEST PIT LOCATION:	PERC TEST No. 1 DEPTH	PERC TEST No. 2 DEPTH
	RUN No. TIME (min sec) 1 2 3 4 5 6 7 8	RUN No. TIME (min sec) 1 2 3 4 5 6 7 8

LAWLER, MATUSKY & SKELLY ENGINEERS
Environmental Science & Engineering Consultants

TEST PIT AND PERC TEST LOG

DATE STARTED _____ TIME _____ JOB No. _____

DATE FINISHED _____ TIME _____ TEST PIT No. T.P. 78

CLIENT _____ SITE _____

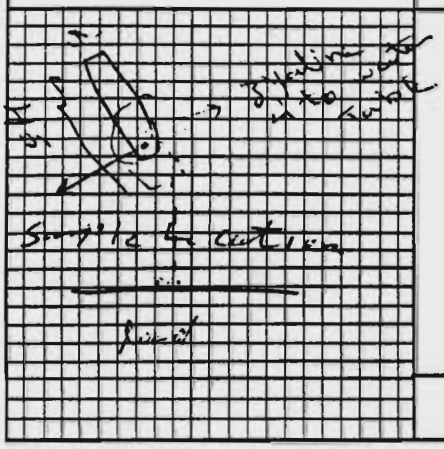
SURFACE ELEVATION _____ EXCAVATOR _____

DATUM _____ EQUIPMENT _____

WATER ELEVATION _____ INSPECTOR _____

DEPTH (ft)	LITHOLOGIC SYMBOL	MOIST.	DESCRIPTION OF SOIL	STONES
0	0-1'		Top soil Brown silty sand.	
	1'-3'		garbage - dump mixed with sand	
	3'-5		garbage (glass, Tires, wood, Paper & Plastic) mixed with greenish gray silty clay	
5	5-6		* water at 5½ ft and metlin gas.	
	6-8'		* Garbage to 8' deep	
	8' →		Bottom of Bluish gray silty Clay, little sand	
			Sweet Strong and strange ~~odor~~ odor of aromatic compound.	
10			samples ~~were~~ were collected at interface 8' deep. from strong odor clay.	Reading over 2500 ppm 400 ppm
			* Trench was exited to 45ft tracing Nuclear until it was gone.	14.8 ft to top of sand and cotton with saturated

TEST PIT LOCATION:



PERC TEST No. 1
DEPTH

RUN No.	TIME (min sec)
1	
2	
3	
4	
5	
6	
7	
8	



PERC TEST No. 2
DEPTH

RUN No.	TIME (min sec)
1	
2	
3	
4	
5	
6	
7	
8	

LAWLER, MATUSKY & SKELLY ENGINEERS
Environmental Science & Engineering Consultants

TEST PIT AND PERC TEST LOG

DATE STARTED 9/24/92 TIME 7:30 Am JOB No. _____

DATE FINISHED _____ TIME _____ TEST PIT No. TP 8B

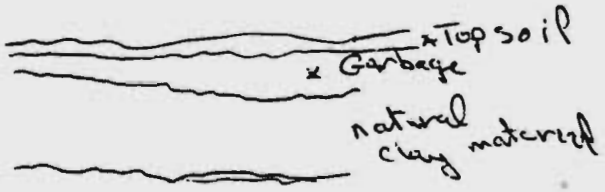
CLIENT _____ SITE _____

SURFACE ELEVATION _____ EXCAVATOR _____

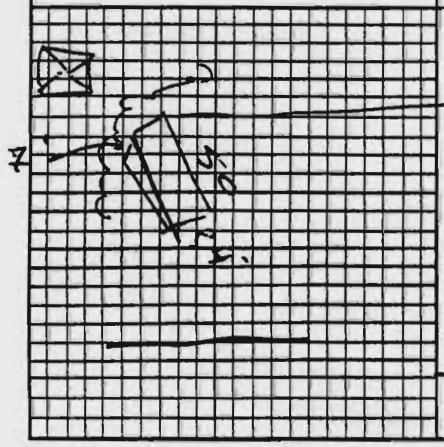
DATUM _____ EQUIPMENT _____

WATER ELEVATION _____ INSPECTOR _____

DEPTH (ft)	LITHOLOGIC SYMBOL	MOIST.	DESCRIPTION OF SOIL	STONES
0	0 - 5		Top soil, Roots, grass. Dry, Loose sand & layers of garbage over 50 ft long on garbage was thicking from 1.5' to 3.0' of garbage	
	1 - 4			
	4 - 8		* Dry Compacted greenish yellow clay, Roots. no smell, No oder, no water.	1.0 1.5 3.0
5				
10				



TEST PIT LOCATION:



PERC TEST No. 1 DEPTH		PERC TEST No. 2 DEPTH	
RUN No.	TIME (min sec)	RUN No.	TIME (min sec)
1	1.0 Top soil 1.5 Garbage 3.0 natural clay compacted	1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	

LAWLER, MATUSKY & SKELLY ENGINEERS
Environmental Science & Engineering Consultants

TEST PIT AND PERC TEST LOG

DATE STARTED 9/24 TIME 10 50 JOB No. _____

DATE FINISHED 9/24 TIME _____ TEST PIT No. TP 9B

CLIENT _____ SITE _____

SURFACE ELEVATION _____ EXCAVATOR _____

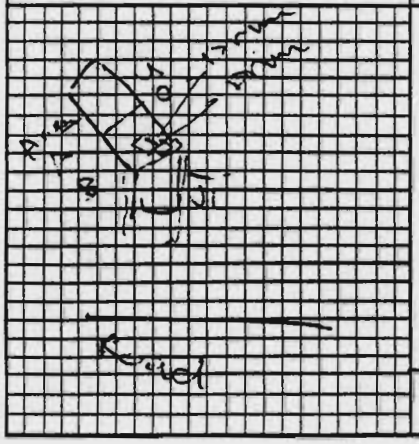
DATUM _____ EQUIPMENT _____

WATER ELEVATION _____ INSPECTOR _____

DEPTH (ft)	LITHOLOGIC SYMBOL	MOIST.	DESCRIPTION OF SOIL	STONES
0	O —		Garbage on surface mixed with Brown silty sand. Dry Plastic, Tires, glass, wood cans, metals, paint Pallet was found with green Paint on it	
5		Area A	Eq. water Tanks License Plate N.Y 1962 Bedrock at 12' deep, This layer of greenish gray Clay on the surface of the bedRock. No odor, No odor,	
10		Area B	+ Garbage on surface mixed with Brown silty to Black x One Drum was found of product was sampled from it (at 3' deep) Couldn't identified). x Another Drum was found near the First one was OK and Silicone cable on it.	
12'				

No Table

TEST PIT LOCATION:



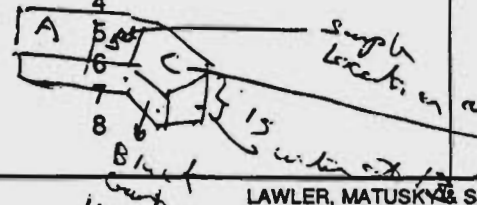
PERC TEST No. 1
DEPTH

~~water inhibited at 12' below surface~~

Bedrock was found at 13'

x VOA sample Q

RUN No.	TIME (min sec)
1	
2	
3	
4	
5	
6	
7	
8	



PERC TEST No. 2
DEPTH

RUN No.	TIME (min sec)	
1		area C
2		
3		melted gas ball.
4		To 13' with Table
5		at bottom at 14.5
6		of silty clay &
7		sample Location at 12' 8 gray. same spiral shells as the clay.
8		

LAWLER, MATUSKY & SKELLY ENGINEERS
Environmental Science & Engineering Consultants

TEST PIT AND PERC TEST LOG

DATE STARTED 9/24/92 TIME 1521 JOB No. _____

DATE FINISHED _____ TIME _____ TEST PIT No. TP-1

CLIENT _____ SITE _____

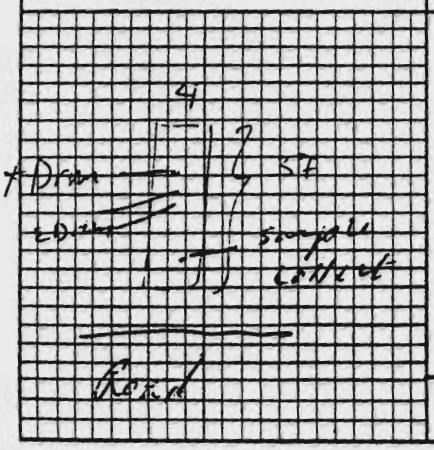
SURFACE ELEVATION _____ EXCAVATOR _____

DATUM _____ EQUIPMENT _____

WATER ELEVATION _____ INSPECTOR _____

DEPTH (ft)	LITHOLOGIC SYMBOL	MOIST.	DESCRIPTION OF SOIL	STONES
0	0-0.8	Dry	Top soil brown sand & silt, roots garbage mixed with f. sand. (glass [Bottles], metals, wood, Plastic Paper.)	
	0.8-		* A Drum was found at 3ft dep (crushed yellow & green with Micro Tip 1525 PPM 10' from the Beginning of the Trench.	
5			* another Barrels Pale orange Glowing strip. unsampleable Solid elastic it could be silicone.	
			* Third drum was found more Rusty, at 3ft	
			* Sample collected from the bottom at 12' dep of f. sand & gravel.	
10		Dry	* No water, (Dry) NO Bedrock only fine sand & silty clay at the bottom	
			* (Grey) high reading was found from the Barrels	

TEST PIT LOCATION:



PERC TEST No. 1 DEPTH

RUN No. TIME (min sec)

1
2
3
4
5
6
7
8



PERC TEST No. 2 DEPTH

RUN No. TIME (min sec)

1
2
3
4
5
6
7
8

LAWLER, MATUSKY & SKELLY ENGINEERS
Environmental Science & Engineering Consultants

TEST PIT AND PERC TEST LOG

DATE STARTED 9/24/92 TIME 1730 JOB No. _____

DATE FINISHED _____ TIME _____ TEST PIT No. TP-11B

CLIENT _____ SITE _____

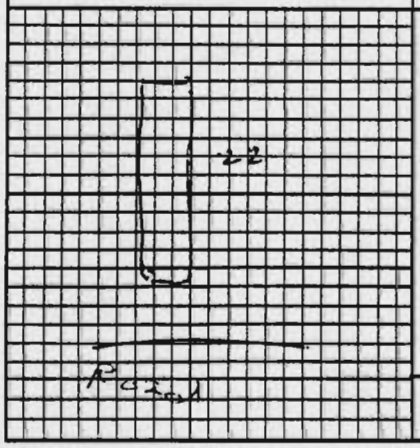
SURFACE ELEVATION _____ EXCAVATOR _____

DATUM _____ EQUIPMENT _____

WATER ELEVATION _____ INSPECTOR _____

DEPTH (ft)	LITHOLOGIC SYMBOL	MOIST.	DESCRIPTION OF SOIL	STONES
0	0 – 2'	Dry	Garbage mixed with Brown silty sand (Paper, Bottles, Plastic wood, material, metals,) household waste. Pieces of ROCKS.	
	2'	Dry	Blackish color Garbage, 1963 Newspaper in extent condition	
5			No Drums, no water	
			Grey f. sand, & clay, some Rock fragments. (0.5 – 2 ft Diameter)	
			samples were collected from the interface.	
10				

TEST PIT LOCATION:



PERC TEST No. 1 DEPTH		PERC TEST No. 2 DEPTH	
RUN No.	TIME (min sec)	RUN No.	TIME (min sec)
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	

LAWLER, MATUSKY & SKELLY ENGINEERS
Environmental Science & Engineering Consultants

TEST PIT AND PERC TEST LOG

DATE STARTED 9/25/92 TIME _____ JOB No. 576-067

DATE FINISHED _____ TIME _____ TEST PIT No. TP-12B

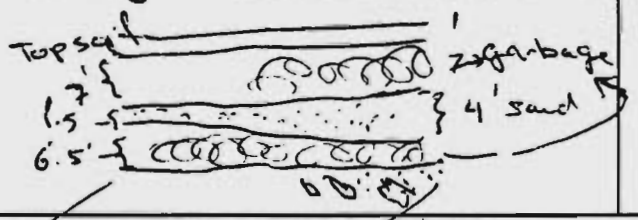
CLIENT _____ SITE _____

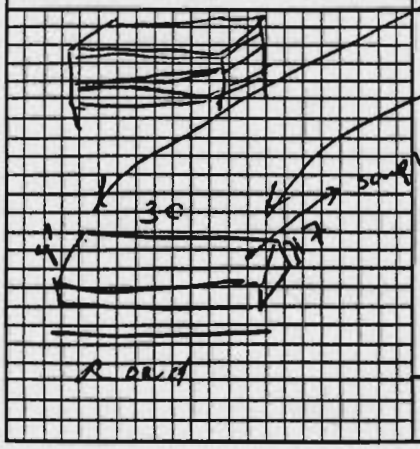
SURFACE ELEVATION _____ EXCAVATOR _____

DATUM _____ EQUIPMENT _____

WATER ELEVATION _____ INSPECTOR _____

DEPTH (ft)	LITHOLOGIC SYMBOL	MOIST.	DESCRIPTION OF SOIL	STONES
0	0 – 1'	Dry	Brown Top Soil & Fill	
	1' – 8'		Household garbage (Plastic, paper Bottles, Rusty metals, Tires, woods, Junks, (water Tank,)	
	8 – 9.5		Layer of gray sand (left Boundary) and clay.	
5	9.5-16		Second Bfft of Garbage. (New dump, same Type of garbage grey	
	16 → 17 Refusal		with bottom grey silty Clay with Roots and Rock Pieces. at 12'-17' dump. (Refusal at 17'	
			Sample was collected from green gray silty clay, some Roots & Rocks.	
10				



TEST PIT LOCATION:	PERC TEST No. 1 DEPTH	PERC TEST No. 2 DEPTH
	RUN No. TIME (min sec)	RUN No. TIME (min sec)
	1	1
	2	2
	3	3
	4	4
	5	5
	6	6
	7	7
	8	8

LAWLER, MATUSKY & SKELLY ENGINEERS
Environmental Science & Engineering Consultants

TEST PIT AND PERC TEST LOG

DATE STARTED 9/25/92 TIME 1130 JOB No. _____

DATE FINISHED _____ TIME _____ TEST PIT No. ~~TP-13~~ 6

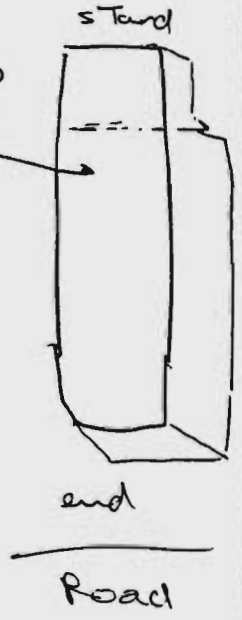
CLIENT _____ SITE _____

SURFACE ELEVATION _____ EXCAVATOR _____

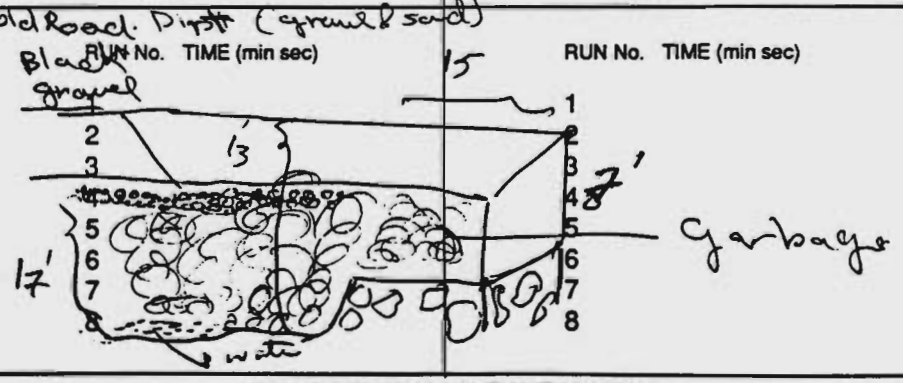
DATUM _____ EQUIPMENT _____

WATER ELEVATION _____ INSPECTOR _____

DEPTH (ft)	LITHOLOGIC SYMBOL	MOIST.	DESCRIPTION OF SOIL	STONES
0	0-0.5		Topsoil mixed with garbage.	
	0.5-5		Garbage (Bottles, cans, glass, Plastic wood, Tires. Paper.	
			+ A Broken GE x Drum was found at 5' deep from the hole filled with white solid material easy to be friable, it has silicone label and GE Tradmark on it.	
5	5'-16'		x samples were collected from the center of the canal at 16-17' depth. of greenish gray silty sand some clay, and Rock pieces.	
10				



TEST PIT LOCATION:	PERC TEST No. 1 DEPTH	PERC TEST No. 2 DEPTH
	RUN No. TIME (min sec)	RUN No. TIME (min sec)



LAWLER, MATUSKY & SKELLY ENGINEERS
Environmental Science & Engineering Consultants

TEST PIT AND PERC TEST LOG

DATE STARTED 9/28/92 TIME 1430 JOB No. _____

DATE FINISHED _____ TIME _____ TEST PIT No. TP-19B

CLIENT _____ SITE _____

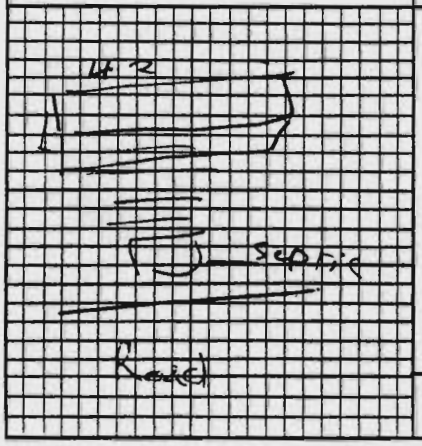
SURFACE ELEVATION _____ EXCAVATOR _____

DATUM _____ EQUIPMENT _____

WATER ELEVATION _____ INSPECTOR _____

DEPTH (ft)	LITHOLOGIC SYMBOL	MOIST.	DESCRIPTION OF SOIL	STONES
0	0-2		Brown silty Topsoil (grass on the top)	
1	2-5	household	Garbage (mixed with fill (Brown silty sand)	
2			Paper, Plastic, Tires, Bottles, wood)	
3	5-10	Standing water Table, and methane is Bubbling (gas is coming out, sewer smell).		
4			Garbage (Blackish)	(OVA) → breathing zone 1 ppm = methane 5-10 =
5				
at	10-11-		OVA equal (Background).	
	12'		at 12' deep a crushed drum filled with Blue Liquid (heavy Like Paint) was found and a 2 VOA 300 Bottle were collected the drum was overBack and will be pu	
10	Apple		A	

TEST PIT LOCATION:



PERC TEST No. 1 DEPTH		PERC TEST No. 2 DEPTH	
RUN No.	TIME (min sec)	RUN No.	TIME (min sec)
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	

LAWLER, MATUSKY & SKELLY ENGINEERS
Environmental Science & Engineering Consultants

TEST PIT AND PERC TEST LOG

DATE STARTED 9/29/92 TIME 0800 JOB No. 576-07

DATE FINISHED _____ TIME _____ TEST PIT No. 15-B

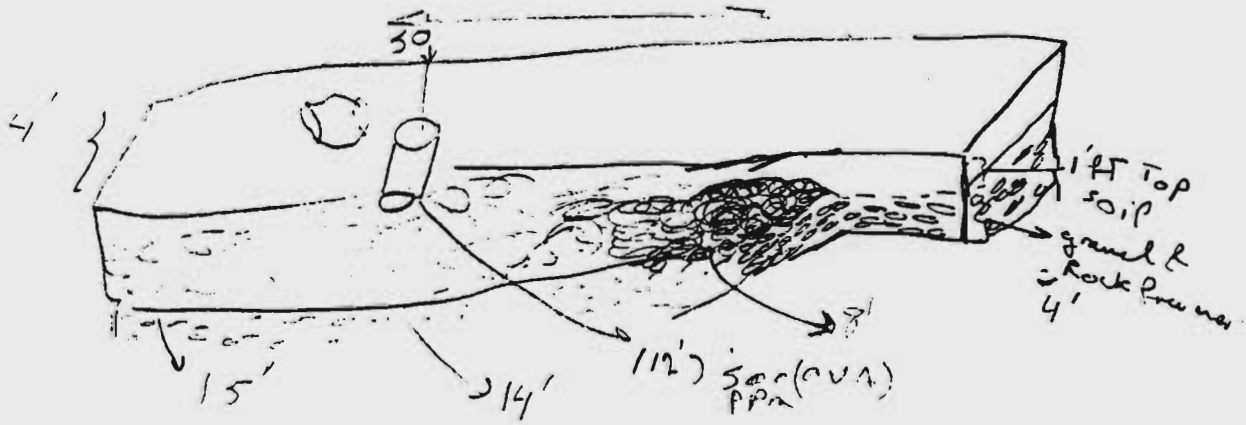
CLIENT _____ SITE _____

SURFACE ELEVATION _____ EXCAVATOR _____

DATUM _____ EQUIPMENT _____

WATER ELEVATION _____ INSPECTOR _____

DEPTH (ft)	LITHOLOGIC SYMBOL	MOIST.	DESCRIPTION OF SOIL	STONES
0				
1	0 – 1		Brown Topsoil and sand Fill	
	1 – 3		~~Black~~ Black ground and Rock fragment extend to 3' deep	
2		(Road)	~~garbage start to show up laterally on the~~	
			Top of the ground. Household garbage mixed with Fill	
3				
Reading 4	2 – 3 ppm HNu		(~~Paper, Plastic, Bottle, Junks, wood~~)	
			~~at 50' station a drum with a label was~~	
5			~~yellow clear~~ heavy viscous liquid was found inside and was enough to collect sample	
			another Drum was found crushed Empty, no label	
			+ Bottom at 14' (silty) gray sand. Rock fragments, Poo	
			+ extend to 15' and Bottom was at 15' the same	
			+ As samples were collected, from the B interval Bottom.	
10			+ The sampled Drum was repacked and	
			and was put back in the hole at 4' depth.	



TEST PIT AND PERC TEST LOG

DATE STARTED 9/29/92 TIME 1200 JOB No. 57[illegible]-2

DATE FINISHED 9/29/92 TIME 1330 TEST PIT No. TP-16B

CLIENT _____ SITE _____

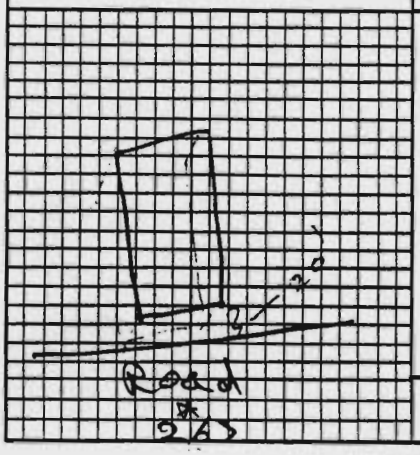
SURFACE ELEVATION _____ EXCAVATOR _____

DATUM _____ EQUIPMENT _____

WATER ELEVATION 1.0 below surface INSPECTOR _____

DEPTH (ft)	LITHOLOGIC SYMBOL	MOIST.	DESCRIPTION OF SOIL	STONES
0	0 – 0.5'		Top mixed garbage and Topsoil	
	0.5 – 1.5		Garbage (household) paper, Bottles Plastic, some Fill.	
	1.0 w.T →		water Table. (shallow water Table). gray color.	
	1.5 – 6'		garbage (house hold.)	
5	6' –		bottom sediments (gray silty fine Sand, some clay & very fined sand & Rock chips	
			* ~~Test~~ Same sheen on water surface from the bottom sample.	
			* Sample were collected from the silty sand (gray)	
10			* No Reading During the digging because 1- shallow water Table (1.0)	

TEST PIT LOCATION:

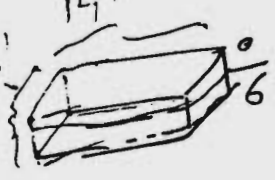


PERC TEST No. 1 DEPTH 2 – less garbage thick

PERC TEST No. 2 DEPTH 5 (6')

3 – less cover Fill (0.5')

RUN No.	TIME (min sec)	RUN No.	TIME (min sec)
1	14'	1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	



LAWLER, MATUSKY & SKELLY ENGINEERS
Environmental Science & Engineering Consultants

APPENDIX B

DATA USABILITY SUMMARY

REFERENCE 45

DATA USABILITY REPORT

OLD HALFMOON LANDFILL SITE

The report from Data Validation Services concluded that analyses performed on samples collected from the Old Halfmoon Landfill site were in compliance with the exceptions discussed below.

The volatiles analyses of samples OHTB-1 and -14-D1 were found not in compliance because they were analyzed in association with a method blank containing a surrogate failure. A reanalysis performed for OHTB-1 was one day outside the prescribed holding time. The outlying surrogate response in the associated method blank and the holding time violation do not affect the reported results in OHTB-1 or -14-D1; the data for the initial analyses and reanalysis are usable without qualification.

The volatiles analyses of samples OHTB-4 and -5 were initially processed under a continuing calibration standard (CCS) with an outlying response requiring reanalyses; the reanalyses holding time was exceeded. As the validator found the outlying CCS response was consistent with calibration standards in subsequent calibration curves, and the reanalyses were only one to two days outside the holding time, the initial and reanalysis for both samples are usable without qualification.

Samples OHTB-9-D1, -14-D1, and -15-D1 were analyzed at medium level using a methanol extraction. Dilutions were required to bring target compounds into the calibration range for quantification. The final analyses were one to two days outside the required seven-day holding time. Sample OHTB-7 was also analyzed at medium level and one day past the required holding time; a medium-level matrix spike/matrix spike duplicate (MS/MSD) (OHTB-7 MS/MSD) was processed seven days beyond the required holding time. As the methanol extraction was performed for all these samples within the required holding time, concentrations of target compounds analyzed one to two days outside the prescribed holding time are not likely to have been significantly compromised and are usable without qualification. However, target compounds in the MS/MSD do show some losses in

comparison with OHTB-7. Spike recoveries were acceptable with the exception of toluene, where recoveries were -249 and -320%. The MS/MSD data are usable as estimated concentrations that confirm the presence and concentration of target analytes in OHTB-7. Poor toluene matrix spike recoveries that may have been a result of sample nonhomogeneity or spike losses require the reported toluene concentration in OHTB-7 to be qualified as estimated and likely biased low.

A less dilute volatile organic compound (VOC) reanalysis performed on drum sample OHTB-9-D1 was one day beyond the required holding time, and a diluted reanalysis performed sample OHTB-15-D1 was performed four days beyond the required holding time. The violation in holding time has no significant bearing on the elevated levels of toluene detected in these samples. The laboratory qualified the elevated level in OHTB-9-D1 with a "b" to indicate detection of a low level of toluene in the associated method blank, likely due to the elevated levels in the samples; the low levels in the associated blank are insignificant compared to the toluene level in the sample and should not be misconstrued as indicating a laboratory contaminant. The data for both analyses are usable without qualification.

Soil samples OHTB-7, -7MS, and -7MSD and drum samples OHTB-9-D1, -14-D1, and -15-D1 were not in compliance because they were not associated with a matrix spike blank. The reported data are unaffected by this noncompliance and are usable without qualification.

The volatile toxicity characteristic leaching procedure (TCLP) reanalysis of OHTB-7 was performed two days outside the prescribed holding time (14 days) following the initial TCLP extraction, causing the analysis to be in noncompliance. The initial analysis was analyzed at a 1:26 dilution within the holding time. A reanalysis was performed at 1:20 dilution. No TCLP volatile components were reported in either analyses. The reported detection limits were well below the TCLP regulatory limits for both analyses. The reported data are usable to indicate that elevated levels of volatile components are not present in the original TCLP extract.

The volatile TCLP analyses for drum samples OHTB-9-D1 and -14-D1 were outside the required holding time by several hours; the reported results are unaffected by this noncompliance and usable without qualification.

The semivolatile analysis for OHTB-13 was not in compliance because it was performed minutes outside the calibration time frame. The reported data are unaffected by this noncompliance and are usable without qualification.

Two samples (OHTB-15 and -16) were received at the laboratory four days after the date of sampling due to shipping problems (the shipping label apparently was removed from the cooler during handling and the cooler was returned to LMS). The four-day holding time violation of the analyses impacts the results. The reported concentrations for these samples may reflect a loss of analytes, particularly for the volatile fraction.

The pesticide/PCB analysis of sample OHTB-16 was not in compliance due to a nine-day violation in extraction holding time. This sample was also delayed for four days prior to laboratory receipt, resulting in a total of 13 days before the sample was extracted. Low levels of several pesticides were reported in this analysis. Although pesticides generally exhibit low volatility, an extended holding time may have compromised the results of this analysis. The data are qualified to indicate that the reported concentrations are biased low due to an extension in holding time, but are usable to indicate elevated levels of pesticides are not present in this sample.

The validator found the remaining data to be in compliance with NYSDEC ASP (December 1991); however, several issues affecting data usability are discussed and summarized below.

Sample OHTB-11 was reanalyzed for VOCs because of an initial elevated surrogate recovery of bromofluorobenzene (BFB) of 119%, above the 113% limit. The high level of toluene in the reanalysis is qualified with an "e" to indicate that the toluene response is above the calibration range and the reported concentration is estimated. The outlying surrogate response in the initial analysis does not affect the usability of the reported data; both analyses are usable without qualification.

The acetone and methylene chloride levels reported in the medium-level and diluted volatile analyses should not be regarded as "elevated" because they incorporate dilution effects and errors; the reported concentrations are estimated and should not be regarded as sample components.

The laboratory case narrative indicates that the 1,1,1-trichloroethane (1,1,1-TCA) present in the sample taken from OHTB-13 is likely due to carryover from an unrelated sample processed immediately before OHTB-13 that contained elevated levels of 1,1,1-TCA. The validator agreed with the laboratory and recommended rejecting the reported 1,1,1-TCA concentration. The reported 1,1,1-TCA concentration in OHTB-13 was rejected and is not reported.

Several semivolatile tentatively identified compounds (TICs) were qualified with a "b" and should not be considered sample components as they were detected in similar concentrations in the associated method blank.

The TCLP semivolatile fraction for sample OHTB-15-D1 was not in compliance due to a 10-day method extraction holding time following the initial TCLP extraction. Low levels of methylphenol (cresol) compounds were found, but were not reported in the target compound list (TCL) analysis. The violation in holding time does not significantly affect the reported results as the initial TCLP extraction was performed within the required holding time. The data are usable without qualification.

With the exception of OHTB-15 and -16, which were analyzed under a separate sample delivery group, all the reported lead concentrations for the remaining soil and drum samples are unreliable due to negative spike recoveries for samples analyzed by inductively coupled plasma (ICP), elevated spike recoveries for samples analyzed by graphite furnace atomic absorption (GFAA), and poor duplicate correlation for both methods (134% difference (D) and 151%D by ICP and GFAA, respectively). As all the samples contained detectable levels of lead, the poor spike performance may reflect sample nonhomogeneity. The lead data are usable, with the qualification that all the reported concentrations qualified with an "R" or "N"

can be used only to indicate the presence of lead and do not reliably convey the actual concentration in the samples.

Antimony and selenium matrix spike recoveries were slightly depressed (40 and 65%, respectively). These values are not excessively low, especially for soil samples where sample nonhomogeneity and interferences are common. The data do not require qualification and are usable as reported.

Overall, the results of the LMS usability review concluded that, with the exception of the reported concentration of 1,1,1-TCA in sample OHTB-13, which was rejected as a laboratory contaminant, the data submitted for the Old Halfmoon Landfill site are usable with the appropriate qualifications discussed in this usability report.

APPENDIX C

PERTINENT FILES OR RECORDS

REFERENCE 13

CORPS OF ENGINEERS

U. S. ARMY

U. S. LAKE SURVEY

CHART NO. 180

NEW YORK STATE
BARGE CANAL SYSTEM

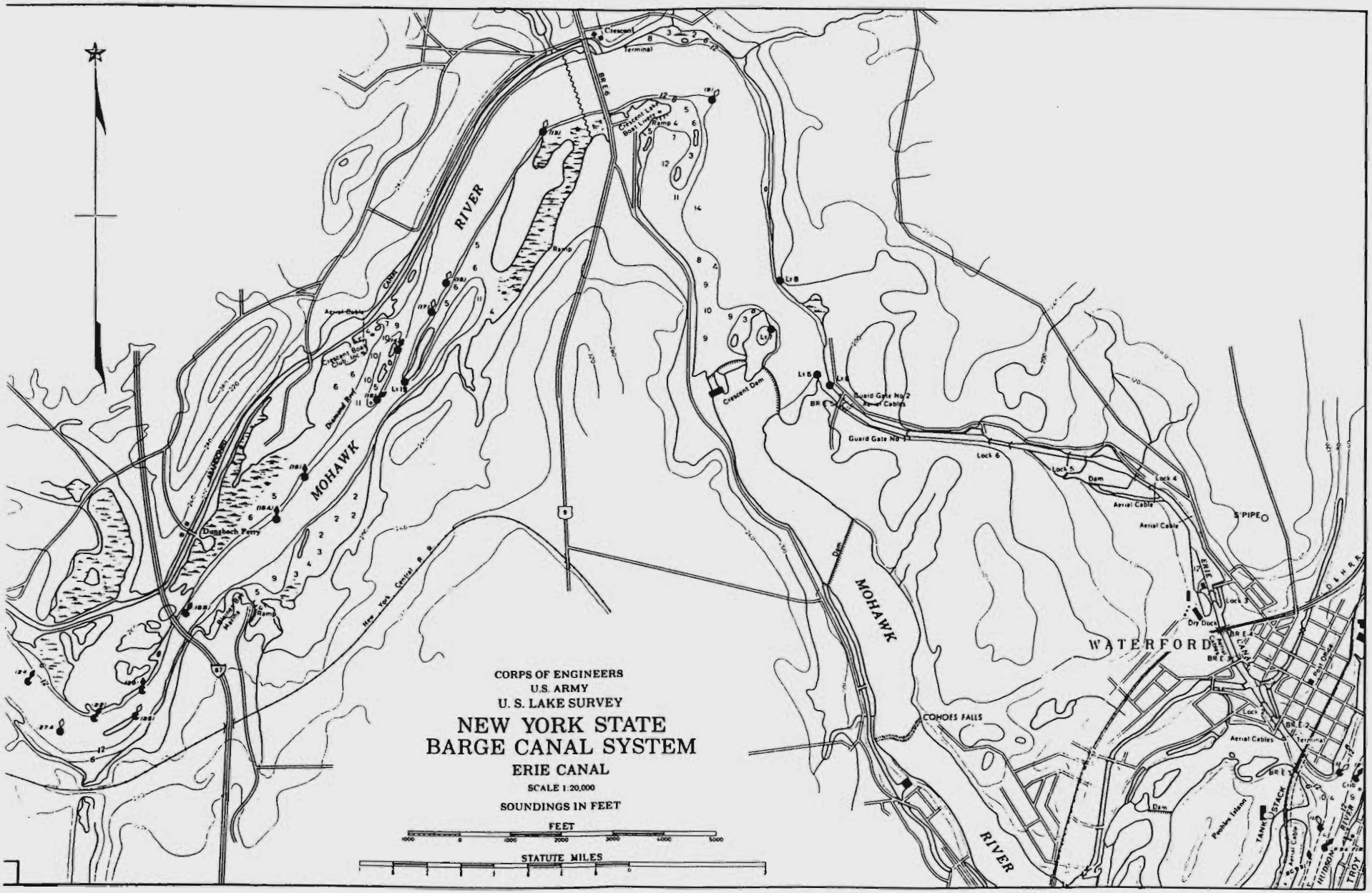
CAYUGA-SENECA, OSWEGO, ERIE AND CHAMPLAIN CANALS

Published and sold by
U.S. ARMY ENGINEER DISTRICT, LAKE SURVEY
CORPS OF ENGINEERS
630 Federal Building, Detroit, Michigan 48226 20 JAN 1967
AIDS TO NAVIGATION CORRECTED TO

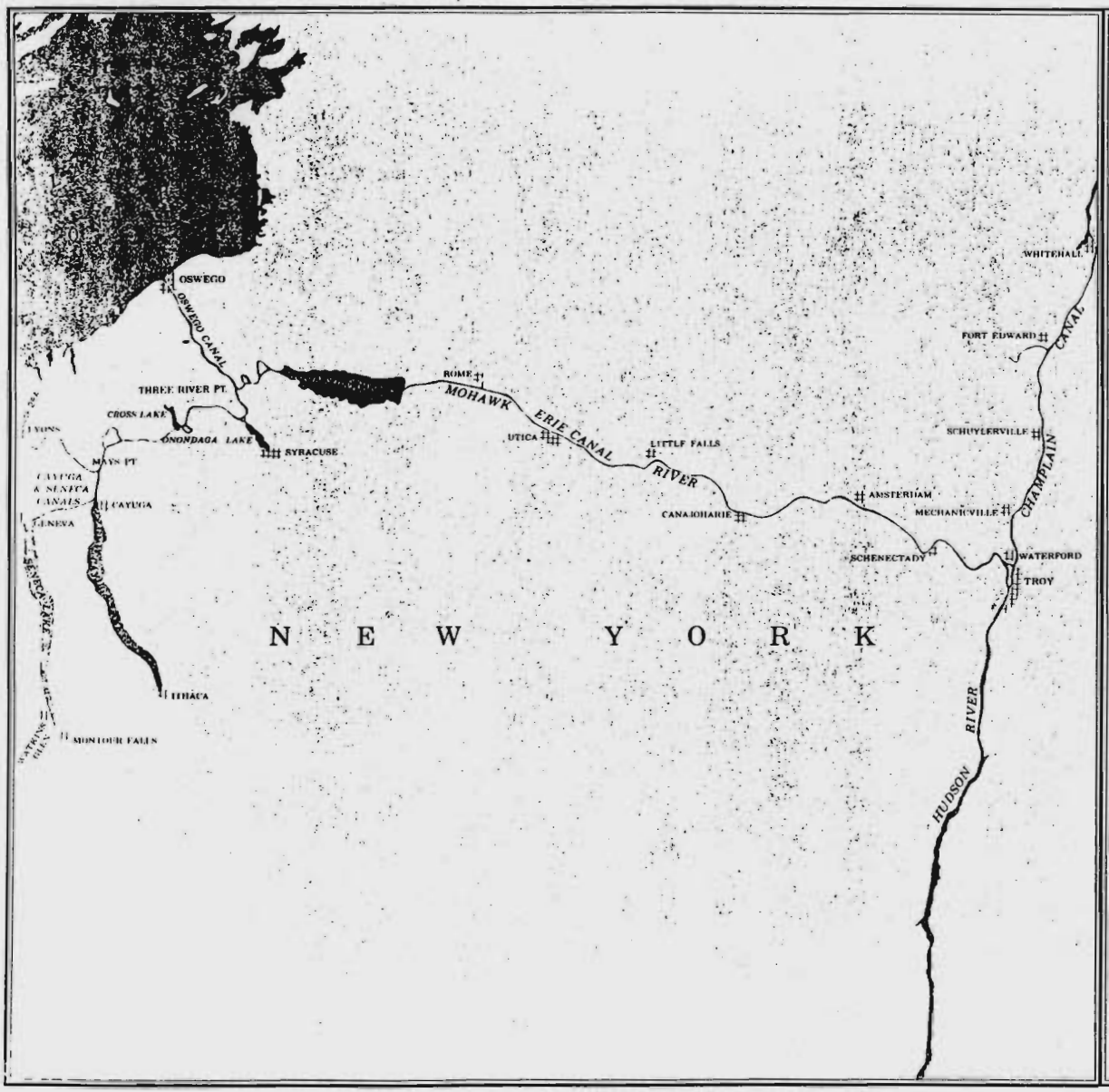
G
380
.P5N7
1964

EDITION OF 1964

PRICE $2.0


CORPS OF ENGINEERS
U.S. ARMY
U. S. LAKE SURVEY
NEW YORK STATE
BARGE CANAL SYSTEM
ERIE CANAL
SCALE 1:20,000
SOUNDINGS IN FEET
FEET
STATUTE MILES
MOHAWK RIVER
MOHAWK
Crescent
Terminal
Crescent Lake Boat Launch Ramp 4
Crescent Dam
Guard Gate No. 1
Guard Gate No. 2
Aerial Cable
Lock 6
Lock 5
Dam
Lock 4
Lock 3
Lock 2
Lock 1
Dry Dock
WATERFORD
COHOES FALLS
Dam
Aerial Cables
Terminal
STACK
TANK
Peebles Island
HUDSON RIVER
TROY
Dunsbach Ferry
Ramp
New York Central R R
ERIE
D L & W R R
STIPE

REFERENCE 16



CORPS OF ENGINEERS
U. S. ARMY

U. S. LAKE SURVEY

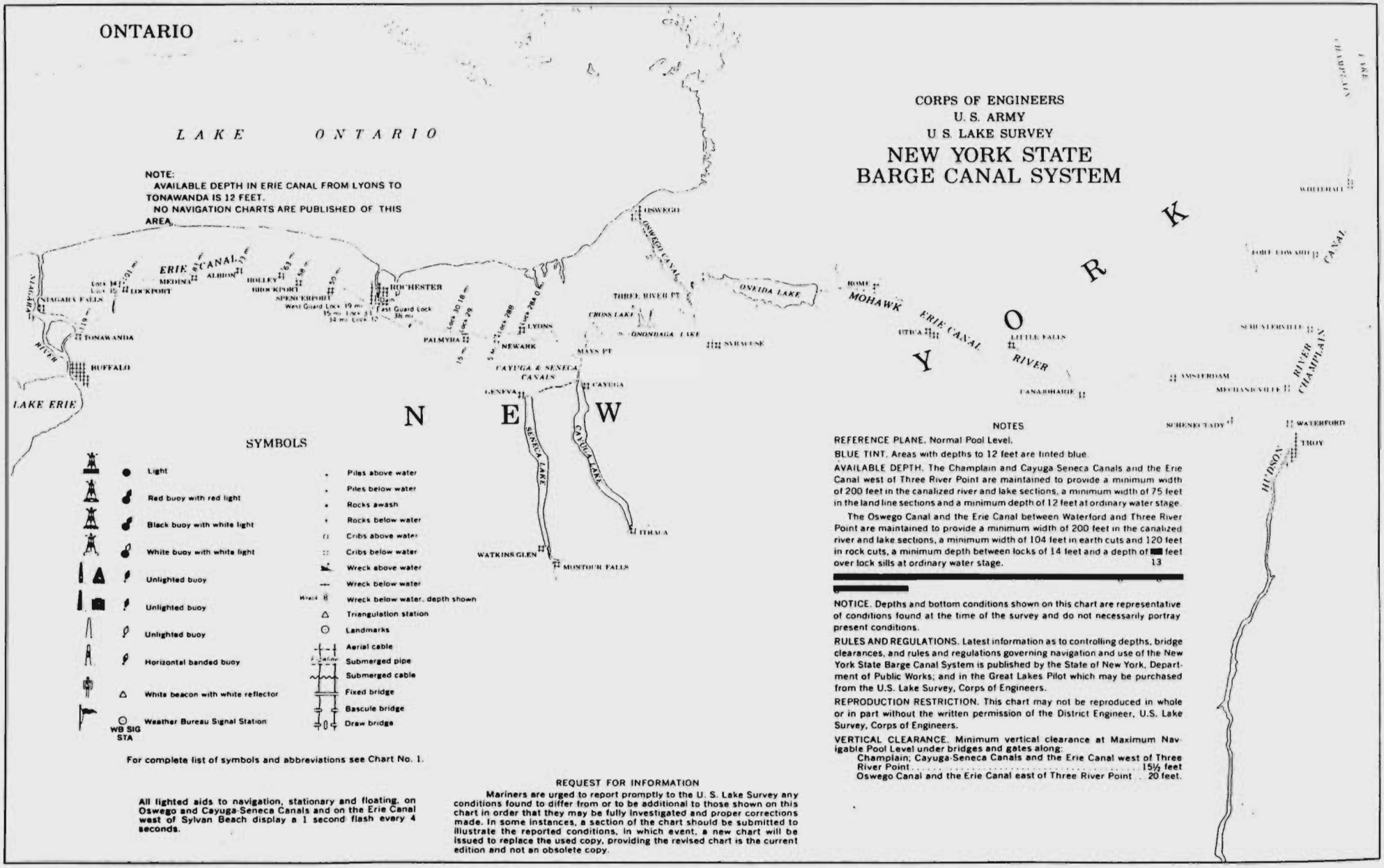
CHART NO. 180

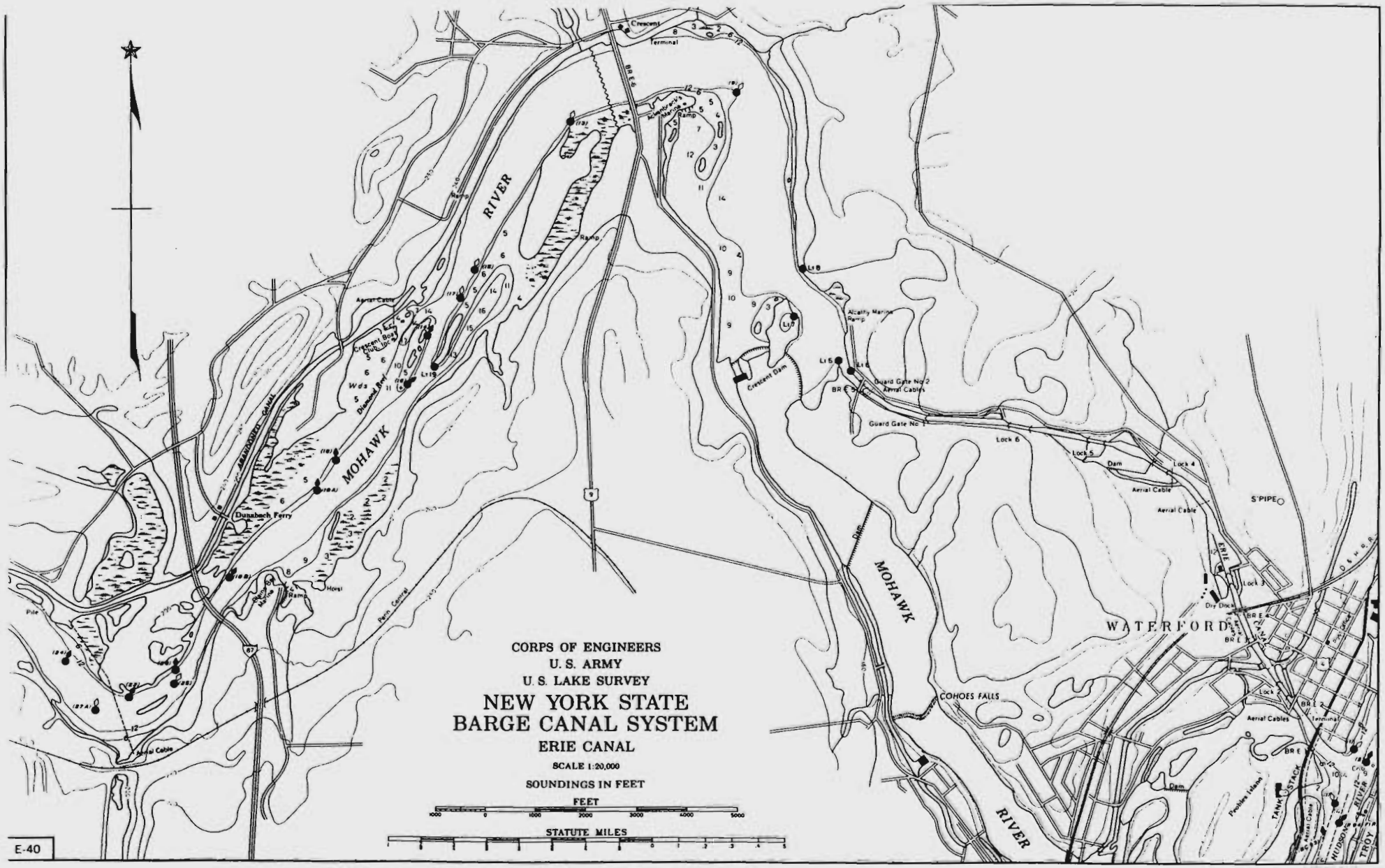
NEW YORK STATE BARGE CANAL SYSTEM

Published and sold by
DEPARTMENT OF THE ARMY
LAKE SURVEY DISTRICT, CORPS OF ENGINEERS
630 Federal Building and U. S. Courthouse, Detroit, Michigan 48226
AIDS TO NAVIGATION CORRECTED TO
17 MARCH 1970

EDITION OF 1969

PRICE $2.00

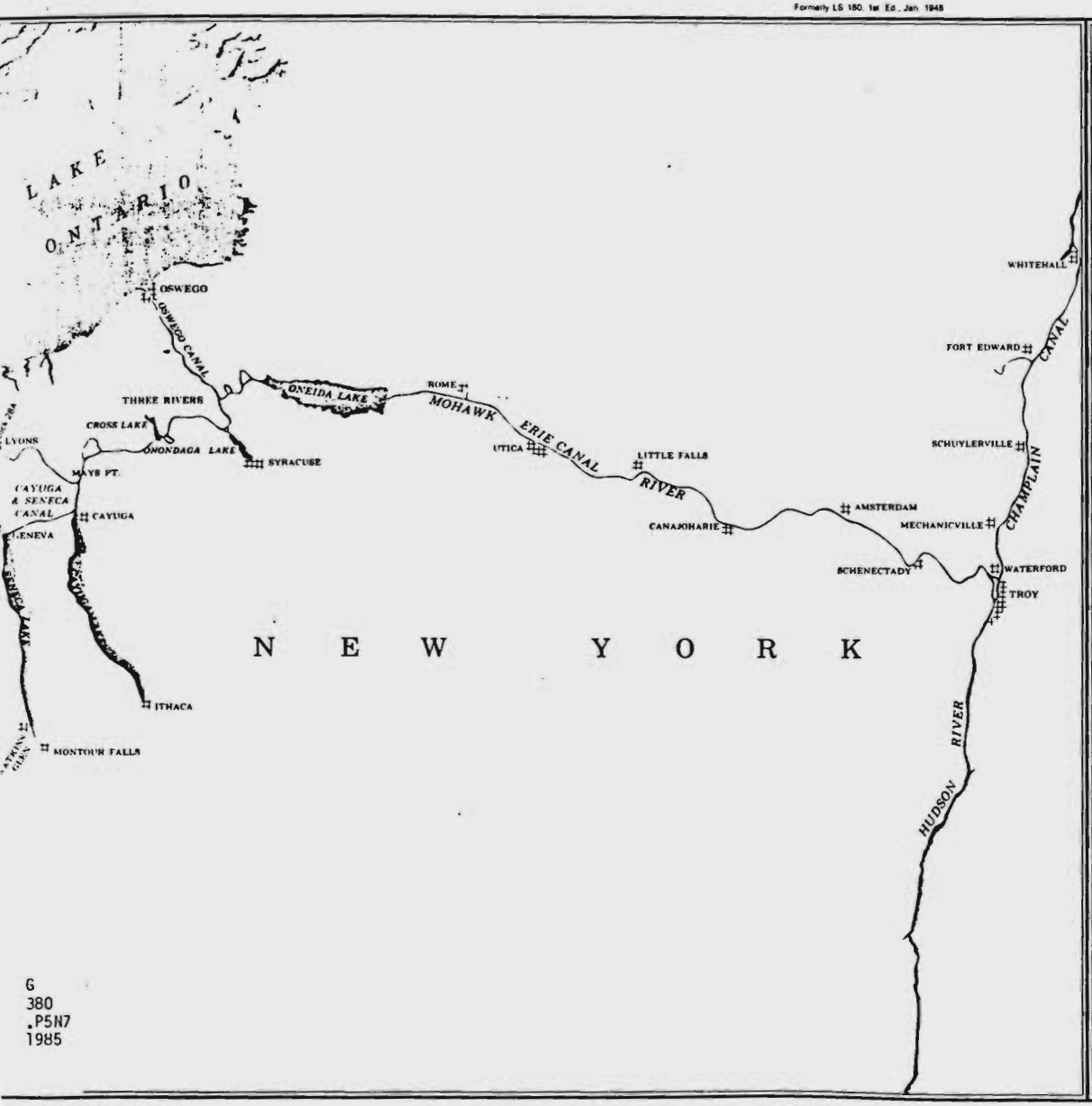

ONTARIO
LAKE ONTARIO
NOTE:
AVAILABLE DEPTH IN ERIE CANAL FROM LYONS TO TONAWANDA IS 12 FEET.
NO NAVIGATION CHARTS ARE PUBLISHED OF THIS AREA.
ERIE CANAL
MEDINA
ALBION
HOLLEY
BROCKPORT
SPENCERPORT
ROCHESTER
LOCKPORT
NIAGARA FALLS
TONAWANDA
BUFFALO
LAKE ERIE
NIAGARA RIVER
PALMYRA
NEWARK
LYONS
MAYS PT
CAYUGA & SENECA CANALS
GENEVA
CAYUGA
SENECA LAKE
CAYUGA LAKE
ITHACA
WATKINS GLEN
MONTOUR FALLS
OSWEGO
OSWEGO CANAL
ONEIDA LAKE
THREE RIVER PT.
CROSS LAKE
ONONDAGA LAKE
SYRACUSE
N E W
SYMBOLS
Light
Red buoy with red light
Black buoy with white light
White buoy with white light
Unlighted buoy
Unlighted buoy
Unlighted buoy
Horizontal banded buoy
White beacon with white reflector
Weather Bureau Signal Station
WB SIG STA
Piles above water
Piles below water
Rocks awash
Rocks below water
Cribs above water
Cribs below water
Wreck above water
Wreck below water
Wreck 8
Wreck below water, depth shown
Triangulation station
Landmarks
Aerial cable
Submerged pipe
Submerged cable
Fixed bridge
Bascule bridge
Draw bridge
For complete list of symbols and abbreviations see Chart No. 1.
All lighted aids to navigation, stationary and floating, on Oswego and Cayuga-Seneca Canals and on the Erie Canal west of Sylvan Beach display a 1 second flash every 4 seconds.
REQUEST FOR INFORMATION
Mariners are urged to report promptly to the U. S. Lake Survey any conditions found to differ from or to be additional to those shown on this chart in order that they may be fully investigated and proper corrections made. In some instances, a section of the chart should be submitted to illustrate the reported conditions, in which event, a new chart will be issued to replace the used copy, providing the revised chart is the current edition and not an obsolete copy.
CORPS OF ENGINEERS
U. S. ARMY
U. S. LAKE SURVEY
NEW YORK STATE
BARGE CANAL SYSTEM
Y O R K
ROME
MOHAWK
ERIE CANAL
UTICA
LITTLE FALLS
RIVER
CANAJOHARIE
FORT EDWARD
CANAL
WHITEHALL
SCHUYLERVILLE
AMSTERDAM
MECHANICVILLE
RIVER CHAMPLAIN
SCHENECTADY
WATERFORD
TROY
HUDSON
NOTES
REFERENCE PLANE. Normal Pool Level.
BLUE TINT. Areas with depths to 12 feet are tinted blue.
AVAILABLE DEPTH. The Champlain and Cayuga-Seneca Canals and the Erie Canal west of Three River Point are maintained to provide a minimum width of 200 feet in the canalized river and lake sections, a minimum width of 75 feet in the land line sections and a minimum depth of 12 feet at ordinary water stage.
The Oswego Canal and the Erie Canal between Waterford and Three River Point are maintained to provide a minimum width of 200 feet in the canalized river and lake sections, a minimum width of 104 feet in earth cuts and 120 feet in rock cuts, a minimum depth between locks of 14 feet and a depth of 13 feet over lock sills at ordinary water stage.
NOTICE. Depths and bottom conditions shown on this chart are representative of conditions found at the time of the survey and do not necessarily portray present conditions.
RULES AND REGULATIONS. Latest information as to controlling depths, bridge clearances, and rules and regulations governing navigation and use of the New York State Barge Canal System is published by the State of New York, Department of Public Works; and in the Great Lakes Pilot which may be purchased from the U.S. Lake Survey, Corps of Engineers.
REPRODUCTION RESTRICTION. This chart may not be reproduced in whole or in part without the written permission of the District Engineer, U.S. Lake Survey, Corps of Engineers.
VERTICAL CLEARANCE. Minimum vertical clearance at Maximum Navigable Pool Level under bridges and gates along:
Champlain; Cayuga-Seneca Canals and the Erie Canal west of Three River Point . . . . . 15½ feet
Oswego Canal and the Erie Canal east of Three River Point . . 20 feet.


CORPS OF ENGINEERS
U. S. ARMY
U. S. LAKE SURVEY
NEW YORK STATE
BARGE CANAL SYSTEM
ERIE CANAL
SCALE 1:20,000
SOUNDINGS IN FEET
FEET
STATUTE MILES
MOHAWK RIVER
HUDSON RIVER
WATERFORD
COHOES FALLS
Crescent Terminal
Crescent Dam
Guard Gate No 2
Guard Gate No 1
Lock 6
Lock 5
Lock 4
Lock 3
Lock 2
Dam
Aerial Cable
Aerial Cables
Dry Dock
Ramp
Pier
Dunnsbach Ferry
Penn Central
Peebles Island
TANK
STACK
S PIPE
E-40
(JOINS C-1)

REFERENCE 17

Formerly LS 180, 1st Ed., Jan. 1948

Nautical Chart Catalog No. 4, Panels E, F



G
380
.P5N7
1985

UNITED STATES - GREAT LAKES;

NEW YORK

NEW YORK STATE BARGE CANAL SYSTEM

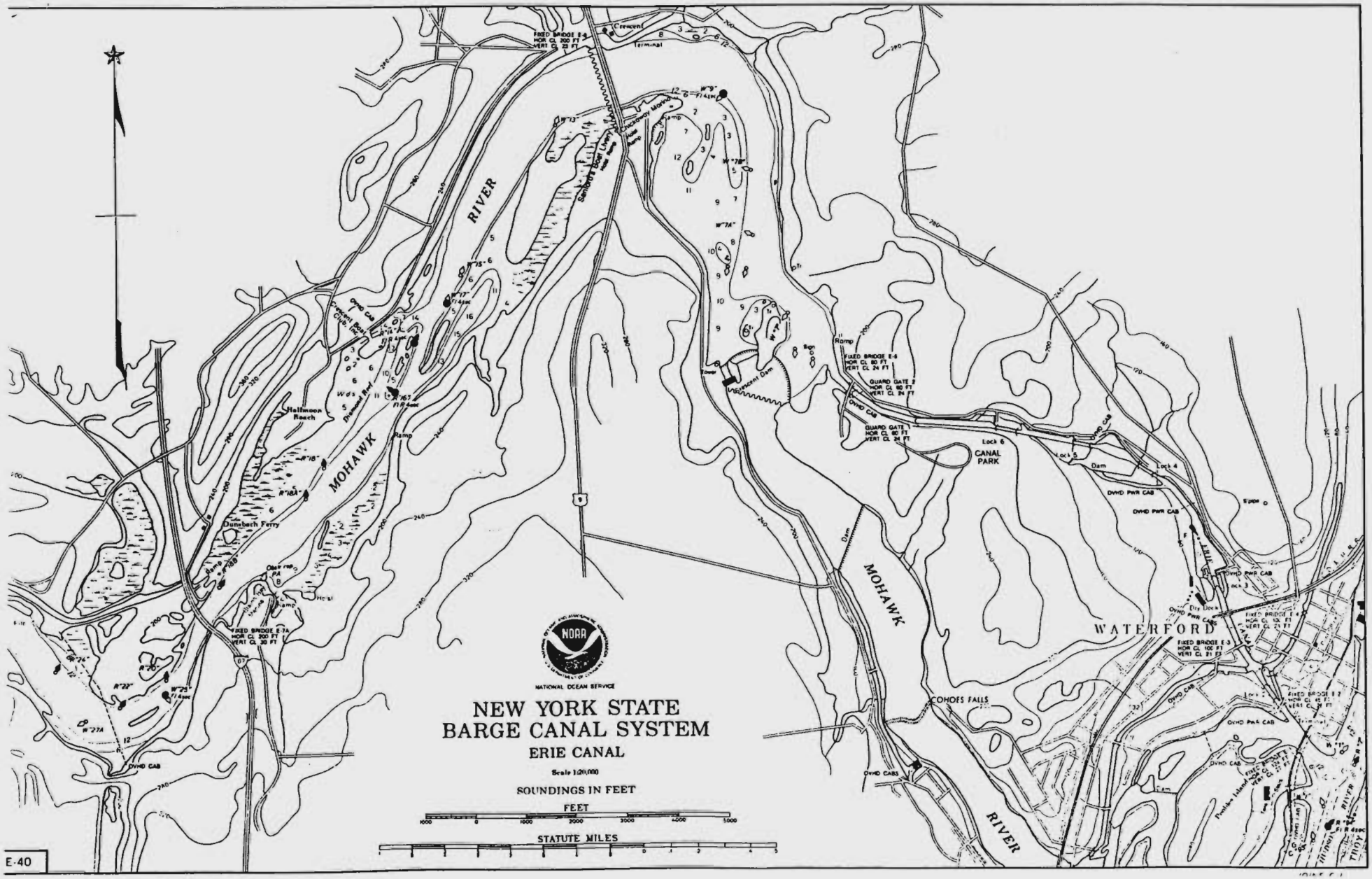
Published at Washington, D.C.
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

CAUTION

This chart has been corrected from the Notice to Mariners published weekly by the Third and Ninth Coast Guard Districts and from information furnished by New York State Parks and Recreation and the New York State Department of Transportation. It is not to be relied upon in the Rivers and Canals.

This nautical chart has been designed to promote safe navigation. The National Ocean Service encourages users to submit corrections, additions, or comments for improving this chart to the Director, Charting and Geodetic Services (N/CG22), National Ocean Service, NOAA, Rockville, Maryland 20852.

'86 10th Ed., June 22/85


NATIONAL OCEAN SERVICE
NEW YORK STATE
BARGE CANAL SYSTEM
ERIE CANAL
Scale 1:20,000
SOUNDINGS IN FEET
FEET
STATUTE MILES
MOHAWK RIVER
WATERFORD
COHOES FALLS
CANAL PARK
Lock 6
Lock 5
Lock 4
Lock 3
Dam
Ramp
Guard Gate
Dunsbach Ferry
Halfmoon Beach
Diamond Reef
Crescent
Terminal
Crescent Dam
Sandbar Boat Launch
Peebles Island
DYKD CAB
DYKD PWR CAB
FIXED BRIDGE E-6
FIXED BRIDGE E-7A
FIXED BRIDGE E-3
FIXED BRIDGE E-2
E-40

REFERENCE 28

New York State Department of Environmental Conservation

MEMORANDUM

TO: John Swartwout
FROM: Mike Komoroske MJK
SUBJECT: Old Halfmoon Dump (#546013)

DATE: January 23, 1992

As planned, I am writing to summarize the information I have gathered in the interview and file review portion of the NYSDEC Phase II investigation for the referenced site. The primary focus of this effort was to document the disposal of Part 371 hazardous waste at this site and obtain further information relative to the operation of this dump.

Introduction:

As part of this effort, I obtained and reviewed relevant Town of Halfmoon legal files as well as the Town's general file on the old dump. I also obtained some additional file information pertinent to the old dump for the DEC Solid Waste regional office in Warrensburg. The original dump file turned over to the DEC by the NYSDOH - Glens Falls District office in approximately 1970 could not be located and most likely has been discarded. I also reviewed the Community-Right-to-Know (CRTK) files and the New York State Industrial Hazardous Waste (IHW) forms completed in the late 1970's for certain industries in the tri-city area.

Interview Approach:

In addition to the file reviews, I talked to approximtely 2 dozen individuals who had first hand knowledge of the old dump's operation or who currently live in the area. These individuals included residents who lived adjacent to the dump during its operation (and in most cases still live there), individuals who transported wastes to the dump (carters), dump equipment operators, and an individual who was the field operations manager for the company who originally operated the dump. Of these individuals, I completed the interview form and obtained acknowledgement signatures from five residents, four eqiupment operators, two carters, and the original field operations manager. Copies of these forms are attached. I did not attempt to contact any of the officers who still may be living of the various companies who operated the dump. A number of the former officers are reportedly deceased. I also did not discuss the information provided by any one interviewee with the others.

For the purpose of this memo and to keep the names of the individuals interviewed confidential, I have numbered the completed interview forms as follows:

No. 1 - Operations Manager
No. 2 to 5 - Equipment Operators at dump
No. 6 and No. 7 - Carters
No. 8 to 12 - Residents

Interviewees No. 1, 2, and 3 remembered each other and worked at the dump early in its operations. Interviewee's No. 4, 5, and 6 were also familiar with each other and likely worked at or carted to the dump at a later period. Generally, the residents were not familiar with the dump's equipment operators and were only familiar with the dumping which occured near their residences. A few residents did remember the name of the original company, who operated the dump, and its president. Generally, the biggest difficulty the interviewees had was remembering exact dates or years or the exact sequence of events.

FINDINGS:

A number of consistencies developed from the information obtained during the interviews and file reviews. Some of these are as follows:

1. HISTORY

The dump's operation began in early 1962 and possibly as early as the late 1950's. Filling of the old canal bed occured in lifts which were compacted and covered when appropriate material could be obtained. Operations apparently initiated in the area of Clam Steam Road and moved generally in a easterly direction to approximately the area of Stone Road. There was apparently a constant moving of the working face up and down the canal as additional lifts were added. Early in the operation the lifts in the area west of Beach Road brought the fill above the canal bed and the dump extended beyond the Town property and onto adjoining parcels. In late 1964 or early 1965 the filling of the canal bed from Route 9 west was initiated. This was most likely a result of a car accident which resulted in the drowning of three occupants in the canal and to prevent further incidents. No one interviewed could remember exact dates of where dumping occured during a particular period, which is understandable after 25 years or more. Generally the fill is limited to the original canal bed in the area east of Beach Road and is at much greater depths in the area approximately 1/2 mile west of Beach Road to Clam Steam Road and beyond. Pictures in the Town of Halfmoon files taken from approximately Clam Steam Road looking east depict the dump operation extending well above the Mohawk River water surface. Considerable settling has occured over time.

2. OPERATIONS

The dump was operated under contract with the Town of Halfmoon by a series of differently named companies who had some of the same officers. Copies of contracts between the Town and two of these firms are attached. It is reported that the Town of Halfmoon had little, if any, involvement in the day to day operation of the dump. The firms operating the dump received waste materials from a host of municipalities, commercial establishments and some industries. A few of the municipalities which were reported to have used the dump during various time periods included the cities of Troy, Cohoes, Watervliet, Green Island, and Schenectady, and the Town's of Waterford, Colonie, North and East Greenbush, and Halfmoon.

It was reported that the dump was basically a regional facility open to anyone who paid the tipping fee or entered into a contract with the operators. Operational controls were minimal and there was continuous

friction between the operators, the Town,the State Health Department, and residents over the dumps operations.

3. NATURE OF WASTES

As reported by the interviewee's,the bulk of the wastes dumped were from residential or commercial sources. The dump operator sold the picking rights and recycleables at the time (paper, metal, etc.) were presumably removed. Some residents also reported medical wastes being dumped from City of Troy hospitals. Finally, numerous local industries were reported to have used the dump with their own trucks or by using a commercial carter. These wastes were reported to include relatively inert materials as well as liquid organic chemical wastes from a few of the industries.

4. 6 NYCRR Part 371 Hazardous Waste

Of the industries which were reported to have disposed of liquid organic chemical wastes at this dump, Behr Manning was mentioned by 10 of 12 individuals interviewed. A couple of others were mentioned by only one or two individuals and reportedly were sighted only occassionally.

a. **Behr Manning Company (purchased by the Norton Company, Coated Abrasive Division in approximately 1968).** Of the ten individuals who reported seeing Behr Manning trucks at the dump, seven reported that in addition to mixed refuse being disposed of (tape, sandpaper, grit) they saw drummed liquid wastes regularly disposed of. This waste was described either as a viscous, volatile material; liquid waste with pronounded odor; liquid waste with solvent odor; barrels with glue wastes; or simply, liquid waste in 55 gallon drums. The disposal of this waste stream was reported over a period of several years. Although Behr Manning trucks were reportedly sighted daily, the liquid drummed waste disposal was reported to be less frequently.

   Interviewee No. 1 - the intitial operators manager, reported "drummed material (viscous, volatile material) from Behr Manning dumped off the back of the truck into the canal or fill. Eight to 15 drums dumped approximately every 15 days. Drums possibly unsealed. ...agreement/contract with Behr Manning for them to dump drummed material for a 2-3 year period."

   Interviewee No. 3, an equipment operator at the dump, reported "Behr Manning had their own blue trucks. Garbage truck came up with tape, nylon, etc. approximately twice a week. Rack or panel truck with drums containing different colored liquid chemical waste with a pronounced odor came approximately once a week with 30 or 40 drums per load."

   The other interviewee's reported similar information. It was generally reported that the drums were flattened with a bulldozer or simply dumped into the fill or canal. It was also generally reported that the drummed material was dumped wherever

they were operating at the time. The majority of interviewee's did indicate that the area from the Yacht Club to the Clam Steam Road was the most likely area this material was dumped. This, of course, is an area of approximately one mile in length.

The disposal of 6NYCRR Part 371 defined hazardous wastes at the Old Halfmoon dump by the Behr Manning Company (now Norton) is further substantiated by Norton's Hazardous Waste Disposal Questionnaire (attached) submitted in 1984 under the CRTK program. The form indicated that the Norton Company disposed of 2300 tons of solvent based phenolic and urethane sludges (solvents were toluene, xylene, ethyl alcohol, methyl isobutyl ketone and methyl ethyl ketone), generated from their ongoing operation, at the Town of Colonie Landfill (old section) from 1966-1975. This landfill is located on the south shore of the Mohawk River just over the Route 9 bridge. Filling operation did not begin at this site until 1968, most likely December of that year when it was originally approved to operate as a sanitary landfill.

Apparently Norton did not distinguish between the Old Halfmoon and the Old Colonie Landfills. The description of the hazardous wastes (D001, F003, and F005) disposed of by Norton is similar to the materials described in the interviews. Norton disposed of wastes at the Old Halfmoon dump for a 2-3 year period as reported by the original operation manager. Assuming that the 2300 tons reported by Norton were disposed of at an equal amount each of the nine years (approximately 255 tons/year), then approximately 511 to 766 tons of hazardous wastes were disposed of in the Old Halfmoon Dump by Behr Manning/Norton. This, of course, is a very rough estimate, but based on the information provided by the interviewee's on a numbers of drums disposed of and frequency of disposal, appears reasonable.

In addition to the above waste streams from their active operation, Norton also reportedly disposed of sludge from five latex evaporation ponds in 1966, and previously landfilled fly ash in 1968, at the Colonie Landfill. This material may have, in fact, also gone to the Old Halfmoon dump (see attached references from the Norton Site (401010) Phase I report).

b. **Other sources of Part 371 Hazardous Wastes** - Four of the interviewees reported that materials that may have been or likely were hazardous wastes were received at the Old Halfmoon dump from two other tri-city industries. These reports indicated only infrequent disposal and were not particularly specific about the nature of the material. Confirmation of these industries dumping hazardous wastes at this dump could not be made through review of the CRTK files. One firm's CRTK files are missing and the other's CRTK questionnaire was vague (attached). Based on the lack of confirmation, listing of the firms names here would be inappropriate. Please refer directly to the interview forms. The NYS IHW forms do provide a good

profile of the composition of wastes generated by these firms, but not former disposal locations.

CONCLUSIONS

Based on the information presented above, it is clear that consequential amounts of Part 371 hazardous wastes have been disposed of at the Old Halfmoon dump. It is my estimate that 511 to 766 tons of D001, F003, and F005 wastes from the Behr Manning Company were disposed of at the dump for at least a 2 to 3 year period. The disposal of these wastes may have occured over the entire length of the dump, but more likely occured in the area of the current Yacht Club (just east of Beach Road) west to the Clam Steam Road area.

Additional disposal of possible hazardous wastes from other industrial sources were reported on a less frequent basis. The quantity and exact natures of these wastes cannot be determined based on currently available information.

RECOMMENDATIONS

In addition to the completion of the NYSDEC Phase II Investigation, the following actions are recommended.

- To further document additional sources and locations of hazardous waste disposal at this site, attempts should be made to interview individuals not previously contacted on the attached list.

- Attempts should be made to interview Norton employees who may be knowledgeable of the history of Norton's waste disposal at the Old Halfmoon dump.

- Attempts should be made to clarify whether or not other local industries hazardous waste was disposed of at this dump as reported by several of the interviewees.

- Consult with DLA whether it is necessary to take formal depositions from some of the individuals already interviewed or individuals who may be interviewed in the future. This is typically done in the remedial and enforcement programs. If necessary, they should be completed as soon as possible, as a number of the individuals interviewed have serious health problems.

Attachments

cc: D. Corliss
D. Steenberge w/att.
B. Lowe
G. Laccetti
B. Fear

AGREEMENT, made in the Town of Halfmoon, Saratoga County, New York, on October 23, 1962; between PAUL TAGLIONE, (herein called the "Contractor"), residing at 216 North Third Avenue, Mechanicville, New York, doing business as BROOKWOOD ENGINEERING CO., and the Town of Halfmoon, a municipal corporation, duly created, organized and existing under, and by virtue of, the laws of the State of New York and having its principal place of business in the Town Hall in the Town of Halfmoon, Saratoga County, State of New York (herein called the "Town"),

WHEREAS, the Town Board of the Town of Halfmoon is desirous to experiment with sanitary land fill and to eradicate and eliminate certain unsightly, unsanitary and blighted areas now existing on and along certain lands now owned and maintained by the Town, which lands were formerly part of the New York State Canal System adjacent to the Mohawk River in said Town and whereas Paul Taglione, doing business as Brookwood Engineering Co., is desirous of filling said areas with varied types of fill materials:

NOW, THEREFORE, in consideration of One ($1.00) Dollar paid by the said Town to the said Contractor, receipt of which is hereby acknowledged, it is mutually agreed as follows:

(1) The Contractor shall have the exclusive right, privilege, and permission to supervise and control the dumping of fill materials of any type into the bed of the former New York State Canal hereinbefore referred to, beginning at Jones Bridge, This contract is for the term of one year and is automatically renewed for a like term unless written notice terminating the contract is given to either party hereto by the other party, at least one month prior to the end of any yearly term. In no event, however, shall this contract run for a period longer than five years from the date of this agreement. Neither party shall be liable for damages or penalties for terminating this contract.

(2) The Contractor further agrees to have transported said fill materials to and unto the areas hereinbefore mentioned,

insuring as reasonably as possible that said fill materials are not disposed of or deposited on any lands in the Town other than the areas hereinbefore mentioned.

(3) The Contractor further agrees to pay for any and all expenses of whatever nature which he may incur by reason of the performance of his duties and conditions set forth herein.

(4) The Contractor further agrees to have all necessary tools, equipment, and employees furnished for the proper performance of the duties and conditions herein set forth.

(5) The Contractor shall be responsible for the performance in a proper, neat, and workmanlike manner of all duties and conditions set forth herein.

(6) The Contractor shall assume and bear all risk of damage to, or failure of, the work to be performed hereunder, and all risk of any accident, or accidents, arising at or adjacent to, and caused by the filling operations, until the work, duties, and conditions set forth herein shall have been fully completed and approved and accepted by said Town in accordance with Paragraph "14" hereinafter set forth.

(7) That the Contractor shall save or hold harmless the Town from and against all suits, or claims, that may be placed for any alleged injuries to any person, or property, that may occur, or that may be alleged to have occurred, in the course of the performance of this Agreement by the Contractor, whether such claim shall be made by an employee of the Contractor or by a third person, and whether or not it shall be claimed that the alleged injury was caused through a negligent act, or omission, of the Contractor; and the Contractor shall, at his own expense, pay all charges of attorneys, and all costs and other expenses, arising therefrom, or incurred in connection therewith; and, if any judgment shall be rendered against the Town in any such action, or actions, the Contractor shall, at his own expense, satisfy and discharge the same.

(8) That the Contractor shall provide all labor and

materials that may be required for the performance of this Agreement and may contract with third parties for same.

(9) Notwithstanding any provision to the contrary herein contained, that if the Contractor shall fail to perform or provide performance of any of the terms and agreements contained herein, then, and in any such event, the Town may, at its election forthwith terminate this agreement, by giving a ten day notice in writing thereof to the Contractor.

(10) The Contractor further agrees not to assign, sublet, or transfer this agreement or any part thereof without the written consent of the Town.

(11) That this Agreement shall bind the parties hereto, and their respective heirs, executors, administrators, successors, and assigns.

(12) The Contractor further agrees as follows:

(a) All fill deposited in the canal shall be kept continuously and constantly covered with dirt or gravel, which dirt or gravel shall be furnished by the Contractor without cost to the said Town.

(b) The canal shall be filled to the contour of the surrounding lands and the said fill shall be topped with at least six (6) inches of top soil, which top soil shall be furnished by the Contractor without cost to the said Town.

(c) All trees and ornamental shrubbery shall be saved where feasible.

(d) The burning of any fill used in the bed of the said Canal is prohibited and if any fire should start, the fire shall be immediately and completely extinguished.

(e) All reasonable precautionary measures shall be taken that are necessary to keep all rodents and vermin in the vicinity of the fill operations under control.

(f) For fire protection, equipment shall be kept near the scene of the filling at all times and there shall be

personnel available to man the same at all times.

(g) Copies of all insurance policies with minimum limits of coverage of $100,000/ $300,000 covering the Contractor and the Town from any and all liabilities arising out of and in connection with the execution of this contract and further showing that the employees of the Contractor are covered by Workmen's Compensation Insurance, shall be filed with the Town Clerk of the Town of Halfmoon prior to the commencement of work.

(h) No drains presently emptying into the canal shall be cut off by reason of the filling of the canal bed. Where necessary the Contractor shall, at no cost to the Town, lengthen the said drains with additional pipe or culverts, as the case may be, to a point where the drains may continue to operate satisfactorily. The Town shall furnish said pipe or culverts to the Contractor at no cost to the Contractor.

(13) The work being performed by the Contractor shall be open to inspection by the Town Board, its agents, servants, or employees at all times. The Town and individual residents of the Town shall not be charged a fee or other consideration by the Contractor to enjoy in said canal.

(14) As work is completed by the Contractor, the Town Board, its agents, servants, or employees shall inspect the same and if found by the said Town Board to be satisfactory in all ways, then the said Town Board shall release the Contractor from all liabilities that might thereafter arise on said completed lands.

IN WITNESS WHEREOF, the Contractor has hereunto set his hand and seal, and the Town has signed this Agreement, by its Supervisor, thereunto duly authorized, and its corporate seal to be hereunto affixed, the day and year first above written.

Town of Halfmoon

By Kenneth Hotaling
Supervisor

/s/ Raphael Tagliagambe
Doing Business as Brookwood Engineering Co.

WHEREAS, a certain agreement was heretofore made and entered into dated October 23, 1962, by and between the parties hereto, namely Paul Taglione, residing at 216 North Third Avenue, Mechanicville, New York, doing business as Brookwood Engineering Co. and the Town of Halfmoon, a municipal corporation duly created and existing under and by virtue of the laws of the State of New York, and having its principal place of business in the Town Hall in the Town of Halfmoon, Saratoga County, State of New York, and

WHEREAS, the subject of said agreement concerned the dumping of fill materials into the bed of the former New York State Canal adjacent to the Mohawk River in the Town of Halfmoon, and

WHEREAS, subsequent to the execution of the agreement aforesaid the said Paul Taglione did in fact dump certain fill materials into the bed of the former New York State Canal in the Town of Halfmoon, and

WHEREAS, the parties to the aforesaid agreement dated October 23, 1962 are the parties herein and they each desire to terminate the said agreement dated October 23, 1962:

NOW, THEREFORE, in consideration of the mutual promises, terms and agreements herein and other good and valuable consideration, it is mutually agreed as follows:

(1) The aforesaid agreement dated October 23, 1962, and any and all renewals thereof, is hereby terminated.

(2) The parties hereto, simultaneously with the execution of this agreement and forming a part hereof with the

KENIRY and KENIRY
ATTORNEYS AT LAW
35 North Main Street
Mechanicville, N.Y.

same force and effect as though set forth in full herein, shall execute and are executing general releases, each to the other.

IN WITNESS WHEREOF, the parties have hereunto set their hands and seals the 1st day of February, 1966.

Paul Taglione

Paul Taglione, d/B/a Brookwood Engineering Co.

George C. Hotle

Supervisor of the Town of Halfmoon

KENIRY and KENIRY
ATTORNEYS AT LAW
35 North Main Street
Mechanicville, N.Y.

To all to Whom these Presents shall Come, or may concern:

Greeting: Know Ye, *That* PAUL TAGLIONE, now or formerly residing at 216 North Third Avenue, Mechanicville, New York, doing business as Brookwood Engineering Co.,

for and in consideration of the sum of One and 00/100 - - -

To all to Whom these Presents shall Come, or may concern:

Greeting: Know Ye, *That* the Town of Halfmoon, Saratoga County, State of New York,

for and in consideration of the sum of One and 00/100 - *dollars* ($1.00), *lawful money of the United States of America to* it *in hand paid by* Paul Taglione, d/b/a Brookwood Engineering Co., and other good and valuable consideration,

the receipt whereof is hereby acknowledged, have remised, released, and forever discharged, and by these presents does for itself, its successors and ~~xxx~~ assigns ~~xxxxxxxxxxxxxxxxxxxxxxxxxx~~, *remise, release and forever discharge the said* Paul Taglione, d/b/a Brookwood Engineering Co., his

heirs, executors and administrators, of and from all, and all manner of action and actions, cause and causes of action, suits, debts, dues, sums of money, accounts, reckoning, bonds, bills, specialties, covenants, contracts, controversies, agreements, promises, variances, trespasses, damages, judgments, extents, executions, claims and demands whatsoever, in law or in equity, which against the said Paul Taglione, d/b/a Brookwood Engineering Co., it *ever had, now has or which* it or its successors or assigns ~~xxxxxxxxxxxxxxxxxxxxxxxxxx~~ *hereafter can, shall or may have for, upon or by reason of any matter, cause or thing whatsoever from the beginning of the world to the day of the date of these presents.*

And more particularly for any and all claims or causes of action of any nature whatsoever arising out of, and stemming from or in any way connected with, including the termination thereof, of a certain contract, and work done thereunder, between Paul Taglione, d/b/a Brookwood Engineering Co., and the Town of Halfmoon, dated October 23, 1962, and any renewals thereof.

In Witness Whereof, I *have hereunto set* my *hand and* /seal/ the of the Town of Halfmoon the 1st *day of* February *in the year Nineteen Hundred and* Sixty-six

In Presence of

George W. Hall
Supervisor of the Town of Halfmoon

AGREEMENT

THIS AGREEMENT made this 2nd day of May. , 1967, between the TOWN OF HALF MOON, a municipal corporation (hereinafter referred to as "the Town" and CHIARELLO LAND FILL AND DISPOSAL, INC., having its principal office and place of business at 136 Everett Road, Colonie, New York, (hereinafter referred to as Chiarello.)

WITNESSETH:

That in consideration of the sum of One ($1.00) Dollar paid by the Town to Chiarello, receipt of which is hereby acknowledged, and other good and valuable consideration ,Chiarello hereby agrees to operate a Sanitary Land Fill in accordance with the New York Public Health Law and State Sanitary Code and the regulations of the Saratoga County Health Department and the Board of Health of the Town of Halfmoon on premises now owned by the Town, which lands were formerly part of the New York State Canal System adjacent to the Mohawk River in said Town on the following terms and conditions:

1. The Town shall license Chiarello to operate said sanitary land fill upon the described premises.

2. The Town shall by its licensing of the premises to Chiarello give Chiarello full control over the premises for the purposes of operating a sanitary land fill but reserves the right to use said premises for other municipal purposes not interfering with Chiarello's use upon written notice given to Chiarello.

3. Chiarello shall operate a sanitary land fill upon the premises in accordance with the laws, codes and regulations above mentioned for the disposal of all trash, garbage, ashes, refuse, waste paper, wooden boxes and demolition material arising out of the Town, with the exception of explosives or other inherently

dangerous substances, without cost to the Town or its residents in consideration for the use of the premises to service other municipalities, corporations, partnerships or individuals with which Chiarello may have contracts for collection or disposal.

4.The Town shall allow access to the premises to all corporations, firms and individuals doing business with Chiarello, so long as the vehicles bearing rubbish for disposal shall be suitably covered to prevent spillage and littering.

5. Chiarello shall assume control of the premises and shall assume and bear all risk of damage to, or failure of, the work to be performed hereunder, and all risk of any accident, or accidents, arising at or adjacent to, and caused by or in connection with the work.

6. Chiarello shall save or hold harmless the Town from and against all actions or claims which may be instituted or made for any and all alleged injuries to any person or property that may occur, or that may be alleged to have occurred in the course of the performance of this Agreement by Chiarello whether such action or claim shall be made by an employee of Chiarello or by a third person and whether or not it shall be claimed that the alleged injury or damage was caused by or through a negligent act or omission of Chiarello or otherwise; and Chiarello shall, at his (or its) own expense pay all charges of attorneys and all costs and other expenses arising therefrom or incurred in connection therewith; and if any judgment shall be rendered against the Town in any such action or actions Chiarello shall at his (or its) own own expense, satisfy and discharge the same. Chiarello shall at all times and at his expense carry liability insurance coverage

for the entire operation including the premises and all men and equipment, in an amount not less than $100,000.00 for personal injury or death to any one person and not less than $300,000.00 for any one accident and not less than $50,000.00 for property damage covering Chiarello and the Town from any and all liability arising out of or in connection with the execution of this agreement and the work performed thereunder. Chiarello shall deposit with the Town Clerk of the Town a certificate of insurance in such amounts. Chiarello shall carry Workmen's Compensation Insurance upon all of his employees and shall provide the Town Clerk of the Town with proof of such insurance.

7. Chiarello reserves any and all rights to salvage any materials brought upon the premises for disposal by any person or corporation whatsoever, provided said salvaging may be done without violating the New York State Sanitary Code.

8. Chiarello reserves the right to exclude from the premises any persons not upon the premises for the purpose of bringing in trash or rubbish and to prevent and prohibit any person from salvaging upon the premises , except that the site shall at all times be open to inspection by the Town Board, its agents, servants or employees.

9. The Town shall issue to Chiarello any necessary permits for the operation of a Sanitary Land Fill as contemplated by this Agreement. This agreement is conditioned upon the issuance and continued grant to the Town by the Department of Health of the State of New York of the necessary permit to conduct the operation contemplated herein. Chiarello shall do nothing to cause the

revocation of any such permit by said Department of Health.

10. Notwithstanding any provision to the contrary herein contained, if Chiarello shall fail to perform or provide performance of any of the terms and agreements contained herein, and particularly but not limited to those in connection with the standards of quality of the work, or if Chiarello shall fail during any period of four consecutive weeks to perform work at the site for the entire day of ten working days, then, and in any such event, the Town may, at its election forthwith terminate this agreement by giving a ten day notice in writing to Chiarello by sending such notice by regular mail to the address of Chiarello recited herein. The Town shall not be liable for damages or penalities for any such termination of this agreement.

11. At the expiration of this Agreement or any renewals thereof, Chiarello shall deliver up the premises to the Town in a clean condition free from any loose trash or rubbish.

12. This Agreement may not be modified without the written consent of both parties hereto.

13. This Agreement shall not be assigned by Chiarello without the written consent of the Town.

14. This contract is for the term of five years or until the completion of the sanitary land fill of the subject premises, whichever is earlier.

IN WITNESS WHEREOF, the parties hereto have hereunto set their hands and seals on the day and year first above written.

TOWN OF HALF MOON

By George A. Hatlee

CHIARELLO SANITARY LAND FILL AND DISPOSAL, INC.

By Harold W. Chiarello
President

STATE OF NEW YORK)
COUNTY OF SARATOGA) ss:-

On the 2nd day of MAY, 1967, before me personally came GEORGE A. HATLEE, to me known and being by me duly sworn did depose and say that he resides at RD #2 MECHANICVILLE, NEW YORK, that he is the SUPERVISOR of the Town of Half Moon, a municipal corporation, the corporation described in and which executed the instrument, that he knows the seal of said Town, and the seal affixed to said instrument is such corporate seal; that it was affixed by order of the TOWN BOARD of said Town, and that he signed his name thereto by like order.

William W Keeney
Notary Public-State of New York

STATE OF NEW YORK)
COUNTY OF SARATOGA) ss:-

On the 2nd day of May 1967 before me came Harold W. Chiarello, the subscribing witness to the foregoing instrument, withwhom I am personally acquainted, who, being by me duly sworn, did depose and say that he resides at 136 Everett Road, Town of Colonie, New York, and he is the President of CHIARELLO SANITARY LAND FILL AND DISPOSAL, INC., the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation; and that he signed his name thereto by like order.

Notary Public-State of New York

REFERENCE 29

GENERATOR FORM PART - I

50 WOLF ROAD
ALBANY, NEW YORK 12233

HAZARDOUS WASTE DISPOSAL QUESTIONNAIRE

PLEASE COMPLETE AND RETURN TO THE ABOVE ADDRESS, ATTENTION: RTK PROCESSING UNIT, ROOM 525

ICS #: 4166816

NORTON CO.(COATED ABRASIVE DIV.
GARY WOOD
10TH AVE.& 25TH ST.
WATERVLIET NY 12189

ICS CODE 4166816
EPA ID NUMBER NYD - 002083954

CITY	STATE	ZIP CODE

CONTACT NAME	TELEPHONE

mail
MAILING ADDRESS (if different)

STREET	CITY	STATE	ZIP CODE
P.O. Box 808	Troy	N.Y.	12181

PRINCIPAL BUSINESS OF PLANT
Manufacture of coated abrasives

PLEASE ANSWER THE FOLLOWING QUESTIONS:

CHECK ONE

1. SINCE JANUARY 1, 1952 THRU DECEMBER 31, 1981, HAVE YOU OR ANY PREVIOUS OWNERS/OPERATORS OF THIS FACILITY GENERATED ANY HAZARDOUS WASTE (SEE INSTRUCTIONS) AT YOUR PRESENT FACILITY, PLANT, PROPERTY, ETC?

☒ YES
☐ NO

IF THE ANSWER IS **YES** COMPLETE QUESTIONS **1, 2, 3, 4** AND **GENERATOR FORM PART - II**
IF THE ANSWER IS **NO** COMPLETE QUESTIONS 1 AND 4 AND RETURN THIS FORM

2. HAS THE FACILITY AT THIS LOCATION CHANGED ITS NAME OR IDENTIFICATION BECAUSE THERE WAS A CHANGE IN OWNERSHIP, CORPORATE NAME OR OPERATOR NAME, ETC. IF YES LIST THE NAMES BY WHICH THIS FACILITY HAS BEEN IDENTIFIED SINCE JANUARY 1, 1952 TO THE PRESENT.

☒ YES
☐ NO

NAME, ADDRESSES, AND TELEPHONE NUMBERS	DATES
Behr Manning Company	1952-1967
Norton Company Coated Abrasive Division	1968 - present
10th Ave. & 25th Street	
Watervliet, New York 12189	
(518) 273-0100	

3. DESCRIBE THE DOCUMENTS FROM WHICH DATA THAT IS INCLUDED ON PART-II WAS OBTAINED (SEE INSTRUCTIONS).

DOCUMENT DESCRIPTION	DATES
Hazardous waste manifests	1980-81
No other documents are available. Data is estimated based on employee interviews and current disposal volumes.	

4. I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THAT INFORMATION SUPPLIED IS TRUE AND COMPLETE. FALSE STATEMENTS SUBMITTED ON THIS DOCUMENT ARE PUNISHABLE PURSUANT TO SECTION 210.45 OF THE PENAL LAW.

Thomas A. O'Brien - Mgr. Facilities Engineering — 8/14/84
NAME OF OWNER/OPERATOR, PARTNER OFFICER OR AUTHORIZED REPRESENTATIVE — TITLE — DATE

Thomas A. O'Brien — (518) 273-0100
SIGNATURE — BUSINESS PHONE

NAME	ICS NUMBER - EPA ID NUMBER
Norton Company	4166816-NYD-002083954
ADDRESS: 10th Ave. & 25th Street	
CITY: Watervliet	STATE: N.Y. ZIP: 12189

GENERATOR FORM
PART - II

1

DATE 8/1

1. HAZARDOUS WASTE DISPOSAL SITE (SEE INSTRUCTIONS)	2. DESCRIPTION OF HAZARDOUS WASTES DEPOSITED AT THIS LOCATION (SEE INSTRUCTIONS)	3. EPA WASTE CODE	4. WASTE DISPOSED OF QUANTITY OF WASTE (TONS)	FORM LIQUID	FORM SOLID	FORM DRUMS	5. WASTE DISPOSAL DATES	6. TRANSPORTER HAZARDOUS W/ (SEE INSTRUCTI
1. Norton Company Landfill, Elm Street Town of Colonie Albany County, N.Y. 12205 (Thus 2 site)	Solvent based phenolic & ure thane sludges. Solvents were toluene, xylene	D001 F003 F005 (1)	Estimated to be 2200	x	x	x	1955-1966	Norton Company 4A-02
Waste was landfilled	Ethyl alcohol, methyl isobutyl, ketone, methyl ethyl ketone, material landfilled							
2. Town of Colonie Landfill Rt. 9 Town of Colonie Albany County, N.Y.12205	Same as above Material landfilled	D001 F003 F005	Estimated to be 2300 (2)	x	x	x	1966-1975	Norton Company 10th Ave. & 25 Watervliet, N.
						(3) (4)	1976-1977 1979- Present	Browning-Ferri 136 Sicker Roa Latham, N.Y. 4A-015
						(5)	1978	A. Pedone Disp Schenectady, N.
Frontier Chemical Waste Process Inc. 4626 Rayal Avenue Niagara Falls, N.Y.14304	Same as above Solids - Landfilled Liquids - blended	D001 F003 F005	Estimated to be 200 (6)	x	x	x	1980-81	Frontier Chemic Process Inc. 4626 Royal Aven Niagara Falls, 4A-078

PHASE I INVESTIGATION REPORT
NORTON COMPANY LANDFILL
COLONIE (T), ALBANY COUNTY, NEW YORK
SEPTEMBER 1984

401010

NEW YORK ST. ... DEPARTMENT OF ENVIRONMENTAL ... 4171C

Priority Code: A
Site Code: 401010
Name of Site: Norton Company Region: 4
County: Albany Town/City Colonie (T)
Street Address: Elm Street, Colonie, NY

Status of Site Narrative:

The toxics substances in New York's Environment Report had indicated that Norton Company had owned 15 inactive sites, but subsequent investigations indicate that this was in error. The Norton Company, however, does own an inactive landfill located adjacent to their plant. This site was used beginning in 1955 mainly to deposit fly ash and excavation material. Other materials deposited include junk tape, coated abrasives, phenolics, some settling basin sludge and liquid wastes in drums. Volume estimates are not available. Five trenches were constructed as latex evaporation ponds on the site. In 1966, the sludge from the settling basins was transported for disposal to the Colonie landfill, and in 1968, fly ash was also transferred to the Colonie landfill. The on-site landfill is used now only for construction and demolition debris. A comprehensive field inspection was made; no hazards were visible, and an extensive amount of vegetation is present on site.

Type of Site: Open Dump ☐ Treatment Pond(s) ☐ Number of Ponds ____
Landfill ☒ Lagoon(s) ☒ Number of Lagoons 5
Structure ☐

Estimated Size 20.9 Acres

Hazardous Wastes Disposed? Confirmed ☒ Suspected ☐

*Type and Quantity of Hazardous Wastes:

TYPE	QUANTITY (Pounds, drums, tons, gallons)
Fly ash (1966-78)	unknown
Junk Tape	
Coated Abrasives	
Non-woven abrasives	
phenolics	

*Use additional sheets if more space is needed.

Address of Current Owner or Site: Hox Rud, Troy,

Time Period Site Was Used for Hazardous Waste Disposal:
19 55 To 19 66

Is site Active ☐ Inactive ☒
(Site is inactive if hazardous wastes were disposed of at this site and site was closed prior to August 25, 1979)

Types of Samples: Air ☐ Groundwater ☐ None ☒
Surface Water ☐ Soil ☐

Remedial Action: Proposed ☐ Under Design ☐
In Progress ☐ Completed ☐ None
Nature of Action:

Status of Legal Action: none State ☐ Federal ☐

Permits Issued: Federal ☐ Local Government ☐ SPDES ☐ none
Solid Waste ☐ Mined Land ☐ Wetlands ☐ Other ☐

Assessment of Environmental Problems:

Little or no sampling has been completed at this site. A preliminary assessment needs to be done of the various media, including groundwater, surface water, air, and flora and fauna to determine if any environmental impact exists.

Assessment of Health Problems:

None known, further investigation is necessary.

Persons Completing this Form:

Ken Griggs
Irv Bonsel
G. David Knowles
New York State Department of Environmental Conservation
Date 1/8/80

Ron Tramontano
New York State Department of Health
Date 1/8/80

1/18/80
CDK:cl

June 30, 1980

SUMMARY

Norton Company
Elm Street
Town of Colonie
Albany County, New York 12205

This is a 21 acre site, adjacent to the Norton Plant, which manufactures coated abrasives and abrasive paper. One part of the site is an active landfill used only for construction and demolition debris. The other part is inactive, it was used from 1955 to 1966. Fly ash, excavation material, junk tape, coated abrasives, phenolics, settling basin sludge and liquid wastes, in drums, were deposited. Quantities are unknown. There were five trenches, used as latex evaporation ponds. In 1966 the sludge from the settling basins was removed and disposed at the Colonie Landfill. In 1968 fly ash was also completely removed and transferred to the Colonie Landfill.

The site is located in a suburban area. Drinking water is obtained from the public water supply. Soil data may be obtained soon from NYSDOT, which made soil borings from alternate Route 7, adjacent to the Norton property.

The nearest surface water body, the Hudson River, is more than one mile away. The site is patrolled and partly fenced.

There is no apparent public health threat or environmental hazard known at the present time. DEC site inspection revealed no visible hazard. Extensive vegetation is present on site. No test data were available at the Regional DEC.

There are no known past or present regulatory actions. DEC has no remedial plans at this time.

From information obtained it appears that no hazardous materials are left on site. However no test data exist to verify this.

The Task Force recommends a site visit, with some sampling, on a "Medium Priority" basis.