FOCUSED REMEDIAL INVESTIGATION WORK PLAN 2350 FIFTH AVENUE NEW YORK, NEW YORK

Prepared For:

2350 Fifth Avenue Corporation
2350 Fifth Avenue
New York, New York 10037

Prepared By:

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Revised March 2001

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APPENDIXES

I. INTRODUCTION

This Focused Remedial Investigation (RI) Work Plan is submitted in accordance with the requirements of the consent order issued by NYSDEC. Phase 1 of the Remedial Investigation is aimed at developing the information required to design an Interim Remedial Measure (IRM) for the site which will address the soil contamination beneath the building and on-site and off-site (if present) groundwater contamination. Phase 2 of the Remedial Investigation will be aimed at assessing soil and groundwater conditions after implementation of the IRM, and developing the information required to perform a Feasibility Study (FS) of further remedial action after implementation of the IRM's.

The project organization for this project will be:

Project Manager . . . . Andrew Rudko
Project Engineer . . . . Melissa McGoogan
Quality Assurance Officer . . . . Jennifer Clements
Field Manager . . . . Mohamed Ahmed

The Project Manager is responsible for the overall performance of the work, reviews all reports and work plans, and coordinates with NYSDEC. The Quality Assurance Officer (QAO) is responsible for developing the site specific quality assurance plan, and assists the Project Manager in the development of the sampling and analytic plans. The QAO or her designee shall conduct periodic field and sampling audits, interface with the analytical laboratory, and prepare the Data Usability Summary Report (DUSR). The field manager is responsible for the performance of all on-site work involved in this Remedial Investigation in accordance with this work plan and AKRF standard operating procedures.

All investigation and remediation operations on the site will be performed in accordance with the project Health and Safety and Community Air Monitoring Plan designed to protect workers on the site and the general public (Appendix A), and in accordance with the Quality Assurance/Quality Control Plan (Appendix B).

II. PROJECT SITE

Description

The site is located in the Harlem section of Manhattan. It is bounded by Fifth Avenue on the east, West 141st Street on the south, a garage and paved parking area on the west, and West

142nd Street on the north (see location map Figure II-1). The western boundary of the site is about 50 feet east of Chisum Place. The site extends about 200 feet north-south and about 345 feet east-west. The Harlem River is 100 to 200 feet to the east of the site.

The site is occupied by a building comprising three connected sections: a two-story section along Fifth Avenue, a three-story section in the center of the site, and a one-story section to the west.

Site History

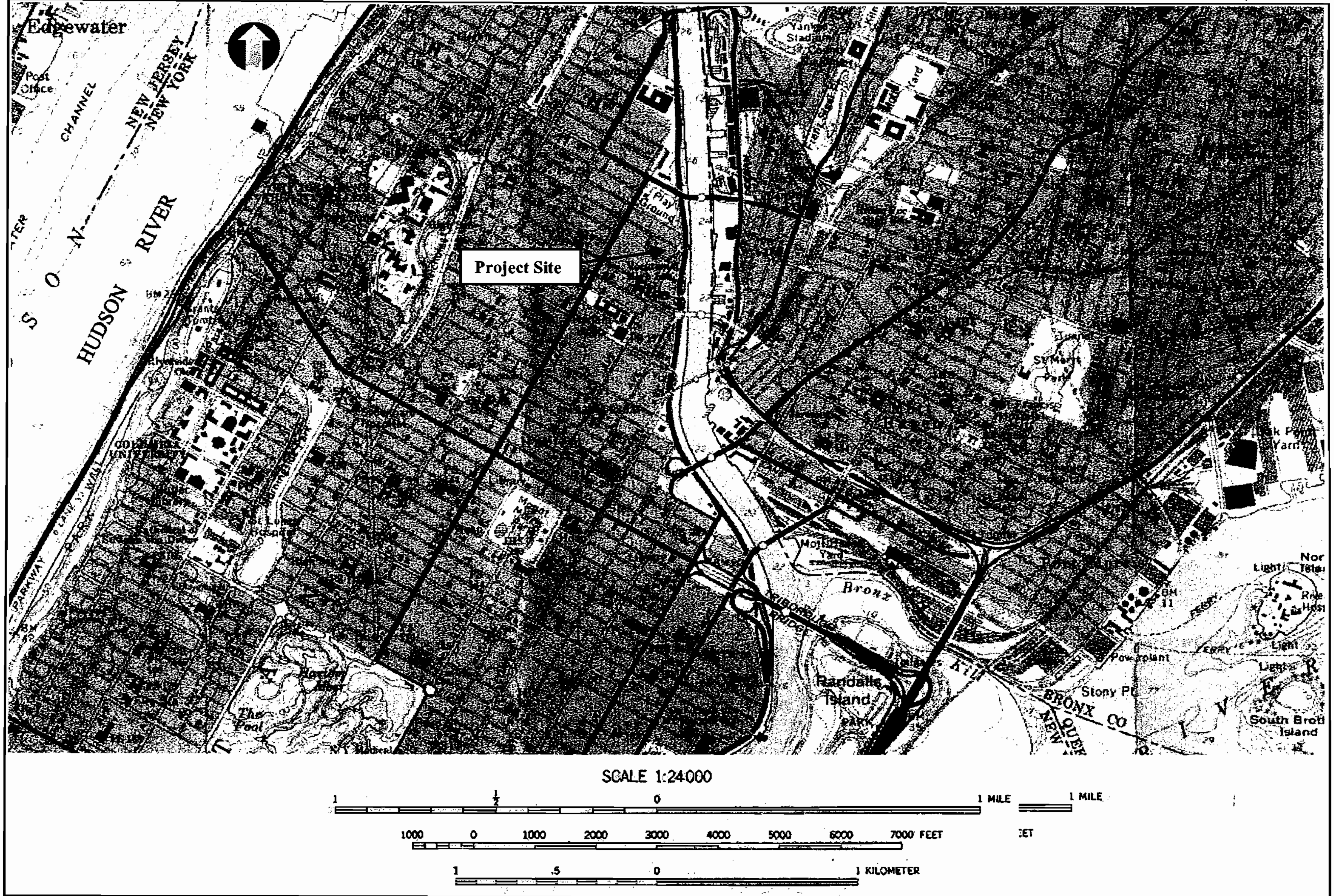
The existing building was originally constructed as an ice cream factory by the Bordens Ice Cream Company. The three-story section was built in 1923; the two-story section was built in 1932; and the one-story section was built in 1950. Following its use as an ice cream factory, the building was occupied by a commercial laundry from 1970 to 1994. The laundry operated under a variety of names including Budge-Wood Service, Bluebird Laundry, and Swiss-American Laundry. The facility included a dry cleaning operation utilizing tetrachloroethene (PCE) as a cleaning solvent. The dry cleaning operation was located near the northern side of the one-story portion of the building, just west of the West 142nd Street loading dock. The facility had an EPA ID number as a generator of hazardous waste (NYD071026173). There is one underground fuel oil tank on the site, located under the West 142nd Street loading dock.

In 1995-1996, most of the ground floor of the building on the site, with the exception of the far western portion, was renovated for use as a New York City public school designated PS 141. Currently, the renovated eastern portion of the ground floor is being used by a local church. A small area of the second floor wasa until recently used as an office by the property owner.

Subsurface Conditions

The site is at an elevation of ten feet or less above mean sea level. U.S. Geological Survey Studies (Open-File Report 89-462; <u>Bedrock and Engineering Geologic Maps of New York County and Parts of Kings and Queens Counties, New York, and Parts of Bergen and Hudson Countries, New Jersey</u>) show that the area of the site was once wetlands, the original shoreline of Manhattan lying several hundred feet to the west. Bedrock is shown at an elevation of about -40 feet (50 feet below grade) at the eastern end of the site, and at -20 feet (30 feet below grade) at the western end of the site. There are no water supply wells in the area. Groundwater is not used for potable water supplies anywhere in Manhattan.

The borings performed for the Preliminary Site Assessment (PSA) show the fill layer under the building to be about ten to twelve feet thick. The fill contains demolition debris (brick,



Source: USGS Topographic Map - Central Park Quadrangle: New York/New Jersey
Dated 1966; Photorevised 1979. Contour Interval 10 feet.
Quadrangle Longitude: 73° 52'30" Quadrangle Latitude: 40° 45'
National Geodetic Vertical Datum of 1929.

FIGURE II-1
LOCATION MAP

concrete, and wood fragments), ash, and coal fragments. Beneath the fill is a layer of organic clay which is at least eight feet thick near Fifth Avenue but tapers to a foot or two thick towards the western end of the site.

Monitoring wells installed as part of the PSA show the groundwater surface to be about five or six feet below grade. Measurements of the groundwater elevations in the monitoring wells installed on the site generally indicate that the groundwater gradient is to the northeast or north-northeast towards the Harlem River. Groundwater elevations in the wells installed within the building appeared to be anomalous. This is probably due to the remains of the foundations of former structures under the building which were encountered in some borings. These foundations may interfere with shallow groundwater flow under the building. In addition, it is possible that the groundwater elevations in the wells closest to the Harlem River are tidally influenced.

III. PRIOR STUDIES

In April 1997, holes were bored through the floor at 30 locations, as shown in Figure III-1 and samples of the sub-slab materials were collected at various depths. Significant PCE contamination in the soil beneath the building was limited to the six cores (C-3, C-4, C-6, C-8, C-9, C-29) in the area directly around the former location of the dry cleaning machines. (These are cores where the field analysis suggested that one or more soil samples contained PCE levels greater than New York State DEC's recommended cleanup objective of 1400 ppb.) At sampling location C-3, which is at the former location of the dry cleaning equipment, PCE levels exceeded the recommended cleanup objective at almost every depth from just below the slab down to 20 feet below the grade of the school floor. At the other locations, levels exceeding the cleanup objective were only found at depths of 7 to 10 feet below the grade of the school floor, and at one location (C-29) only at depths of 15 to 20 feet below the floor grade. These depths for locations other than C-3 are at or below the groundwater level and are at the level of the native organic clay soil beneath the fill.

The interim remedial measures (IRM) aimed at reducing PCE levels within the school building to acceptable levels was completed in June 1997. The IRM consisted of three measures:

1. Removal of contaminated insulating material under the slab at the western end of the building (in the area not included as part of the school).

2. Installation of a shallow soil vapor extraction system in the six-inch deep fill layer between the old building slab and the new floor slab of the school.

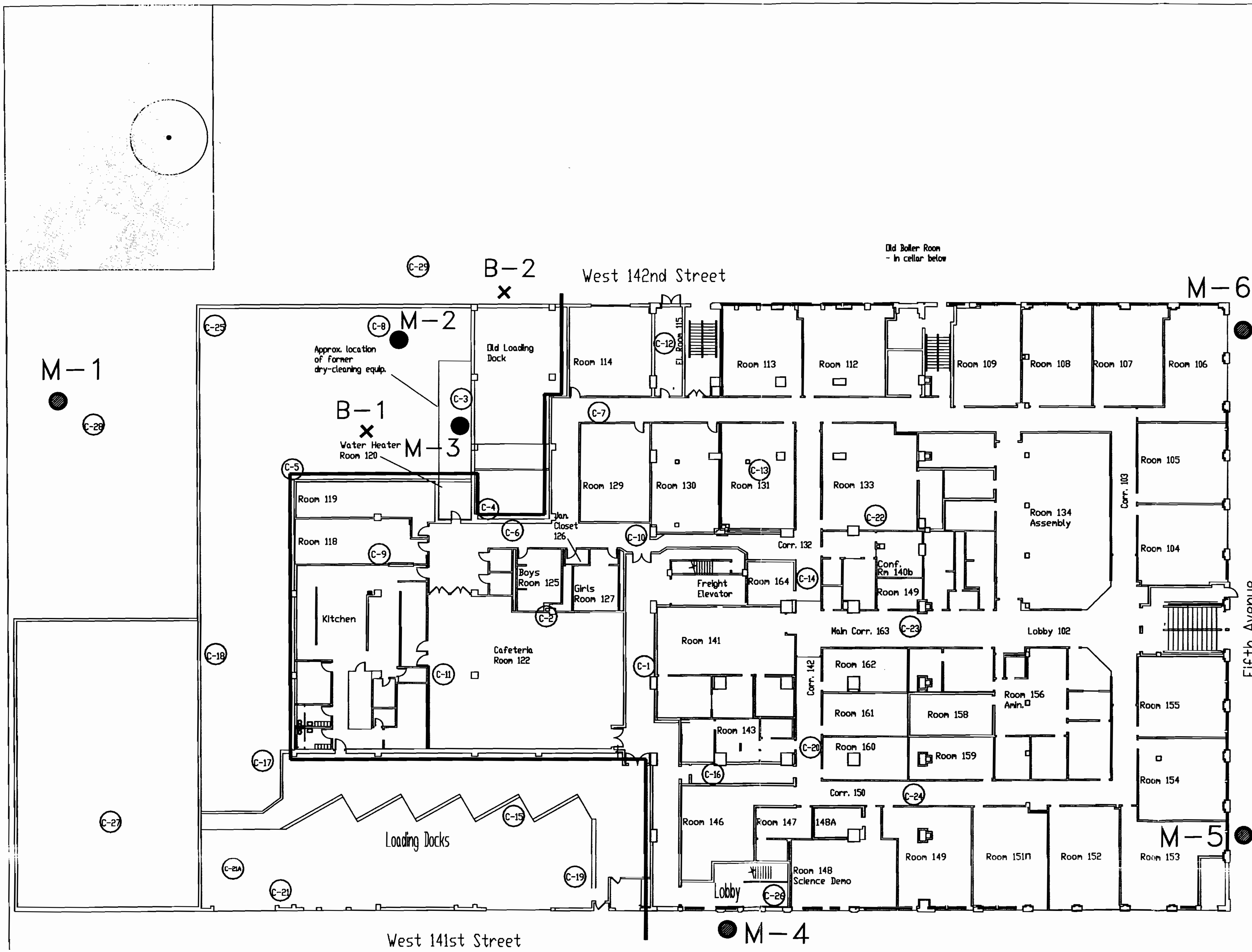
3. Sealing all penetrations through the slab around floor drains or cleanouts.

Following these measures, air sampling was performed within the building in June, July, September, and October 1997, August 1998, and August 1999. In all cases, the average level of PCE in the building air was well below the 15 part per billion DOH guideline for ambient PCE concentrations in residential spaces. The only individual level exceeding the guideline was detected in one space in the September 1997 sampling, just after the building was first occupied. This exceedance may have been due to the operation of the SVE system itself, which is located in an area adjoining the room where the exceedance was detected. To address this possibility, the connections and hoses on the SVE system were resealed to ensure that all the PCE removed by the SVE system was pumped to the receiving cannisters. The shallow vapor extraction system has been operating continuously since June 1997.

The PSA was performed in January/February 1998. Soil boring and monitoring well locations are shown in Figure III-1. The soil and groundwater analyses found no significant contamination on the site other than PCE and its decomposition products. Soil PCE levels exceeding the NYS DEC recommended soil cleanup objective of 1400 parts per billion (ppb) were detected at two sampling locations: M-3, in the former dry cleaning area, and M-2, which is about 20 feet northeast of the former dry cleaning area. At sampling location M-3, all the samples from just below the slab down to a depth of 12 feet below grade exceed the cleanup objective. The highest concentration was at a depth of 8 to 10 feet. This is at the groundwater surface and at the surface of the native silt and organic clay. The sample from a depth of 12 to 14 feet, which is within the organic clay layer, contains a much lower concentration of PCE, well below the cleanup objective. This indicates that the organic clay acts as a barrier to the downward movement of the PCE. At sampling location M-2, the only sample exceeding the cleanup objective was from a depth of 9 to 11 feet, at the top of the native silt and organic clay. Because the PCE cannot readily penetrate this material, it has apparently spread out laterally at this depth.

PCE and its decomposition products (trichloroethene, dichloroethene, and vinyl chloride) were detected in groundwater samples from only the two wells in and adjacent to the former dry cleaning area: M-2 and M-3. The sample from M-3 contained about 1100 ppb of PCE and decomposition products; the sample from M-2 contained about 230 ppb. In M-2 most of the material was in the form of vinyl chloride, a product of anaerobic decomposition of PCE. This indicates that the PCE has undergone considerable degradation before reaching this location.

PCE has been detected in three media: the cork and styrofoam insulation below the original floor slab, the soil in the vadose zone, and in groundwater/soil in the saturated zone. A schematic representation of these materials are shown in Figure III-2.



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2350 FIFTH AVENUE CORPORATION
for submission to:
NEW YORK STATE
DEPT. OF ENVIRONMENTAL CONSERVATION

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ISSUE	DATE	ORIG	BY	DESCRIPTION	CHK
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1	12/MAY/97	AF	ED	PRELIMINARY ISSUE	AF

LOCATION: NEW YORK CITY, USA | PROJECT NUMBER: 8010
SCALE: see bar scale

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0 30 FT

BASE MAP SOURCES:
Riverpoint, Inc., 7 Hillside Ave, New Rochelle, NY 10801, drawn by Birger Elvenis from drawings and digital files provided by Kirshenbaum & Tambasco, P.C., 22 Feb., 19

KEY:

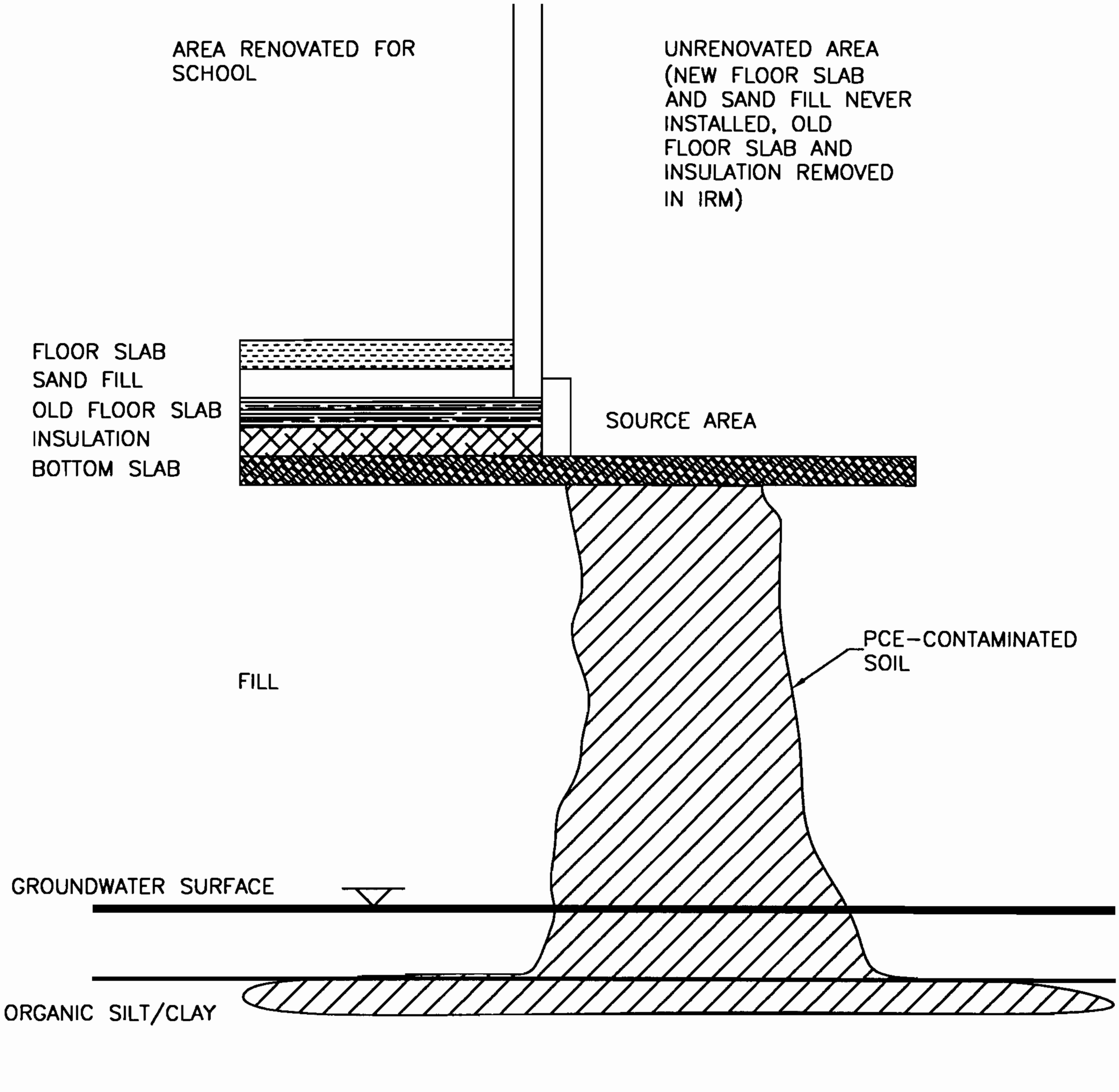
- MONITORING WELL LOCATION
- BORING / MONITORING WELL LOCATION
- × BORING LOCATION
- (C-26) FORMER CORE DRILLING LOCATIONS
- — SCHOOL BOUNDARY

SAMPLING LOCATIONS

2350 FIFTH AVE, NEW YORK, NY

ISSUE: 2

DRAWING NUMBER: III-



2350 FIFTH AVE.
New York, New York

SCHEMATIC CROSS-SECTION OF CONDITIONS UNDER BUILDING

AKRF Engineering, P.C.
Environmental Consultants
117 East 29 Street New York, N.Y. 10016

DATE 6/12/00

PROJECT No. 08010-0018

FIGURE No. III-2

Cork and styrofoam insulation was present under the floor in the western portion of the building. In the original IRM, all the insulation in the part of the building not renovated for use as a school was removed. Cores through the building floor and the original plans indicate that insulation is only present in the portion of the former school area west of the service corridor. (See Figure III-3) In this area a new floor has been laid over the original floor with a layer of sand fill in between. The 1997 study showed that PCE had spread laterally through a portion of the floor structure. However, the level of PCE in this stratum is difficult to quantify, since coring through the overlying concrete slabs disturbs the material between the lower slabs. The sub-slab vapor extraction system, installed as part of IRM-1, has been removing PCE from the remaining insulation. A work plan for modification/enhancement of IRM-1 is submitted along with this Focused RI Work Plan.

Soil in the vadose zone has only been found with PCE contamination at location M-3 within the source area. Since the fill material would not hinder vertical migration of the PCE, contamination in the vadose zone appears to be limited to the soil directly under the source area.

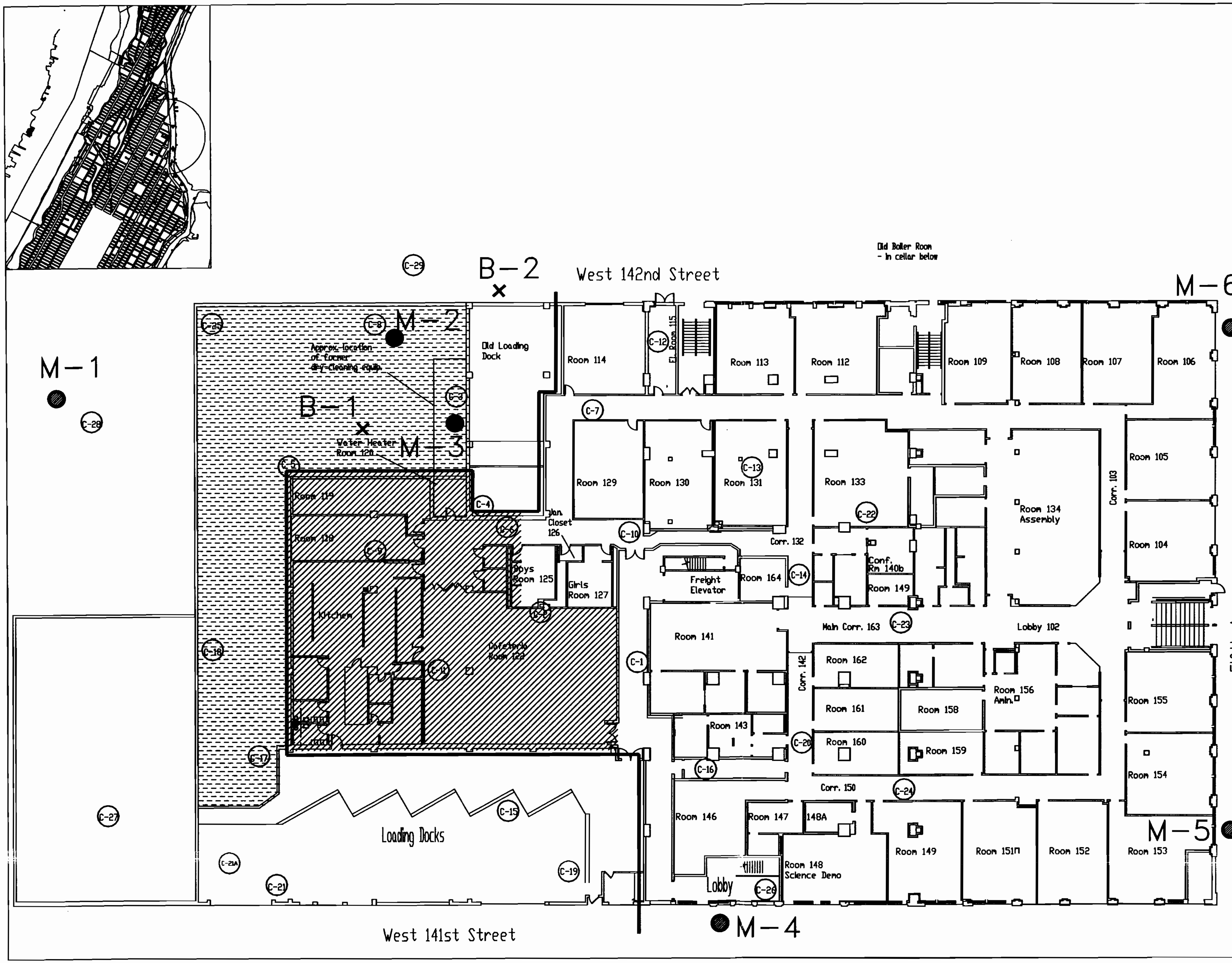
Groundwater/soil in the saturated zone containing PCE has been detected at locations within about 30 feet of the source area, as shown in Figure III-4. A layer of organic silt or clay is present just below the groundwater level. Since this type of material has a strong affinity for organic contaminants like PCE and its decomposition products, the PCE has spread horizontally at the surface of this layer.

IV. REMEDIAL INVESTIGATION PHASE 1

Soil Sampling

Soil borings will be performed at two downgradient (M-7 and M-8) locations as shown in Figure IV-1. The purpose of these borings is to assess soil conditions near the groundwater interface downgradient from the source. After augering to approximately four feet above the groundwater interface, split spoon samples will be collected every two feet to a depth of two feet below the groundwater interface. Soil samples will be field screened for organic vapors by head-space analysis using a photoionization detector (PID). The sample exhibiting the highest level of organic vapors will be submitted to the laboratory and analyzed for volatile organic compounds in accordance with NYSDEC ASP Category B 95-1.

Soil samples will be obtained by a steel, 24-inch long, 2-inch in diameter split-spoon sampler that will be driven through the subsurface soils ahead of a hollow-stem (4.25-inch inside diameter) auger that bores into the soil to just above the desired sampling depth. The split-spoon



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LAST EDITED BY: M. MCGOOGAN, e-mail: mikey_mcgoogan@akrf.com
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1	12/MAY/97	AF	ED	PRELIMINARY ISSUE	AF

LOCATION: NEW YORK CITY, USA PROJECT NUMBER: 8010
SCALE: see bar scale

0 30 FT

BASE MAP SOURCES:
Riverpoint, Inc., 7 Hillside Ave, New Rochelle, NY 10801, drawn by Birger Elvenis from drawings and digital files provided by Kirshenbaum & Tambasco, P.C., 22 Feb., 19

KEY:

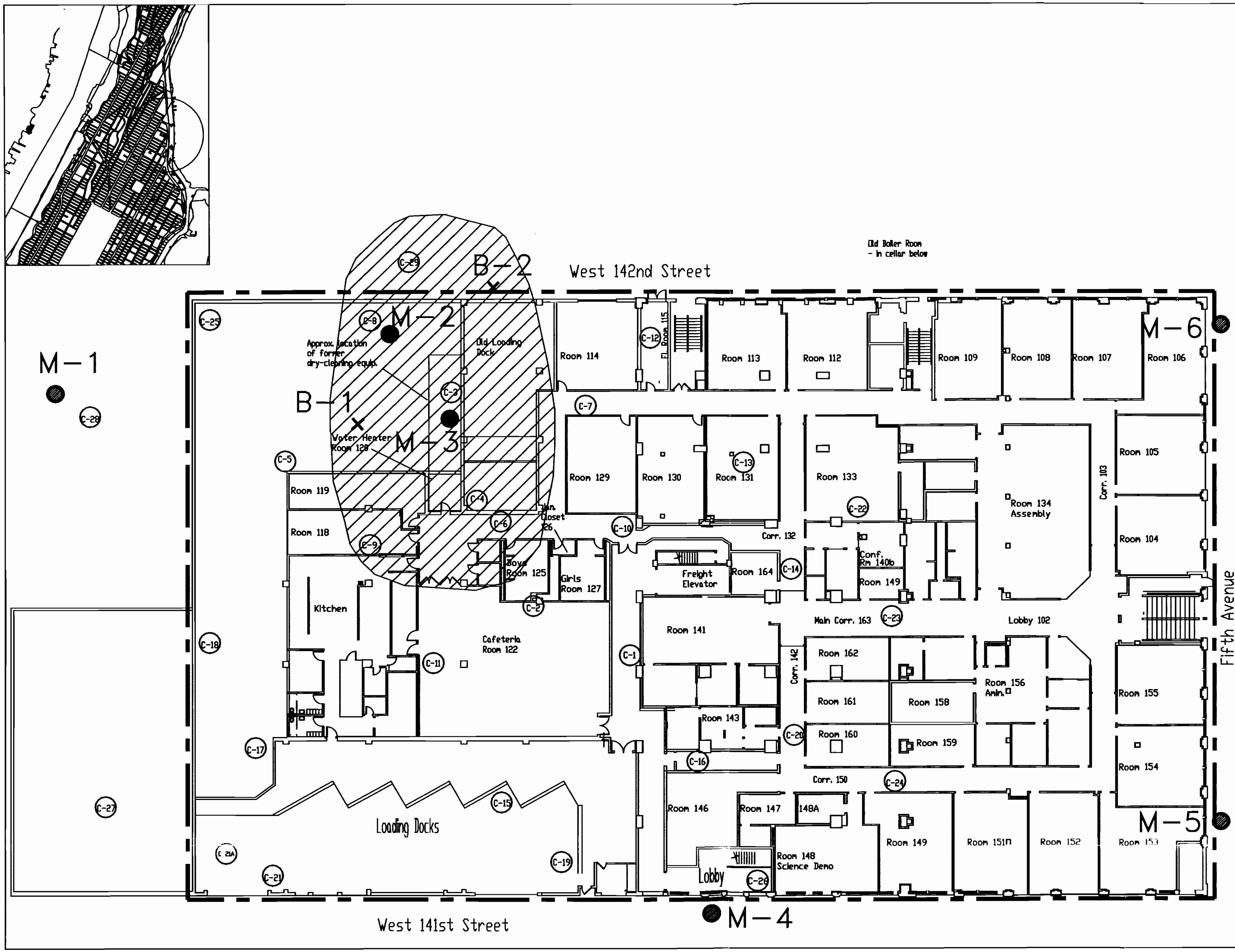
- AREA WHERE INSULATION WAS REMOVED
- AREA WHERE INSULATION REMAINS
- MONITORING WELL LOCATION
- BORING / MONITORING WELL LOCATION
- BORING LOCATION
- FORMER CORE DRILLING LOCATIONS
- SCHOOL BOUNDARY

REMAINING INSULATION

INTERMEDIATE SCHOOL 120
2350 FIFTH AVE, NEW YORK, NY

ISSUE: 1

DRAWING NUMBER: III-3



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1	12/MAY/97	AF	ED	PRELIMINARY ISSUE

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KEY:

- PSA MONITORING WELL LOCATION
- PSA BORING / MONITORING WELL LOCATION
- PSA BORING LOCATION
- FORMER CORE DRILLING LOCATIONS
- SITE BOUNDARY

MAXIMUM AREA OF SOIL CONTAMINATION

2350 FIFTH AVE, NEW YORK, NY

DRAWING NUMBER: III-sampler will be driven through the next 2 feet of soil to obtain the surface sample. Following the completion of sampling, all borings will be converted to groundwater monitoring wells as described below.

All samples will be containerized and stored in accordance with NYSDEC sampling protocols. Each container will be properly sealed, labeled, and placed in a refrigeration unit for transport to the laboratory. A record of each sample, including notation of any odors, color, or sample matrix and of PID head-space readings, will be kept in the sampler's field log book. A chain of custody will be maintained throughout the field sampling, transport of samples to the laboratory, and during lab analysis.

Groundwater Monitoring

Groundwater monitoring performed for the PSA found no off-site groundwater contamination. However, since the groundwater flow direction appears to be more to the north than expected, none of the off-site wells may be directly downgradient of the source area. Additional monitoring wells M-7 and M-8 will be installed at the two soil boring locations on the north side of West 142nd Street as shown in Figure IV-1. Based on the groundwater elevations measured in the PSA, these locations appear to be directly downgradient of the PCE source area.

The two new wells M-7 and M-8, as well as the two wells near the source area, M-2 and M-3, will be sampled in accordance with NYSDEC sampling protocol, as described in Technical and Administrative Guidance Memorandum #4007: Phase II Investigation Generic Work Plan; DEC Division of Hazardous Waste Remediation, 1988. The groundwater samples will be analyzed for volatile organic compounds in accordance with NYSDEC ASP Method 95-1 and for chloride, sulfide, nitrite, dissolved organic carbon, and total dissolved solids. Laboratory deliverables shall be ASP Category B.

The monitoring wells will be drilled using a hollow-stemmed auger and will consist of 2-inch Schedule 40 PVC casing in a 6¼-inch augured hole. A 10-foot PVC screen (0.020 inch slot) will be installed in the top 8 feet of groundwater. A filter pack of sand (US Std sieve sizes 30 to 8) will be placed in the annular space around the screens and will extend 2 feet above the screen.

The annular area around the well casing will be sealed with bentonite pellets for an interval of 2 feet above the filter pack. A grout, consisting of a cement and bentonite mixture or an anti-shrink mixture, will then extend from the bentonite pellet seal to a level 2 feet below ground. The remaining annular space will be sealed with a concrete cap and well apron (expanding cement). A locking well cap will be installed upon completion of the well.

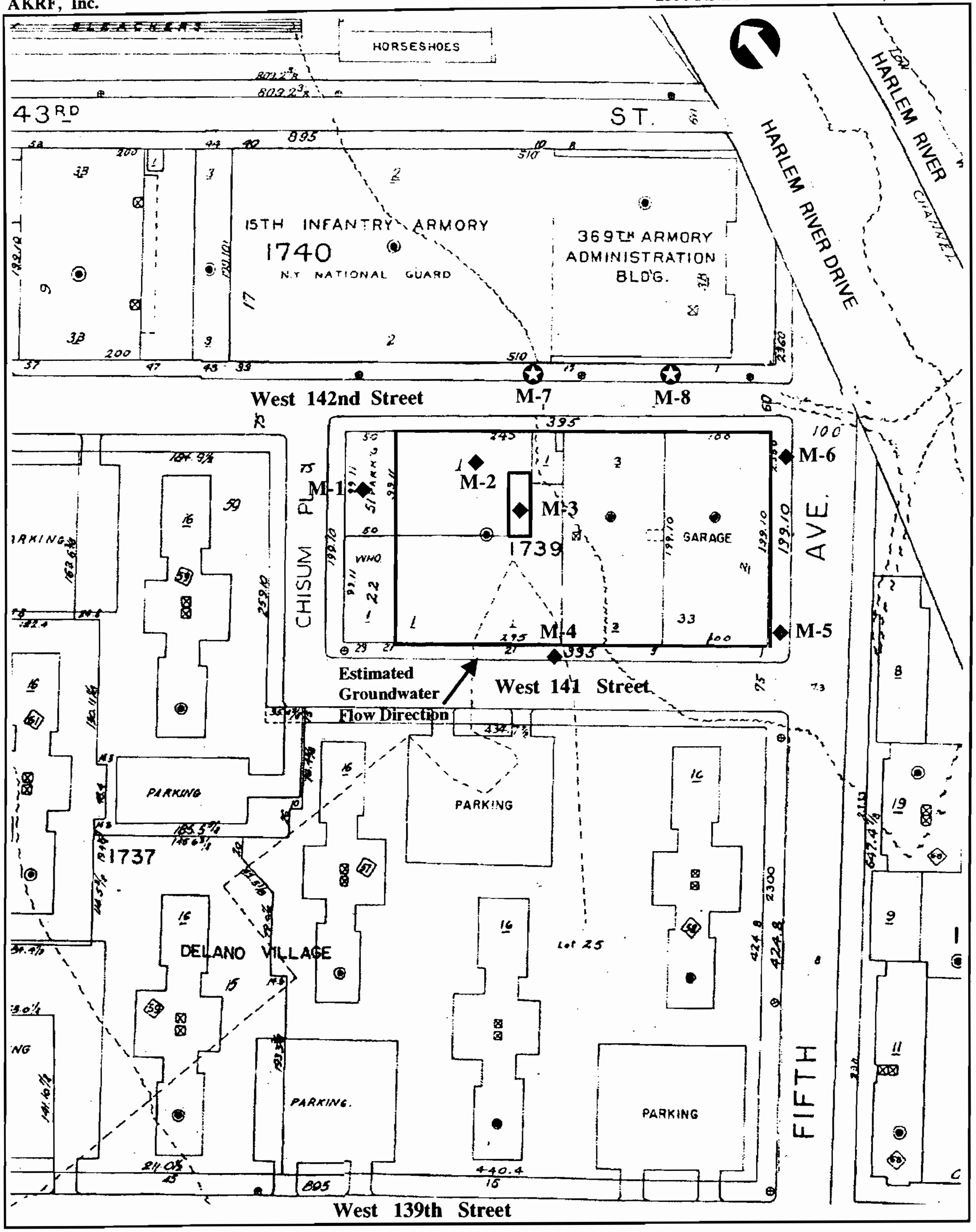


FIGURE IV-1
EXISTING AND PROPOSED MONITORING WELL LOCATIONS

The wells will be developed the day after they are drilled by pumping. Dedicated PVC tubing will be used. The well will be developed until the turbidity of the water sample, as measured by a nephelometer, becomes less than 50 Nephelometric Turbidity Units (NTU) or at least 15 well volumes of groundwater have been pumped out. The new wells will not be sampled for at least seven days after development.

Before sampling the new wells, water levels will be measured using an electronic water level indicator. The following parameters will be measured using field test kits: dissolved oxygen, redox potential, pH, alkalinity, and temperature. A dedicated bailer or a submersible sample pump will be used for sample collection. A minimum of three well volumes will be purged from the well before sampling. Samples will not be collected until the turbidity is below 50 NTUs and the pH, temperature, and conductivity readings have stabilized.

All water samples for laboratory submission will be containerized and stored in accordance with applicable EPA or NYSDEC analytical protocols. After collection, each container will be properly labeled, sealed, and refrigerated for shipment to the laboratory. All sampling equipment will be decontaminated before its use.

To determine whether groundwater levels are influenced by tidal fluctuations, water levels in the four wells closest to the Harlem River, M-5, M-6, M-7, and M-8, will be continuously measured over a four-day period (eight tidal cycles). A Solinst Levelogger F30 or equivalent will be placed below the water level in each well to monitor fluctuations in thee water depth, and an additional Levelogger will be placed in one well above the water level to monitor fluctuations in atmospheric pressure.

The well locations and their elevations will be surveyed. Using these data and the measured water levels, a hydraulic gradient map will be prepared to confirm the direction of groundwater flow on the site.

TABLE 1: Remedial Investigation Phase I Sample Chart

Matrix	Samples	Analyses	Data reporting level
Soil	M-7, M-8	Volatile Organic Compounds (ASP Method 95-1)	Category B
Groundwater	M-2, M-3, M-7, M-8	Volatile organic compounds (ASP Method 95-1), chloride, sulfide, nitrite, dissolved organic carbon, dissolved iron, and total dissolved solids	Category B

IRM-2 Pilot Studies

Interim Remedial Measure 2 is intended to remediate the PCE contamination under the building. This is in two forms: contaminated soil in the vadose zone and contaminated soil/groundwater in the saturated zone. The contaminated soil in the vadose zone is miscellaneous fill material. The soil just below the groundwater level to which most of the PCE is bound is organic silt or clay. PCE contamination in the vadose zone soil was found only at one location (M-3) and is believed to be limited to the source area. PCE contamination was found at about the level of the groundwater interface at locations within about 30 feet of the source area, as shown in Figure III-3. The Phase I Focused Remedial Investigation will determine whether PCE has spread further downgradient.

For PCE-contaminated soil in the vadose zone, soil vapor extraction is a presumptive remedy and will be proposed for IRM-2. For soil/groundwater in the saturated zone, air sparging or pump-and-treat would be the most common remedies, but neither would be very effective in the organic clay/silt soil. In this type of soil, the radius of effectiveness of sparging points would be very limited. Furthermore, because of the high organic carbon content (up to 3.5 percent total organic carbon) the partition coefficient greatly favors absorption of PCE onto the soil, so pump-and treat would be very inefficient. Since the area of contamination is relatively limited, the proposed treatment is local lowering of the groundwater level by pumping, if feasible, accompanied by soil vapor extraction to remove PCE from the unsaturated soil.

This requires two pilot studies, a vapor extraction pilot test to estimate the soil permeability to vapor flow, and a pump test to determine the pumping rate required to lower the groundwater level in the remediation area.

Soil vapor permeability testing will be performed using wells M-2 and M-3. These wells were constructed with 15 feet of screen extending seven feet above the groundwater surface. A vacuum pump will be attached to one well, and the air flow from the well and the pressure response in the other well will be measured as the pump rate is varied. The soil permeability to vapor flow, and the radial distance in which vapor flow is induced can then be calculated using the method described by Johnson et.al. (Ground Water Monitoring Review, Spring 1990) and Toy (Journal of Environmental Engineering, July 1997).

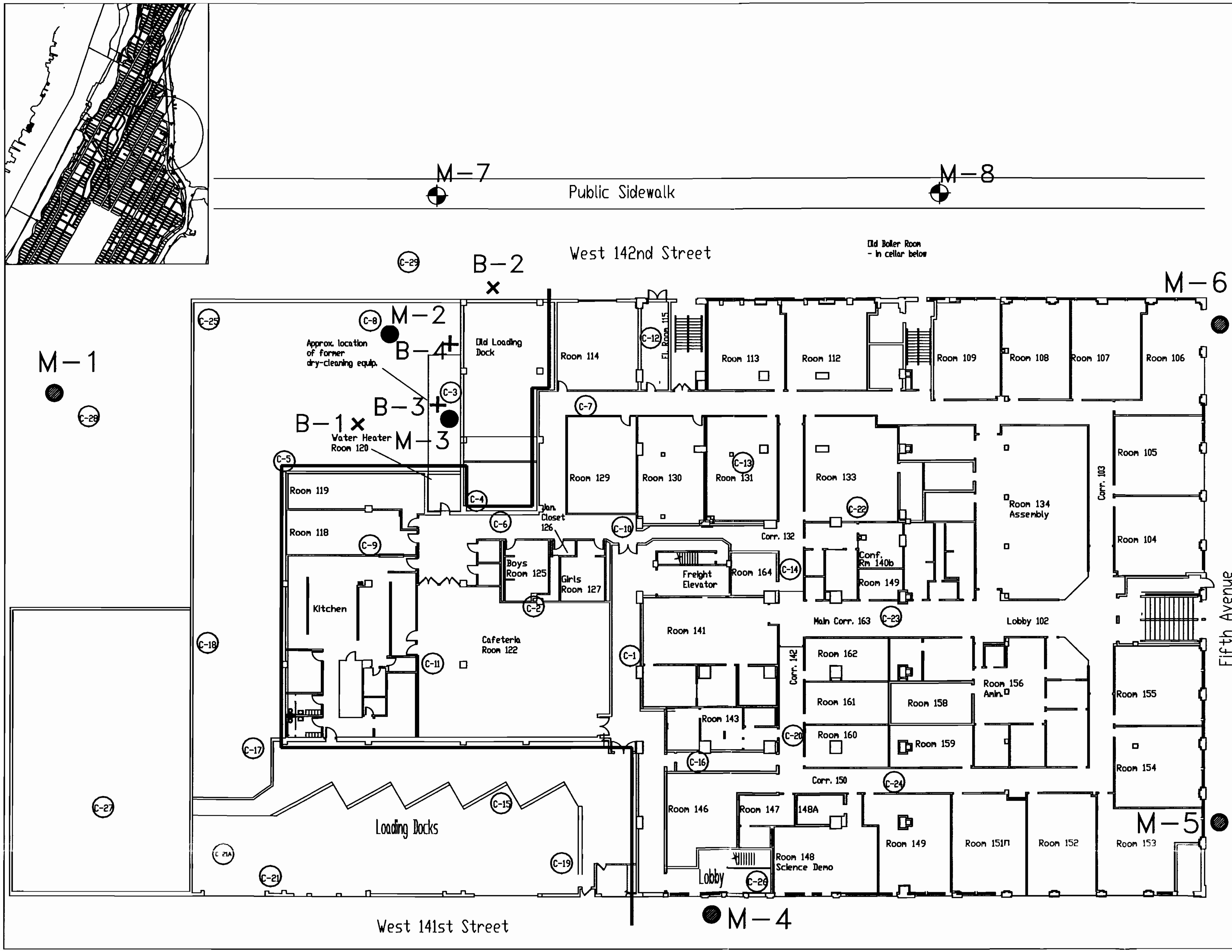
The pump test will be performed using wells M-1, M-2, and M-3. Well M-3 will be pumped at varying rates, and drawdown response will be measured at the two observation wells. After pumping, recovery rates will be measured in each well. Water pumped during the test will be treated with activated carbon and then tested for volatile organic compounds before being discharged to the sewer system.

V. REMEDIAL INVESTIGATION PHASE 2

Soil Sampling

Soil borings will be performed at two locations at the PCE source area as shown in Figure V-1. The purpose of these borings is to confirm that the IRM has reduced PCE levels in soils in the source area. Continuous soil samples will be collected at two-foot intervals down to the groundwater interface and one additional sample will be collected from the two-foot interval below the groundwater interface. Each sample will be analyzed for volatile organic compounds in accordance with NYSDEC ASP Category B 95-1, and the sample from just above the groundwater interface will also be analyzed for total organic carbon (EPA 415.1).

Soil samples will be obtained by a steel, 24-inch long, 2-inch in diameter split-spoon sampler that will be driven through the subsurface soils ahead of a hollow-stem (4.25-inch inside diameter) auger that bores into the soil to just above the desired sampling depth. The split-spoon sampler will be driven through the next 2 feet of soil to obtain the surface sample. Following the completion of sampling, all borings will be backfilled and sealed immediately using a Portland cement/bentonite grout to minimize the potential for PCE entering the building atmosphere.



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ISSUE	DATE	ORIG	BY	DESCRIPTION	CH
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1	12/MAY/97	AF	ED	PRELIMINARY ISSUE	AF

LOCATION: NEW YORK CITY, USA | PROJECT NUMBER: 8010
SCALE: see bar scale

0 30 FT

BASE MAP SOURCES:
Riverpoint, Inc., 7 Hillside Ave, New Rochelle, NY 10801, drawn by Birger Elvenis from drawings and digital files provided by Kirshenbaum & Tambasco, P.C., 22 Feb., 1

KEY:

- PROPOSED RI PHASE 1 BORING/MONITORING WELL LOCATION
- PROPOSED RI PHASE 2 BORING LOCATION
- MONITORING WELL LOCATION
- BORING / MONITORING WELL LOCATION
- BORING LOCATION
- FORMER CORE DRILLING LOCATIONS
- SCHOOL BOUNDARY

SAMPLING LOCATIONS

2350 FIFTH AVE, NEW YORK, NY

ISSUE: 2

DRAWING NUMBER: V-1

All samples will be containerized and stored in accordance with NYSDEC sampling protocols. Soil samples will be field screened for organic vapors by head-space analysis using a photoionization detector (PID). Each container will be properly sealed, labeled, and placed in a refrigeration unit for transport to the laboratory. A record of each sample, including notation of any odors, color, or sample matrix and of PID head-space readings, will be kept in the sampler's field log book. A chain of custody will be maintained throughout the field sampling, transport of samples to the laboratory, and during lab analysis.

Groundwater Sampling

The eight monitoring wells on and around the site (M-1 to M-8) will be sampled in accordance with NYSDEC sampling protocol, as described in Technical and Administrative Guidance Memorandum #4007: Phase II Investigation Generic Work Plan; DEC Division of Hazardous Waste Remediation, 1988. Redevelopment, field sampling parameters, and the collection of samples for laboratory submission will be performed as described in Section V above. The groundwater samples will be analyzed in the laboratory for volatile organic compounds in accordance with NYSDEC ASP Category B 95-1 and for chloride and total dissolved solids.

TABLE 2: Remedial Investigation Phase 2 Sample Chart

Matrix	Samples	Analyses	Data reporting level
Soil	B-3, B-4 (From each two foot depth interval to two feet below the groundwater interface)	Volatile Organic Compounds (ASP Method 95-1)	Category B
Soil	B-3, B-4 (Depth interval just above the groundwater interface)	Total Organic Carbon (EPA Method 415.1)	
Ground water	M-1, M-2, M-3, M-4, M-5, M-6, M-7, M-8	Volatile Organic Compounds (ASP Method 95-1), chloride, dissolved iron and total dissolved solids	Category B

VI. UNDERGROUND STORAGE TANK

A 20,000-gallon underground fuel oil storage tank most likely remains on the site beneath the loading dock. The tank will be temporarily closed in accordance with all applicable local, state, and federal regulations. Subsurface sampling will be performed in the vicinity of the tank to evaluate its impact on the surrounding soils. The scope of the tank closure includes the following tasks:

- Drawdown of any product remaining in the tank;
- Cleaning of tank and inspection of interior for leaks.
- Locking of manways, fill and supply pipes, and any other access points:
- Collection of soil and groundwater samples using soil probes on each side of the tank at the nearest accessible point at depth approximately even with the bottom of the tank. All soil and groundwater samples to be analyzed for STARS parameters for fuel oil contamination.;
- Produce a letter report on the temporary closure, documenting clean-up activities and include copies of soil analysis results and waste manifests; and
- Notify the NYS DEC of the change in tank status (submit the appropriate forms).

VII. ESTIMATED REMEDIAL INVESTIGATIONS SCHEDULE

Remedial Investigation Phase 1

Phase I of the Remedial Investigation will begin after final DEC approval of the Work Plan. The estimated schedule is given below.

TABLE 3: Remedial Investigation Phase 1 Estimated Schedule

Weeks after start	Task
2	Installation of new monitoring wells
3	Tidal cycle groundwater measurements
4	Groundwater sampling
7	Laboratory analyses completed
9	Report to DEC

It is anticipated that the IRM-2 Pilot Studies will be performed concurrently with the RI Phase 1.

Remedial Investigation Phase 2

Phase 2 of the Remedial Investigation will begin after the IRM is deemed complete and DEC approves proceeding with Phase 2. The estimated schedule is given below.

TABLE 4: Remedial Investigation Phase 2 Estimated Schedule

Weeks after start	Task
2	Installation of soil borings. Well redevelopment.
4	Groundwater sampling
7	Laboratory analyses completed
9	Report to DEC

VIII. INVESTIGATION REPORT

Upon completion of each phase of the the investigation, a report will be submitted to the NYS DEC as specified in the Consent Order. The following items will be included in the report:

- a narrative section describing all remedial activities on site
- a copy of the daily activity log book
- copies of the laboratory data for the sample analysis
- Soil boring logs
- monitoring well construction logs
- groundwater purging and sampling data
- results of air monitoring performed in accordance with the Health and Safety Plan

APPENDIX A

HEALTH AND SAFETY AND COMMUNITY AIR MONITORING PLAN

Health and Safety and Community Air Monitoring Plan

2350 Fifth Avenue
Manhattan, New York

Prepared By:

AKRF Engineering, P.C.
117 East 29th Street
New York, New York 10016
(212) 696-0670

Revised March 2001

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Page Number

1. INTRODUCTION

The site is located on the west side of Fifth Avenue between West 141st and West 142nd Streets in Manhattan. The entire site is occupied by a building comprising three connected sections: a two-story section along Fifth Avenue, a three-story section in the center of the site, and a one-story section on the western portion of the site. Old Sanborn insurance maps show that the building was originally constructed as an ice cream factory. Following its use as an ice cream factory, the building was occupied by a commercial laundry from 1970 to 1994. The laundry included a dry cleaning operation utilizing tetrachloroethene (PCE) as a cleaning solvent. The dry cleaning operation was located near the northern side of the one-story portion of the building, just west of the West 142nd Street loading dock. In 1995-1996, most of the building on the site, with the exception of the far western portion, was renovated for use as a New York City public school. Currently, the renovated eastern portion of the ground floor is being used by a local church. A small area of the second floor is used as an office by the property owner.

Prior testing programs on the site have shown that building materials -- primarily insulation under the floor slab -- and soil under the building in both the unsaturated and saturated zones are contaminated with PCE.

The purpose of this Health and Safety Plan (HASP) is to protect field personnel and others during soil vapor extraction (SVE) system operations, as well as drilling activities and activities involving soil disturbances on the site. It is in conformance with the various Occupational Safety and Health Administration (OSHA) standards and other applicable regulations governing site investigation operations, and all AKRF, Inc. policies and procedures on health and safety. It has been prepared to establish practices and procedures to protect the health of AKRF personnel and others during all activities associated with the upkeep of the SVE system.

2. HEALTH AND SAFETY GUIDELINES AND PROCEDURES

A. HAZARD EVALUATION

The testing performed by Riverpoint in April 1997 found contamination of the sub-slab insulation with PCE. Samples of cork and/or Styrofoam from the western part of the building contained PCE concentrations ranging from 1000 to 100,000 ppb. (Samples from the cores were analyzed on-site using a portable gas chromatograph equipped with an electron capture detector. No samples were sent for laboratory analysis to confirm the field analyses, so the analysis results can only be considered reliable to within an order of magnitude.) PCE contamination in the fill material beneath the insulation was limited to the area around the former location of the dry cleaning machines. At sampling location C-3, which is at the former location of the dry cleaning equipment, PCE levels exceeded New York State DEC's recommended cleanup objective of 1400 ppb at almost every depth from just below the slab down to 20 feet below the grade of the building floor. At other locations in this area, levels exceeding the cleanup objective were found at depths of 7 to 10 feet below the grade of the building floor, and at one location (C-29) at depths of 15 to 20 feet below the floor grade. These depths are potentially at or below the groundwater level.

B. DESIGNATED PERSONNEL

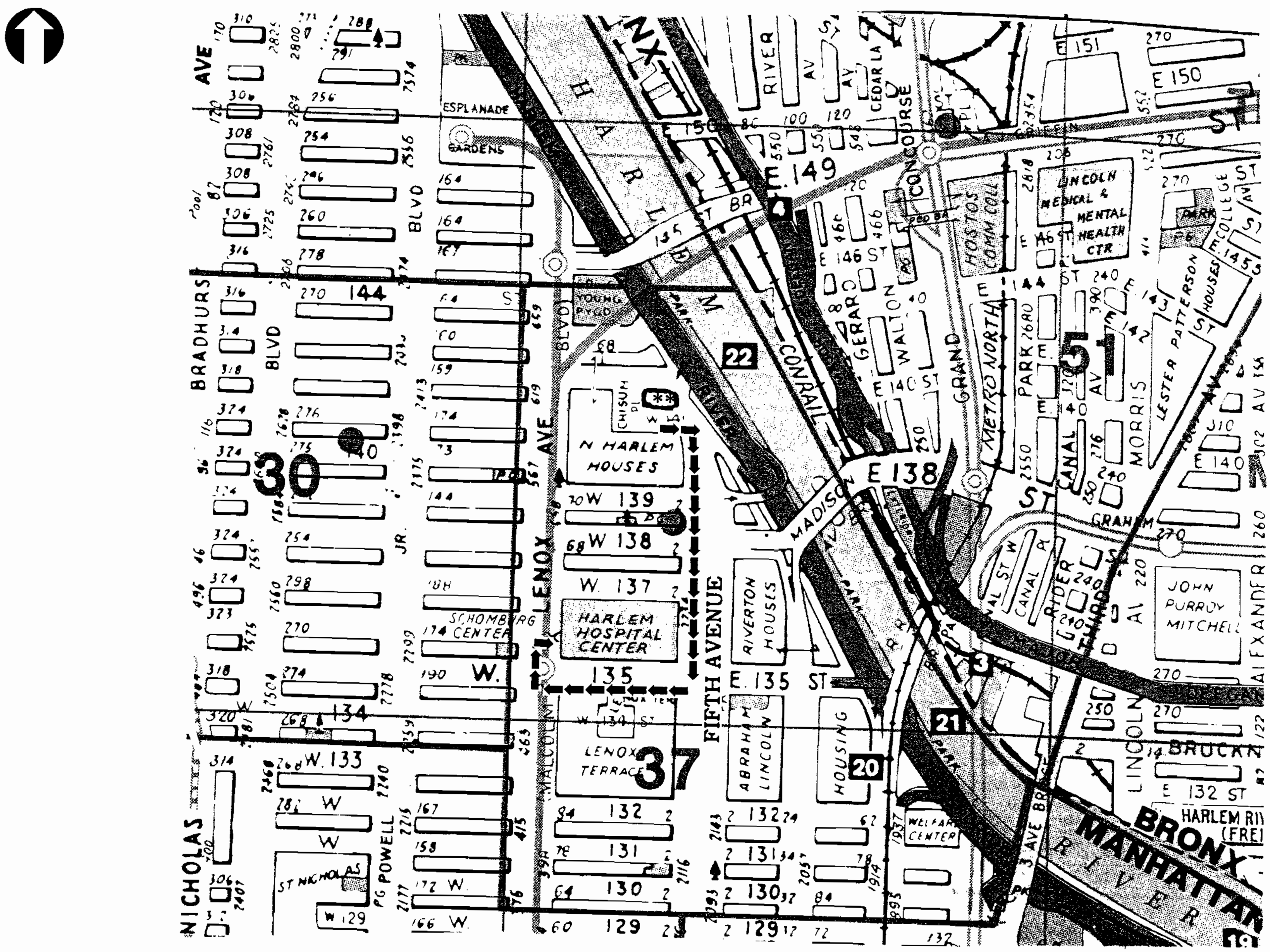
AKRF will appoint one of its personnel as the Health and Safety Officer (HSO). This individual will be responsible for the implementation of the HASP. The HSO will have a 4-year college degree in occupational safety or a related science/engineering field, and 2 years of experience in implementation of air monitoring and hazardous materials sample programs. The HSO will have completed a 40-hour training course that meets OSHA requirements of 29 CFR Part 1910, Occupational Safety and Health Standards.

The HSO will be responsible for training personnel that will be responsible for system monitoring and other on-site upkeep activities. The HSO will be present on-site during the conduct of all field operations involving drilling or other subsurface disturbance, and will be responsible for all health and safety activities and the delegation of duties to the field crew. The HSO has stop-work authorization, which he/she will execute on his/her determination of an imminent safety hazard, emergency situation, or other potentially dangerous situation. If the HSO must be absent from the field during activities involving a subsurface disturbance, he/she will designate a replacement who is familiar with the health and safety plan, air monitoring, and protection equipment.

C. TRAINING

All those who are responsible for SVE system monitoring and other on-site system operation and maintenance activities must recognize and understand the potential hazards to health and safety. All system upkeep personnel must attend a training program, whose purpose is to:

- Familiarize them of the process description; the remediation system and its components; the elements of the process control system; the operation procedures for start-up, continuous operation, shut down, and emergency shut-down; maintenance, service, and repair operations at the site;
- Familiarize them with the O&M Manual;
- Make them aware of the potential hazards they may encounter;
- Provide the knowledge and skills necessary for them to perform the work with minimal risk to health and safety;
- Make them aware of the purpose and limitations of safety equipment; and
- Ensure that they can safely avoid or escape from emergencies.



** PROJECT SITE

➡➡ ROUTE TO HOSPITAL

FIGURE 1

HOSPITAL LOCATION MAP

All those who enter the work area while intrusive activities are being performed must recognize and understand the potential hazards to health and safety. All field personnel must attend a training program, whose purpose is to:

- Make them aware of the potential hazards they may encounter;
- Provide the knowledge and skills necessary for them to perform the work with minimal risk to health and safety;
- Make them aware of the purpose and limitations of safety equipment; and
- Ensure that they can safely avoid or escape from emergencies.

Each member of the field crew will be instructed in the above objectives before he/she goes onto the site. The HSO will be responsible for conducting the training program.

D. MEDICAL SURVEILLANCE PROCEDURE

All AKRF, Inc. and subcontractor personnel performing field work involving drilling or other subsurface disturbance and all personnel responsible for SVE system operations and maintenance at the site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120 (f). A physicians medical release for wok will be confirmed by the HSO before an employee can begin site activities. The medical examination will, at a minimum, be provided annually and upon termination of hazardous waste site work.

E. SITE WORK ZONES

.During any activities involving drilling or other subsurface disturbance, the work area must be divided into various zones to prevent the spread of contamination, ensure that proper protective equipment is donned, and provide an area for decontamination.

The Exclusion Zone is defined as the area where PCE-contaminated materials are generated as the result of drilling, sampling, or similar activities. The Contamination Reduction Zone (CRZ) is the area where decontamination procedures take place and is located next to the Exclusion Zone. The Support Zone is the zone area where support-facilities-such as vehicles, a field phone, fire extinguisher, and first aid supplies-are located. The emergency staging area (part of the Support Zone) is the area where all workers on site would assemble in the event of an emergency. These zones shall be designated daily, depending on that day's activities. All field personnel will be informed of the location of these zones before work begins.
Control measures such as "Caution" tape and traffic cones will be placed around the perimeter of the work area when work is being done in the areas of concern to prevent entrance onto the area with exposed soil.

Site work zones do not need to be specified for SVE system operations and maintenance activities.

F. AIR MONITORING

An Organic Vapor Meter (OVM) will be used to perform air monitoring during all sampling, drilling and well installation, as well as SVE system operations and maintenance activities. The purpose of the air monitoring program is to avoid or minimize exposure of the field personnel and the public to potential environmental hazards in the soil and groundwater. Results of the air monitoring will be used to determine the appropriate response action, if needed. The OVM will be calibrated with isobutylene in accordance with the manufacturers recommendations.

Work Zone Air Monitoring

Real time air monitoring will be done, with the OVM, whenever soil removal or drilling is being performed, and whenever entering the room containing the SVE equipment. When activities involving subsurface disturbances take place, measurements will be taken prior to commencement of work and for at least 1 minute every 60 minutes during the work. These measurements will be made as close to the workers as practical and at the breathing height of the workers. The HSO shall set up the equipment and confirm that it is working properly. His/her designee may oversee the air measurements during the day. The initial measurement for the day will be performed before the start of work and will establish the background level for that day. The final measurement for the day will be performed after the end of work. The action levels and required responses are listed in Table 1.

TABLE 1 Work Zone Ambient Air Monitoring Action Levels

ACTION LEVEL	RESPONSE ACTION
Less than 20 ppm above background	Continue work in Level D
Between 20 and 100 ppm above background	Upgrade to Level C
More than 100 ppm above background*	Stop work. Resume work when source of vapors is abated and readings are less than 100 ppm above background

** OSHA's 8-hour time-weighted-average Permissible Exposure Limit (PEL) for PCE is 100 ppm*

Community Air Monitoring

During all outdoor or indoor ground-intrusive activities, perimeter air monitoring will be performed as follows. Air quality will be continuously monitored at the downwind perimeter of the work area, or if inside, on the perimeter of the work area nearest occupied spaces of the building. The action levels and required responses are listed in Table 2.

TABLE 2 Community Air Monitoring Action Levels

ACTION LEVEL	RESPONSE ACTION
Less than 5 ppm above background *	Continue work
More than 5 ppm but less than 25 ppm above background	Implement vapor emission response plan
More than 25 ppm above background	Stop work. Perform downwind monitoring in accordance with vapor emission response plan.

* *The NYSDEC Short Term Guidance (SGC) concentration for PCE is 11.7 ppm*

Vapor Emission Response Plan

When vapor concentrations at the downwind edge of the work area exceed 5 ppm over background then work will be temporarily suspended. Work may be resumed if:

1. Concentrations at the downwind edge of the work area fall below 5 ppm over background; OR,

2. Concentrations measured 200 feet downwind or at half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the downwind concentrations measured 200 feet downwind or at half the distance to the nearest downwind residential or commercial structure, whichever is less, exceed 5 ppm over background, then all work will be halted. If the concentrations measured at the downwind location persist above 5 ppm over background after the cessation of work, then monitoring will be performed within 20 feet of the nearest downwind residential or commercial structure. The major vapor emission response plan will be put into effect if levels measured in the 20-foot zone either:

1. Exceed 10 ppm over background; OR,
2. Exceed 5 ppm over background for a period greater than 30 minutes.

Major Vapor Emission Response Plan

The safety officer will contact the local police authorities (32nd precinct - (212) 690-6311)) and all contacts listed below under Emergency Response and inform them of the situation. Air monitoring will be conducted in the 20-foot zone at 30-minute intervals. Air monitoring may be halted or modified if two successive readings are below 5 ppm over background.

G. PERSONAL PROTECTION EQUIPMENT

The personal protection equipment required for various kinds of site investigation tasks are based on 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, Appendix B, "General Description and Discussion of the Levels of Protection and Protective Gear."

AKRF field personnel and other site personnel shall wear Level D personal protective equipment. During activities such as drilling, well installation, or sampling where is a chance of contact with contaminated materials modified Level D equipment will be worn. The protection will be upgraded to Level C if the results of the air monitoring indicates that Level C equipment is warranted.

Level D

Respiratory Protection:	None
Protective Clothing:	Coveralls, work shoes

Modified Level D

Respiratory Protection:	None
Protective Clothing:	Coveralls, work shoes, gloves

Level C

Respiratory Protection:	Air purifying respirator with organic vapor cartridges.
Protective Clothing:	Same as modified Level D

H. GENERAL WORK PRACTICES

To protect the health and safety of the field personnel, all field personnel will adhere to the guidelines listed below during activities involving subsurface disturbance. These guidelines should also be followed by operations and maintenance workers in the room containing SVE equipment.

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited, except in designated areas on the site. These areas will be designated by the HSO.
- Workers must wash their hands and face thoroughly on leaving the work area and before eating, drinking, or any other such activity. The workers should shower as soon as possible after leaving the site.
- Contact with contaminated or suspected surfaces should be avoided.
- The buddy system should always be used; each buddy should watch for signs of fatigue, exposure, and heat stress.

I. EMERGENCY PROCEDURES AND EMERGENCY RESPONSE PLAN

The field crew and operations and maintenance personnel will be equipped with emergency equipment, such as a first aid kit and disposable eye washes. In the case of a medical emergency, the HSO will determine the nature of the emergency and he/she will have someone call for an ambulance, if needed. If the nature of the injury is not serious—i.e., the person can be moved without expert emergency medical personnel—he/she should be driven to a hospital by on-site personnel. There will be an on-site field phone. The location of the nearest hospital, Harlem Hospital Center, is one quarter mile south of the site at Fifth Avenue and 135th Street. The route to the hospital is shown in Figure 1. Telephone numbers are:

Ambulance 911

All emergencies shall be reported to:

Inner City Redevelopment - (212) 234-5000
Joseph Karten, Project Manager

New York State DEC Region 2 - (718) 482-4891
Vaim Brevdo, Project Manager

3. ACKNOWLEDGMENTS OF HASP

Below is an affidavit that must be signed by all workers who enter the site. A copy of the HASP must be on-site at all times and will be kept by the HSO.

AFFIDAVIT

I, ______________________ (name), of ______________________ (company name), have read the Health and Safety Plan (HASP) for the site at 2350 Fifth Avenue. I agree to conduct all on-site work in accordance with the requirements set forth in this HASP and understand that failure to comply with this HASP could lead to my removal from the site.

Signed ______________________ Date ______________________

APPENDIX B

QUALITY ASSURANCE/QUALITY CONTROL PLAN

QUALITY ASSURANCE/QUALITY CONTROL PLAN
2350 FIFTH AVENUE
NEW YORK, NEW YORK

Prepared For:

2350 Fifth Avenue Corporation
2350 Fifth Avenue
New York, New York 10037

Prepared By:

AKRF Engineering, P.C.
117 East 29th Street
New York, New York 10017
(212) 696-0670

Arnold E. Fleming, P.E. #050411
Vice President

Revised January 2001

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QUALITY ASSURANCE/ QUALITY CONTROL

A. Personnel

The following people have been designated as the project personnel and a copy of their resumes is included in Appendix 1 to this appendix.

Project Manager:	Andrew D. Rudko, Ph.D.
Project Engineer:	Melissa A. McGoogan
Quality Assurance Officer:	Jennifer Clements
Field Manager:	Mohammed Ahmed

The Project Manager will be responsible for the oversight of all aspects of the project, including environmental investigations, remediation design, and construction and operations of remediation equipment. The Project Engineer will be responsible for the design of remediation equipment such as soil vapor extraction systems and any necessary alterations or adjustments to such systems. The Quality Assurance Officer will be responsible for ensuring that all investigations and sampling procedures meet applicable standards and guidelines promulgated by the USEPA, NYSDEC, NYSDOH, NYCDEP, and NYCDOH. The Field Manager will be responsible for the performance of environmental investigations such as soil borings and the collection of groundwater samples, oversight for the installation of any remediation equipment, weekly monitoring and upkeep of remediation equipment, and the collection of ambient air samples in the structure.

B. Field Decontamination Procedures

To avoid contamination and cross-contamination of samples, all sampling equipment will be cleaned before collection of each sample. The procedure to be used is derived from that of the United States Environmental Protection Agency (EPA) Region II, as published by the New Jersey Department of Environmental Protection *Field Sampling Procedures Manual,* February 1988. (It differs from this reference in allowing alternatives to acetone and in the use of HCl for stainless steel.) The following procedure will be followed for all samples:

Step 1: Steam clean or pressure wash equipment.

Step 2: Scrub equipment with a bristle brush using a non-phosphate detergent in hot tap water.

Step 3: Rinse with hot tap water.

Step 4: Rinse with 0.1N reagent grade nitric acid ($HNO3$) diluted to the required normality with distilled deionized water. For stainless steel equipment, rinse with 0.1N hydrochloric acid (HCL).

Step 5: Rinse twice with deionized water.

Step 6: Rinse with a pesticide grade methanol.

Step 7: Air dry.

Step 8: Double rinse with deionized, distilled water.

Step 9: Air dry the equipment.

Step 10: Package in clean unused aluminum foil.

C. Chain of Custody

To ensure the integrity of samples taken, a strict chain of custody record must be maintained on each sample. This begins after sampling with the entry in the sampler's field log book of the sampling details:

a) Date and time of sampling;

b) Sample location (as specific as possible);

c) The unique sample number, size, and container(s) used;

d) Sample description;

e) Weather conditions (if applicable); and

f) Any additional comments.

In addition, a record must be kept of the sample's progress from the sample site to the laboratory where it will be analyzed. This is the chain-of-custody form. The form must include:

a) The sample number;

b) The sampler's name;

c) Date and time of sampling;

d) Location at which the sample was taken, including the address, if possible;

e) A description of the sample, as best known;

f) Signatures of people involved in the chain of possession; and

g) Inclusive dates of possession of each person in the chain.

The chain-of-custody form must accompany the sample throughout its trip to the laboratory. If the sample(s) must be shipped to a laboratory, most shipping agents will refuse to sign or separately carry the chain-of-custody form. In this one case, it is permissible to put the chain-of-custody form into the box with the sample and then seal the box. The recipient of the box, the laboratory's sample custodian, can then attest to the box's arrival still sealed and un-opened.

Accompanying the chain-of-custody record, or included in it, must be a request to the laboratory for sample analyses. Information required includes:

a) Name of person receiving the sample;

b) Laboratory sample number;

c) Date of sample receipt;

d) Sample allocation; and

e) Analyses to be performed.

Finally, on arrival at the laboratory, the sample custodian must enter the sample in the laboratory's sample log book. The chain-of-custody should be kept on file at the laboratory.

E. Standard Operating Procedures - Field Screening Methods

Field screening for organic vapors will performed by head-space analysis using a handheld photoionization detector (PID) calibrated to the reference standard isobutylene gas, according to the manufacturer's instructions. The PID will be calibrated daily at the project site. To perform a head-space analysis, the soil will be placed in a sealable plastic bag and put aside to allow the vapors to collect in the bag. After several minutes have passed, the bag will be pierced with the PID probe and the volume in parts per million (ppm) of organic vapors will be recorded from the meter. When the PID is used to monitor emissions from the soil vapor extraction system, a tedlar bag will be connected to an open valve on the pressurized side of the carbon filter system and filled with gas. Once the bag is full and sealed off, it will be pierced with the PID probe and the volume of organic vapors will be recorded. This will provide a relative estimate of PCE exiting the system.

F. Laboratory Testing

Severn Trent Laboratories (Newburgh, New York), a New York State ELAP CLP-certified laboratories will be used for all laboratory analyses. The laboratory will operate a Quality Assurance/Quality Control (QA/QC) program that will consist of proper laboratory practices (including the required chain-of-custody), an internal quality control program, and external quality control audits by New York State.

A trip blank and field blank will be included in each batch of samples, or 1 for each 20 samples, whichever is greater in frequency. Trip blanks and equipment blanks will be analyzed for volatile organic compounds to check for contamination during transport and sampling procedures.

The samples to be collected are presented in Tables 1 and 2 below. Sampling locations are shown in Figure V-1 in the Focused Remedial Investigation Work Plan document revised in January 2001.

TABLE 1: Remedial Investigation Phase I Sample Chart

Matrix	Samples	Holding Time	Analyses	Data reporting level
Soil	M-7, M-8	10 days	Volatile Organic Compounds (ASP Method 95-1)	Category B
Groundwater	M-2, M-3, M-7, M-8	10,28,7,228, 28,7 days respectively	Volatile organic compounds (ASP Method 95-1), chloride, sulfide, nitrite, dissolved organic carbon, dissolved iron, and total dissolved solids	Category B

TABLE 2: Remedial Investigation Phase 2 Sample Chart

Matrix	Samples	Holding Time	Analyses	Data reporting level
Soil (Post system operation)	B-3, B-4 (From each two foot depth interval to two feet below the groundwater interface)	10 days	Volatile Organic Compounds (ASP Method 95-1)	Category B
Soil (Post system operation)	B-3, B-4 (Depth interval just above the groundwater interface)	28 days	Total Organic Carbon (EPA Method 415.1)	
Groundwater	M-1, M-2, M-3, M-4, M-5, M-6, M-7, M-8	10,28,7,228, 28,7 days respectively	Volatile organic compounds (ASP Method 95-1), chloride, sulfide, nitrite, dissolved organic carbon, dissolved iron, and total dissolved solids	Category B

G. Data Usability Summary Report (DUSR)

All laboratory data will be evaluated by the Project Quality Assurance Officer according to the DER DUSR Guidelines, included in Appendix b to this appendix. Data deficiencies, analytical protocol deviations, and quality control problems will be identified and their effect on the data discussed in a DUSR which will be included in the final report for the project.

APPENDIX 1
PROJECT PERSONNEL RESUMES

Andrew D. Rudko, Ph.D.

Education

Cornell University, B.S., Biochemistry, 1965.

Columbia University, Ph.D., Biochemistry, 1972.

Membership in Professional Organizations

National Ground Water Association

Years of Experience

With AKRF: 15.

With other firms: 8.

Andrew D. Rudko, Ph.D., is a vice president and principal of AKRF, Inc. with more than 20 years' experience in environmental analysis and management, with particular emphasis on hazardous materials, environmental site assessments and audits, and soil and groundwater remediation.

Dr. Rudko's current and recent experience includes management of several projects involving Voluntary Cleanup Agreements for assessment and remediation of soil and groundwater contamination problems on major development sites. Dr. Rudko directed the assessment and remediation work on a 14-acre parcel in New Rochelle, New York that was being developed by a national retail chain. After extensive review and discussions with DEC, a remediation agreement was developed and approved that became the model for New York State's Voluntary Cleanup Program. AKRF supervised the implementation of the remediation measures, which included removal of underground storage tanks and associated contaminated soil, and construction of an impermeable cap with a gas venting system for areas with lead contamination.

On another retail site, serious solvent contamination was unexpectedly encountered on a property being developed in Queens, New York. Dr. Rudko managed the design and execution of a testing program, planned a remediation program that would permit development of the site, and assisted in the negotiation of a Voluntary Cleanup Agreement with DEC. Development of the property is now continuing while a groundwater remediation system designed by AKRF Engineering is installed as part of the building construction. Another Voluntary Cleanup directed by Dr. Rudko involved the delineation and removal of PCB-contaminated soil from a site in College Point. DEC has issued a release letter following the successful completion of this project.

Dr. Rudko directed the site assessment work on the 90-acre site of the proposed Queens West development project being sponsored by the Empire State Development Corporation, the New York City Public Development Corporation, and the Port Authority of New York and New Jersey. This site comprises more than 10 blocks of industrial property along the East River in Queens. Former uses on the site include oil refineries, paint manufacturers, and railyards. AKRF developed and implemented extensive soil and groundwater testing programs, and developed remediation plans which have been incorporated into four separate Voluntary Cleanup Agreements.

Dr. Rudko has been managing the assessment and cleanup of the only listed hazardous waste site in Manhattan, a former laundry/dry cleaning plant on Fifth Avenue in Harlem. Remediation has included the removal of contaminated building materials and operation of an innovative sub-slab vapor extraction system. Installation of this system required the development of special techniques for horizontal drilling under the floor of the building.

For the New York City Department of Environmental Protection, Dr. Rudko directed fast-track site assessments of 17 properties acquired from the Jamaica Water Company. The assessments, all of which were completed within 2 months, included soil and groundwater testing, asbestos and lead paint surveys, and testing of buildings for mercury contamination.

Dr. Rudko was project director for the site assessment work the firm performed for the New York City School Construction Authority, directing assessments on school sites in the Bronx, Brooklyn, and Queens. Sites included a former gas station, a truck salvage yard, and a former plastics factory. Testing programs were recommended, developed, and implemented for these sites, and remedial actions were recommended where necessary. At the former plastics factory site, the testing program included soil and groundwater sampling, testing of building floors for PCB contamination, and location and removal of old underground gasoline and oil tanks, with screening of surrounding soil for possible petroleum contamination.

Dr. Rudko has also directed numerous property assessments for private parties to identify potential environmental liabilities associated with vacant or occupied properties. Assessments have been performed for major corporations, prominent real estate developers, and leading environmental law firms. He directed Phase I environmental assessments for several major commercial properties in the New York City area, including the AT&T building, the Plaza Hotel, One Seaport Plaza, New York Plaza, the former General Electric building, the site of the proposed Trump Riverside South development, and many others. Dr. Rudko has been providing environmental consulting services to Home Depot, Inc. and Costco, Inc. in connection with their development of major retail facilities at locations throughout the New York metropolitan area. Many of these locations are former industrial properties that have required remedial actions prior to redevelopment. In addition, he also directed Phase I environmental assessments of several major medical facilities in connection with new financing through bonds issued by the New York State Medical Care Facilities Finance Agency. Facilities include Presbyterian Hospital, Mt. Sinai Medical Center, St. Lukes/Roosevelt Hospital Center, Brooklyn Hospital, and Syosset Hospital. He directed Phase I and Phase II assessments for the New York Times in preparation for the development of its major new printing facility in New York City. Assessments were prepared for three alternative sites: a former railyard in the Bronx later used as an illegal landfill for demolition debris; a site in Queens comprising six industrial properties, several with multiple tenants; and a large city-owned site in Queens.

Dr. Rudko has managed cleanups of many petroleum spills on sites in New York City. Some recent spill cleanup sites include the Tribeca Hotel site being developed by Hartz Mountain Industries in Lower Manhattan, retail sites in Maspeth and Long Island City developed by Forest City Ratner Companies, a site in the Bronx being developed by Triangle Equities for the Department of Motor Vehicles, the Rivergate Apartments on East 34th Street in Manhattan, and a residential development on Sixth Avenue in Manhattan.

He has been responsible for assessing impacts on public health for a number of projects involving the use of hazardous chemicals, biohazards, and radioactive materials. These projects include an engineering and physics research center on the campus of Columbia University, a new laboratory building for biomedical research at Rockefeller University, and the proposed Audubon Research Park in upper Manhattan.

Andrew D. Rudko

Dr. Rudko's experience includes several projects involving the environmental impacts of solid waste disposal facilities. He designed and managed a testing program to determine whether toxic pollutants were being emitted into the atmosphere from the 2,900-acre Fresh Kills Landfill on Staten Island. He also participated in studies of the environmental impacts of various proposals to dispose of New York City sewage sludge, and of several proposed resource recovery facilities.

Previously, Dr. Rudko was a senior environmental scientist at Parsons Brinckerhoff Quade and Douglas, Inc. He was responsible for environmental analyses for a variety of development, transportation, and solid waste disposal projects throughout the country. These included projects in New York, New Jersey, Maryland, Virginia, Washington, D.C., and Florida.

Mohamed K. Ahmed, CPG

Education

Graduate Center of the City of New York, Ph.D., Earth and Environmental Science, 2000.

City University of New York, M. Phil., Earth and Environmental Science, 1998.

Brooklyn College, M.A. in Geology, 1993.

Alexandria University, Egypt, B. Sc., Geology, 1982.

Professional Organizations

American Institute of Professional Geologists (AIPG).

National Groundwater Association.

The Society of Sigma Gamma Epsilon.

Geological Society of America.

Certifications

AIPG Certified Professional Geologist, 1997.

40-Hour Hazardous Waste Worker/ Supervisor.

New York State Asbestos Inspector.

AHERA Inspector.

New York State Asbestos Project Designer.

Publications

Ahmed, M., and G. Friedman, "Impact of Toxic Waste Dumping on the Submarine Environment: A Case Study from The New York Bight." *Northeastern Geology and Environmental Sciences*, V.21, no.½, 1999, p. 102-120.

Ahmed, M., and G. Friedman, "Metals fluxes Across the Water/Sediment interface and the Influence of pH." Northeastern Geology and Environmental Sciences, to be published in 1999.

Mohamed K. Ahmed, CPG, is a hydrogeologist specializing in the assessment of soil and groundwater conditions, including groundwater modeling, design of groundwater treatment systems, and soil remediation.

- Home Depot, Rego Park, NY. Developed the subsurface sampling plans; oversaw the installation of groundwater monitoring wells installation; conducted subsurface investigation, including soil and groundwater sampling in accordance with federal, state, and/or industrial practices; oversaw underground storage tanks removal; negotiated New York State Department of Environmental Conservation (NYSDEC) cleanup requirements for contaminated soil and groundwater; and conducted a pilot test to gather data for the design of a soil vapor extraction and sparging system.
- Home Depot, New Rochelle, NY. Conducted subsurface soil and groundwater investigations, and designed and conducted electromagnetic surveys using Geonics EM31 to locate underground gasoline and fuel oil tanks. Performed soil gas survey to design a methane venting system under the Home Depot store and parking lots.
- Former Dry Cleaning Facility at 2350 Fifth Avenue, New York, NY. Conducted soil and groundwater assessments, designed and installed a soil vapor extraction system (SVES), monitored the operation of the SVES, and performed extensive indoor air testing. Negotiated the Remedial Investigation and Interim Remedial Measure for the site with NYSDEC.
- Pelham Manor shopping Center Site, New York, NY. Designed and conducted a major electromagnetic survey on the entire shopping mall parking lot using the Geonics EM31 to locate abandoned underground storage tanks and buried underground utilities.
- Rivergate Apartments Building, New York, NY. Performed the site field work to determine the source of a major fuel oil spill. Interacted with Con Edison, the owner of the adjacent property, and NYSDEC to determine the appropriate method of oil recovery. Studied the hydrogeological conditions of the site and ran pilot tests to determine the most effective and least expensive oil recovery system for the site. Designed and installed an oil recovery system to quickly recover a large quantity of oil.
- Yonkers Waterfront Redevelopment, Yonkers, NY. Designed and performed a major electromagnetic survey for six parcels of the site to detected large, buried metallic objects, such as drums, tanks, concrete debris, and building foundations. Supervised a test pit excavation program to locate detected anomalies found in the electromagnetic survey and evaluate and classify soil conditions.
- Prince's Point, Prince's Bay, Staten Island, NY. Conducted a subsurface investigation, including soil and groundwater sampling; performed sediment sampling

Mohammed K. Ahmed

Publications

(continued)

Ahmed, M., et al, "Water and Organic-Rich Waste Near Dumping Grounds in the New York Bight." *International Journal of Coal Geology,* Vol. 43, 2000.

Ahmed, M., et al., "Waters and Waste Near Dumping Grounds in the New York Bight." *Abstract Volume, 19th Regional European Meeting of Sedimentology*, Copenhagen, 2000.

Years of Experience

With AKRF: 9.

With other firms: 4.

from Lemon Creek adjacent to the site; delineated the extent of soil contamination on-site using field screening kits to minimize laboratory costs; and supervised the subcontractor who performed contaminated soil excavation, removal, and disposal.

Melissa A. McGoogan

Education

Columbia University School of Engineering and Applied Science, B.S. Environmental Engineering, 1995.

Barnard College, B.A. Philosophy, 1996.

Certifications

40-Hour OSHA Hazardous Materials Training.

Asbestos Inspector, State of New York.

Years of Experience

With AKRF: 2½.

With other firms: 1.

Melissa A. McGoogan is an environmental engineer with AKRF, Inc., and specializes in environmental site assessments and site remediation. She performs Phase I Assessments, Phase II Assessments, oversight of site remediations, and is responsible for hazardous materials aspects of Environmental Impact Statement (EIS) work. Her current and recent work for AKRF includes:

- Long Island Rail Road East Side Access, New York, NY. She prepared hazardous materials assessments on the Highbridge Yard, a former freight yard in the Bronx; and on lower level Grand Central Terminal track areas. She also developed and implemented soil and groundwater testing programs for both sites.
- East River Plaza, East Harlem, NY. Ms. McGoogan developed and implemented soil and groundwater testing programs, coordinated remediation activities with the New York State Department of Environmental Conservation, and oversaw remediation of contaminated materials.
- Home Depot, Rego Park, NY. Ms. McGoogan performed sampling to delineate the extent of on-site soil contamination, oversaw the excavation and transportation for the disposal of more than 1,000 tons of hazardous soil from the site, and prepared the final remediation report.
- H.E.L.P. Housing Development, East New York, NY. Ms. McGoogan oversaw the removal of 2,500 tons of hazardous soil from the site and prepared the final remediation report.
- Phase I Assessments. Ms. McGoogan has performed more than 25 Phase I Assessments, including those for Two Broadway, a high-rise office building in Manhattan; 520 Belleville Avenue, a large hospital complex in Belleville, New Jersey; and the Charleston Retail Site, a large, undeveloped parcel in Staten Island, New York.
- EIS hazardous materials chapters. Following site research and investigations, Ms. McGoogan wrote hazardous materials chapters for the East River Plaza; an abandoned wire factory spanning 3 blocks in East Harlem, NY; the proposed New York Stock Exchange site consisting of four high-rise structures encompassing an entire block in the Financial District of New York City; and the Avenue V pumping station complex and proposed force main route in Brooklyn, NY.
- Long Island Railroad Freight, Garden City, NY. Ms. McGoogan modeled hypothetical spill scenarios to assess potential impacts to groundwater along a proposed freight route. She prepared an analysis of a hypothetical incinerator ash spill along the proposed freight line.

Ms. McGoogan is proficient in various software utilized in the environmental industry for GIS mapping, displaying boring log data, spill modeling, and the analysis of piezometric data.

As a project manager, Ms. McGoogan has been responsible for coordinating subcontractors and other professionals in the activities described above. Her other project management duties have included proposal writing; preparation of sampling protocols, work plans, health and safety plans, citizen participation plans, and quality assurance plans; project scheduling; budgeting; and acting as a liaison between clients and regulatory agencies.

Jennifer L. Clements

Education

Emory University, Atlanta, Georgia, B.S., Anthropology and Human Biology, 1998.

Cp-Major, Human and Natural Ecology, 1998.

Certifications

40-Hour Hazardous Material Control and Emergency Response.

New York State Licensed Asbestos Inspector.

Training Courses

USEPA Region 4 Standard Operating Procedures for Field Sampling.

Hazard Ranking System Training Course.

Years of Experience

With AKRF: ½.

With other firms: 1.

Jennifer L. Clements is an environmental scientist with AKRF, Inc., specializing in environmental site assessments. She performs Phase I and Phase II Assessments and has previous experience assessing and over-seeing remediation of potential Superfund sites for the U.S. Environmental Protection Agency in Region 4. Her current and recent work includes:

- Long Island City Rezoning Project, Long Island City, NY. Ms. Clements is currently performing a Phase 1 Assessment of a portion of the rezoning area for possible E designation. This site consists of a block of buildings that has a history of manufacturing and commercial uses.
- Biltmore Hotel, New York, NY. Assessment of previous dry cleaning facility within four abandoned buildings located in the Theater District of Manhattan. Recommended soil gas survey to delineate potential soil and groundwater contamination.
- Meyers Parking Garage, New York, NY. Assessment of eight parking garages throughout Manhattan for potential environmental impairments. Preliminary Asbestos surveys and limited asbestos sampling was conducted for some of these facilities.
- Forest City Ratner MetroTech Site 9S, Brooklyn, NY. Assessment of property for hazardous material in downtown Brooklyn. This project is the final phase for the MetroTech center. The supplemental EAS will be used for the potential upzoning of this parcel.
- New York Bus Service Parking Expansion and the Home Depot, Zerega, and Randall Avenues Site. These sites in industrial areas of the Bronx were assessed for the potential presence of hazardous constituents, and may then be used for commercial redevelopment.
- Brooklyn College Retail Site, Brooklyn, NY. Oversaw the installation of groundwater monitoring wells, field screening soils for volatile organic compounds, and spilt spoon soil sampling at the former gasoline station and car wash.

Ms. Clements' field work experience includes supervising the installation of permanent and temporary groundwater monitoring wells. She is qualified to collect soil and groundwater samples and also has experience in Level B sampling and health and safety procedures. Ms. Clements is experienced in air monitoring and field-screening for volatile organic compounds, and in soil and groundwater sampling in conjunction with a Geoprobe.

Previously, Jennifer L. Clements, was a member of the Roy F. Weston , Inc. Superfund Technical Assessment and Response Team. As a member of this team Jennifer was a Site Assessment Project Manager. She is qualified to prepare work plans, cost estimates, site specific sampling plans, health and safety plans and site inspection reports. She is also qualified to conduct background research, procure subcontractor support, conduct and oversee fieldwork, analyze data and make recommendations. Ms.

Jennifer L. Clements

Clements was involved in projects and worked with local agencies in almost every state within EPA Region 4 including: Florida, Georgia, North and South Carolina, Tennessee, Kentucky, and Mississippi.

Ms. Clements was the Project Manager for CERCLA Preliminary Hazardous Ranking Scoring Strategies and CERCLA Expanded Site Inspections. Ms. Clements has also conducted oversight for integrated EPA Emergency Response and Removals. She was also a member of the EPA Hurricane Response Team. As a member of this team she conducted oversight of emergency operations and helicopter overflights of hazardous materials storage and treatment facilities in cooperation with the Federal Emergency Management Agency, National Guard, Gulf Coast Strike Team, Coast Guard MSO and local city/state authorities.

APPENDIX 2

DER DUSR GUIDELINES

4

New York State Department of Environmental Conservation
Division of Environmental Remediation

Guidance for the Development of Data Usability Summary Reports

Background:

The Data Usability Summary Report (DUSR) provides a thorough evaluation of analytical data without the costly and time consuming process of third party data validation. The primary objective of a DUSR is to determine whether or not the data, as presented, meets the site/project specific criteria for data quality and data use.

Though the substitution of a DUSR for a full third party data validation may seem to be a relaxation of the Division's quality assurance requirements, this is definitely not the case. The development of the DUSR must be carried out by an experienced environmental scientist, such as the project Quality Assurance Officer, who is fully capable of conducting a full data validation. Furthermore, the DUSR is developed from a full New York State Department of Environmental Conservation Analytical Services Protocol (NYSDEC ASP) Category B or a United States Environmental Protection Agency Contract Laboratory Protocol (USEPA CLP) deliverables package.

The DUSR and the data deliverables package will be reviewed by the Division's Quality Assurance Unit. In most cases, we expect that this review will result in agreement or with only minor differences that can be easily reconciled. If data validation is found to be necessary (e.g. pending litigation) this can be carried out at a later date on the same data package used for the development of the DUSR.

Personnel Requirements:

The Environmental Scientist preparing the DUSR must hold a Bachelors Degree in a relevant natural or physical science or field of engineering and must submit a resume to the Division's Quality Assurance Unit documenting experience in environmental sampling, analysis and data review.

Preparation of a DUSR:

The DUSR is developed by reviewing and evaluating the analytical data package. During the course of this review the following questions must be asked and answered:

1. Is the data package complete as defined under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?

2. Have all holding times been met?

3. Do all the QC data: blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?

4. Have all of the data been generated using established and agreed upon analytical protocols?

5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?

6. Have the correct data qualifiers been used ?

Once the data package has been reviewed and the above questions asked and answered the DUSR proceeds to describe the samples and the analytical parameters. Data deficiencies, analytical protocol deviations and quality control problems are identified and their effect on the data is discussed. The DUSR shall also include recommendations on resampling/reanalysis. All data qualifications must be documented following the NYSDEC ASP '95 Rev. guidelines.

Contact the Division of Environmental Remediation Quality Assurance Group at (518) 457- 9280, with any questions on the preparation of a DUSR.

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