218 LAKEVILLE ROAD ASSOCIATES

HICKSVILLE, NEW YORK

SUPPLEMENTAL INVESTIGATION

WORK PLAN

IMPERIAL CLEANERS SITE

218 LAKEVILLE ROAD

LAKE SUCCESS, NEW YORK

VOLUNTARY CLEANUP PROGRAM SITE NO. V-00244-1

March 2002

Prepared For:
Mr. Christopher Alonge
DEC DER Project Manager
New York State Department of
Environmental Conservation
625 Broadway, 11th Floor
Albany, New York 12233-7015

WALDEN ASSOCIATES, INC.

ENVIRONMENTAL CONSULTANTS
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CHECK THE BOX PRECEDING THE REQUESTED ANALYSIS

PRIORITY POLLUTANTS (Water Part 136)—SPDES

- ☐ 2. 13PP Metals
- ☐ 3. Volatiles—(USEPA 624 GC/MS)
- ☐ 6. Pesticides/PCBs (USEPA 608-GC)
- ☐ 4. Acids Base/Neutrals (USEPA 624 GC/MS)
- ☐ 5. Cyanide
- ☐ 9. BOD
- ☐ 7. Halogenated Volatiles (USEPA 601 GC)
- ☐ 8. Aromatic Volatiles USEPA 602 GC)
- ☐ 12. TSS
- ☐ 10. pH
- ☐ 11. COD
- ☐ 15. Ammonia
- ☐ 13. Settleable Solids
- ☐ 14. TKN
- ☐ 18. Reactive Phosphorus
- ☐ 16. Nitrate/Nitrite
- ☐ 17. Total Phosphorus
- ☐ 21. Total Phenols
- ☐ 19. Oil/Grease)
- ☐ 20. TOC
- ☐ 60. PCBs congener method (ASP 91-11)
- ☐ 22. Other _____
- ☐ 59. PCBs at 0.065 ug/l
- ☐ 64. Total Solids
- ☐ 62. CBOD
- ☐ 65. Volatiles (USEPA 524.2 GC/MS)

CONTRACT LABORATORY PROTOCOLS

- ☐ 23 (ALL)—Water—Includes 24-28
- ☐ 29. (ALL)—Soil/Sediments—Includes 30-34
- ☐ 24 Base/Neutral/Acid (B/N/A)—Water—GC/MS (ASP #95-2)
- ☐ 30. (B/N/A)—Soil/Sediments—GC/MS (ASP #95-2)
- ☐ 25 Volatile Organic Analysis VOA—Water—GC/MS (ASP #95-1)
- ☐ 31. VOA—Soil/Sediments—GC/MS (ASP #95-1)
- ☐ 26 Pesticides/PCBs—Water—GC/MS (ASP #95-3)
- ☐ 32. Pesticides/PCBs—Soil/Sediments—GC (ASP #95-3)
- ☐ 27 Metals—23 in Water
- ☐ 33. Metals—23 in Soil/Sediments)
- ☐ 28 Cyanide—Water
- ☐ 34. Cyanide—Soil/Sediments)
- ☐ 66 Dioxin-Water (ASP #91-7)
- ☐ 67. Dioxin-Soil/Sediments (ASP #91-7)
- ☐ 35 Other _____

HAZARDOUS WASTES/RCRA ANALYSIS SW-846

- ☐ 36. EP Toxicity
- ☐ 37. EP Toxicity (Metals Only)
- ☐ 38. Ignitability
- ☐ 39. Corrosivity
- ☒ 40. VOA—(USEPA 8260 GC/MS)
- ☐ 41. BNA—(USEPA 8270 GC/MS)
- ☐ 42. Pesticides/PCBs (USEPA 8081)
- ☐ 43. TCLP
- ☐ 44. TCLP (Metals Only)
- ☐ 45. Reactivity
- ☐ 46. Dioxin (USEPA 8280)
- ☐ 47. Appendix IX
- ☐ 48. Other _____
- ☐ 63 Percent Solids
- ☐ 68. Metals—17 Hazardous

MUNICIPAL SLUDGE

☐ 56. RS-01 ☐ 57. RS-02 ☐ 58. Other _____

COLLECTED BY:	TELEPHONE NUMBER:	REGION NO.:
CHRISTOPHER G. ALONGE	(518) 457-3395	0

CONTRACT LABORATORY:	COUNTY:	SAMPLING DATE:	MILITARY TIME:
RECRA LABNET	NASSAU	6/4/00	11:40

SAMPLE MATRIX:

☐ Air ☒ Soil/Sediment ☐ Groundwater ☐ Surface Water ☐ Wastewater ☐ Other _____

CASE NO.	SDG NO.	SAMPLE NO.	CHECK FOR MS/MD	TYPE OF SAMPLE
RIA0010	06194	D2311101	☐ This sample	☒ Grab-SPLIT ☐ Composite ☐ Term _____ hours

☐ Check if there will be more samples with this SDG sent in this calendar week.

SAMPLING POINT:

Report via Category B, unless checked ☐

Check if field duplicate ☐ | Outfall Number

Check if sampling is part of inspection ☐

FLOW: _____ GPD _____ MGD

SPDES NUMBER/REGISTRY NUMBER

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- ☐ 59. PCBs at 0.065 ug/l
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- ☐ 63 Percent Solids
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MUNICIPAL SLUDGE

☐ 56. RS-01 ☐ 57. RS-02 ☐ 58. Other _____

COLLECTED BY:	TELEPHONE NUMBER:	REGION NO.:
CHRISTOPHER G. ALONGE	(516) 457-3395	0

CONTRACT LABORATORY:	COUNTY:	SAMPLING DATE:	MILITARY TIME:
RECRA LABNET	NASSAU	6/4/00	14:00

SAMPLE MATRIX:

☐ Air ☒ Soil/Sediment ☐ Groundwater ☐ Surface Water ☐ Wastewater ☐ Other _____

CASE NO.	SDG NO.	SAMPLE NO.	CHECK FOR MS/MD	TYPE OF SAMPLE
R1A1010	01614	D1213 1 1 0 2	☐ This sample	☒ Grab (SPLIT) ☐ Composite ☐ Term _____ hours

☐ Check if there will be more samples with this SDG sent in this calendar week.

SAMPLING POINT:

Report via Category B, unless checked ☐

Check if field duplicate ☐ | Outfall Number

Check if sampling is part of inspection ☐

FLOW: _____ GPD _____ MGD

SPDES NUMBER/REGISTRY NUMBER

RECRA LabNet Use Only

Custody Transfer Record/Lab Work Request

Page ___ of ___

FIELD PERSONNEL: COMPLETE ONLY SHADED AREAS

RECRA LabNet

Client NYSDEC

Est. Final Proj. Sampling Date

Project # D231

Project Contact/Phone # CHRISTOPHER ALONGE/(518)457-3987

RECRA Project Manager JUDY STONE

QC ____ Del ____ TAT STANDARD

Date Rec'd ____ Date Due ____

Account # ____

Refrigerator #																			
#/Type Container	Liquid																		
	Solid	2																	
Volume	Liquid																		
	Solid	125mL																	
Preservatives		ICE	X																
ANALYSES REQUESTED →				ORGANIC							INORG								
				VOA	BNA	Pest/PCB	Herb				Metal	CN							

MATRIX CODES:	Lab ID	Client ID/Description	Matrix QC Chosen (✓) MS	MSD	Matrix	Date Collected	Time Collected	RECRA LabNet Use Only
S - Soil, SE - Sediment, SO - Solid, SL - Sludge, W - Water, O - Oil, A - Air, DS - Drum Solids, DL - Drum Liquids, L - EP/TCLP Leachate, WI - Wipe, X - Other, F - Fish		D231-01, LP-2, 17.5' CTR-BOTTOM (SPLIT)			S	6/4/00	11:40	X
		D231-02, DW-1, 21' CTR-BOTTOM (SPLIT)			S	6/4/00	14:00	X

Special Instructions:

DATE/REVISIONS:

1. ____
2. ____
3. ____
4. ____
5. ____
6. ____

Relinquished by	Received by	Date	Time

Relinquished by	Received by	Date	Time

Discrepancies Between Samples Labels and COC Record? Y or N

NOTES:

RECRA LabNet Use Only

Samples were:
1) Shipped ____ or Hand Delivered ____

Airbill # ____

2) Ambient or Chilled

3) Received in Good Condition Y or N

4) Labels Indicate Properly Preserved Y or N

5) Received Within Holding Times Y or N

COC Tape was:
1) Present on Outer Package Y or N

2) Unbroken on Outer Package Y or N

3) Present on Sample Y or N

4) Unbroken on Sample Y or N

COC Record Present Upon Sample Rec't Y or N

Cooler Temp. ____ °C

DIVISION OF ENVIRONMENTAL REMEDIATION
SAMPLE CONTAINER LOG

LABORATORY RECRA LABNET DATE RECEIVED 6/2/00

SITE NAME IMPERIAL CLEANERS RECEIVED BY CHRISTOPHER GRAZIANO

SITE ID. NO. D231

LIQUID CONTAINERS

TYPE	QUANTITY RECEIVED
40 ML VIAL W/SEPTUM	
ORGANIC EXTRACTABLES (BNAs & PEST/PCBs)	
METALS	
CYANIDE	
OTHER	

SOIL/SEDIMENT CONTAINERS

TYPE	QUANTITY RECEIVED
PURGEABLES (VOA)	8 +2 trip blanks
ORGANIC EXTRACTABLES (BNAs & PEST/PCBs)	
METALS	
CYANIDE	
OTHER	

COMMENTS:

v 1.00

Bottle Request Form

Reference No 3250

Project Manager: JUDY STONE

Requested By: JUDY STONE

Date of Request: 5/31/00

Date Bottles Needed: 6/ 2/00

Sent To: NYSDEC
50 WOLF RD. - ROOM 242
ALBANY , NY 12233-7010
ATTN: MR. CHRIS ALONGE

Client ID: NYSDEC

W.O. No.: 01667-600-001

Picked Up By:

Pick Up Date:

Lot Number	Parameters Requested	Bottles Prepped	Bottles and Supplies	Preservative Added
0128101K	VOA	8	~~40 ML VOA VIALS L-1~~ 125ml Voa wh/cap	Cool 4° C
0319001K	VOA - Trip Blank	2	40 ML VOA VIALS L-1 4-7-00-A, 26 18	HCL N007003-A36
	UPS# 2228664657		COOLERS	
	Ref- T+A Code D231		CHAIN OF CUSTODY	
	Case# RA000		BLUE ICE	
			VERMICULITE	
			CUSTODY SEALS EACH	

Comments: COC Seals on Trip Blanks and Coolers.
PH# 518-457-3987

Bottles Prepared By: [signature]

Date: 5.6.1.00

Cooler Numbers: 1 pm.

Chargeable Supplies

To:

From:

Requested By: JUDY STONE

Reference No.: 3250

Client ID: NYSDEC

WO No.: 01667-600-001

Item	Unit Cost	Quantity	Total
40 ML VOA VIALS L-1	$1.20	10.00	$12.00
		Sub Total:	$12.00

Handling: $0.00

Total: $12.00

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1.0 INTRODUCTION

The following Supplemental Investigation Work Plan (WP) has been prepared by Walden Associates, Inc., Environmental Consultants (Walden) on behalf of the owner of 218 Lakeville Road. The purpose of this report is to define investigative measures to be employed at the site and surrounding area to better define the extent of tetrachloroethlyene (PCE) contamination in soil and groundwater associated with historical releases from Imperial Cleaners. The 218 Lakeville Road site is a commercial center with four active tenants (Imperial Cleaners, Tobacco Plaza, Lake Success Deli and Here Comes the Bridesmaids, Figure 2) and totals approximately 4,900 square feet. The owner and the New York State Department of Environmental Conservation (NYSDEC) entered into a Voluntary Cleanup Agreement (VCA) #D1-30001-01-03 effective April 18, 2001. The soil vapor extraction (SVE) system, which was conceptualized and installed by Anson Environmental, Ltd. (AEL), has been in operation since January 2001. AEL conducts monthly operation and maintenance (O&M) visits on the system. This report focuses on prospective site-related work tasks including: site-related investigative work tasks; performing a site-related exposure assessment; the review of indoor air distribution and handling within the 218 Lakeville Road site; and the piloting and ultimate design of an on-site air sparging (AS) system.

To date, a large site-related environmental database has been collected by AEL, which led to the deployment of the SVE system as an interim remedial measure (IRM). In addition, several investigative and remedial tasks have been completed by AEL. These efforts have resulted in the excavation of contaminant source areas, the installation of on-site monitoring wells, the deployment of the IRM SVE system and an investigation into the extent of on-site and partial off-site soil vapor and perched water contamination. Section 2 of this WP is a summary of these work efforts, which efforts will be presented in three reports. These reports will be submitted to the NYSDEC under separate cover in accordance with the schedule defined in Section 6 of this WP. Site-related data developed during AEL investigative efforts have been briefly summarized in this WP where necessary. Walden has used this data as a basis for investigative efforts proposed herein.

Section 3 describes proposed investigative task and Section 4 presents an environmental exposure assessment. Section 5 defines data validation usability procedures. Section 6 presents a project schedule.

With consideration to the NYSDEC, availability and notice requirement and in the interest of the community, Walden will make all efforts to schedule fieldwork so as not to disrupt the tenants of 218 Lakeville Road and the surrounding residences. The Health and Safety Plan (HASP), the NYSDEC Quality Assurance Guidelines for Voluntary Cleanup Sites, and the New York State Department of Health Generic Community Air Monitoring Plan is attached in Appendix A, B and C, respectively, and will be followed for all site-related work.

This investigation will build upon AEL's work to define and further characterize on-site and off-site PCE contamination, assess the risk to human health and determine prudent measures required for site-related remediation. The goal of this WP is to verify perched groundwater flow direction, sample site-related groundwater and soil, collect sufficient data for the design and development of an air sparge remedial system, develop a Remedial Action Work Plan and derive the extent and thickness of the confining clay layer. These tasks, combined with previous investigation findings, cover the work required to accomplish site-related remedial goals and site closure.

2.0 OVERVIEW OF PAST-COMPLETED SITE INVESTIGATIVE WORK

The release of PCE was first noted in 1995. Since that time, significant site-related activities have been conducted by contractors and by Anson Environmental, Ltd. (AEL). Prior to Walden's involvement, AEL conducted significant site-related investigative, removal and remedial efforts. AEL continues to maintain the active on-site IRM SVE. Walden oversees this operation and prepares regular monthly operation and maintenance (O&M) reports documenting system operations. A chronology of site-related events is shown in Table 1. Walden has used AEL documentation of past-completed work efforts along with site-related sampling results to develop the scope and extent of work defined herein. Because this site is in a Voluntary Cleanup Program and in an effort to present comprehensive site data in the most cost-effective manner, Walden will submit summaries of past-completed AEL site work in accordance with the schedule noted in Section 6. These submittals will be in the form of three reports, listed as follows:

- ***Source Area Excavation Report*** - This report will summarize previously completed AEL excavation efforts of PCE-contaminated drywells, septic leaching pools and floor drains, as well as, site sampling data associated with these efforts.

- ***On-Site and Off-site Investigation Report*** - This report will present a summary of completed on-site and off-site data gathering and investigative methodology, including soil, soil gas and perched groundwater sampling.

SHOULD WE JUST HAVE TO ROLL THIS INTO THE FINAL RPT?

- ***Soil Vapor Extraction System Design Report*** - This report will highlight how the existing IRM SVE system was piloted and conceptualized, when it was installed and made operational, and will define long-term O&M procedures with shutdown criteria.

On-site perched groundwater sampling results collected by AEL and the Nassau County Health Department (NCHD) in April 1998 and November 2000 are summarized in Table 2. Off-site Geoprobe perched groundwater sampling results for PCE are summarized in Table 3. On-site Geoprobe perched groundwater sampling results for PCE are summarized in Table 4. All completed on-site and off-site sampling locations for soil and groundwater are located on Figure 3. AEL concluded that the direction of perched groundwater flow is to the northwest (Appendix D). Site-related perched groundwater flow direction will be verified by tasks defined herein. AEL perched groundwater-sampling results indicated that groundwater contamination has been detected in the northwest area of the site and that contamination has not been noted in samples collected from the east, south or west of the site. With these sampling results in mind, Section 3 (Site Investigative Work Tasks) has been prepared to verify and expand upon the existing knowledge of the site. Sampling results from site-related work defined herein will be presented in such a way as to illustrate our findings.

3.0 SITE INVESTIGATION WORK TASKS

3.1 Verify Site-related Perched Groundwater Flow (Site Survey)

In order to locate proposed off-site Geoprobe boring locations and subsequent off-site perched groundwater monitoring well locations, a confirmed groundwater flow direction will be established. To assess flow direction, a licensed land surveyor will produce a site survey of the locations and top of casing (TOC) elevations of all monitoring wells. This survey will include the locations and elevations (both on-site and off-site) of all site-related subsurface extraction wells, piezometers, topography and major landmarks. Walden will also identify proposed sampling locations on the site survey so that accurate land surface elevations can be determined prior to fieldwork. Walden will use a scaled site plan for accurate reporting and design efforts. Walden will obtain an aerial survey of the site including a two-foot topographic contour map from the Nassau County Department of Public Works. Once this is completed, water level measurements will be taken in order for perched groundwater flow direction to be verified.

3.2 Sampling Existing On-Site Groundwater Monitoring Wells

The five on-site monitoring wells (Figure 3) will be sampled and analyzed for VOCs. This VOC data will confirm current on-site groundwater PCE contamination, which will aid in determining the location of proposed Geoprobe sampling points and monitoring wells described in Sections 3.4, 3.5 and 3.6.

All groundwater and soil samples collected during this WP investigation will be analyzed for VOCs utilizing a full New York State Department of Environmental Conservation Analytical Services Protocol (NYSDEC ASP) Category B deliverable package. A NYSDOH ELAP CLP certified laboratory would be selected upon approval of this WP. All groundwater and soil samples during the investigation will be analyzed using EPA method 8260. A blind duplicate QA/QC sample will be run for every twenty WP investigation field samples, which will include matrix spike and matrix spike duplicates. A trip blank will be included for each day of sampling and the field blanks will be run one per every 20 samples collected.

All investigation-derived waste produced during this WP investigation will be containerized and stored on-site until off-site disposal by a licensed waste hauler. Copies of disposal documentation will be included in a subsequent report to the NYSDEC.

3.2.1 Groundwater Sampling Procedures

Prior to sampling each monitoring well, the static water level and well depth will be measured to within 0.01 feet using an electronic water level probe. A Walden hydrogeologist will calculate the volume of standing water within the well based on well diameter and water column within the well. Monitoring wells will then be purged of three well volumes utilizing dedicated/disposable polyethylene bailers before samples are collected. All field data will be recorded in a dedicated

field book and on individual monitoring well sampling logs (Appendix E). Groundwater samples will be collected with dedicated/disposable polyethylene bailers. The collected samples will be placed into single-use sampling glassware provided by the laboratory. The sampling glassware will be labeled with the site name, the Walden job number, sample location and identification, date, time, sampler's initials, and the parameter(s) for analysis. All samples will be stored in coolers maintained at 4°C during transport to the analytical laboratory.

HOW ABOUT NON-POTABLE WELLS?

3.3 Half-Mile Groundwater Well Survey

A half-mile well survey will be conducted in order to identify potable and non-potable wells. The Nassau County Department of Public Works, the Town of North Hempstead, the Nassau County Health Department, the Village of Lake Success, and the Manhasset/Lakeville Water District will be contacted under the Freedom of Information Act, if necessary, to research locations and applicable analytical data from identified wells located within a half-mile of the 218 Lakeville site. Walden will further ask the Manhasset/Lakeville Water District for a letter indicating if any potable non-district wells exist. Walden will prepare a half-mile well location map based on the result of this investigative research. The map will include all identified potable and non-potable wells. Walden will prepare an Upper Glacial Aquifer groundwater contour map based on regional groundwater flow mapping maintained by the USGA and the NCDPW and any information Walden derives from the above noted review.

3.4 Characterization of the Clay Lens

Walden proposes to utilize a Geoprobe electrical conductivity (EC) system to continuously log the lithology of the subsurface. Conductivity logs are used to differentiate gravel, sand and clay, which will establish the elevation of the clay lens. Direct-push real-time EC logging is very similar to conventional borehole geophysics, but does not require a pre-existing borehole. The direct-push EC logging probe uses a Wenner array design, in which a current is applied to two outer electrodes where the voltages are measured across two inner electrodes. The measurement is transmitted via a pre-strung coaxial cable to signal processing hardware at the surface where the real-time log (reading every 0.05 feet) is displayed on a laptop computer. The manufacturer cut sheets for the EC system is shown in Appendix G. A maximum of ten Geoprobe locations (GBP-1 to GBP-10) have been proposed and are shown on Figure 4. Please note that proposed Geoprobe locations will be re-assessed after Tasks 3.1 and 3.2 are completed and are subject to change once groundwater flow direction is established. It has been proposed that the Geoprobe will only penetrate the top two feet of the clay. As the EC probe is withdrawn, the borehole will be filled with bottom-up (positive pressure) grout to ensure that no potential contamination breaches the clay.

Please note that all site-related work in this WP will adhere to personnel decontamination procedures called out in the attached Health and Safety Plan and equipment decontamination procedures in Section 3.4.1. The New York State Department of Health Qualitative Human Health Exposure Assessment dated November 9, 2000 (Appendix F) will be followed to assess the risks associated with site-related work, which will determine the degree to which these procedures will be followed.

THE EXP. ASS. GUIDANCE IS FOR SITE, NOT PERSONAL EXPOSURE DURING INV.. HASP SHOULD ADDRESS THAT

3.4.1 Equipment Decontamination Procedures

All down-hole tools will be cleaned between uses in five-gallon wash buckets. The first bucket will contain an Alconox detergent/water solution followed by two buckets of progressively cleaner rinse water. The wash water, rinse water and residues will be collected and properly stored until sampling results are received and the final method of disposal can be determined.

Drilling equipment and all down-hole tools will be decontaminated over plastic sheeting to allow decontamination water and residues to be collected. The decontamination water and residues will be drummed, sealed and properly stored on-site to await proper disposal. The plastic sheeting will serve a dual purpose: for decontamination, and to stop equipment leaving the site from tracking materials off-site.

3.5 Off-site Perched Groundwater Geoprobe Sampling

Off-site Geoprobe work will be implemented to verify the direction and extent of PCE in groundwater. Based on the results of the conductivity survey, a surface elevation contour map of the clay layer will be developed to aid in the understanding of perched groundwater flow. Walden will evaluate this figure and the initial perched groundwater sampling locations. Initially, perched groundwater sampling locations will be located in the same locations described in Section 3.4 and shown in Figure 4, but are subject to change based on clay elevation. This will allow for accurate sampling depths since depth to the perched water table and to the clay layer will be known. Geoprobe locations GPB-3, 4, 5, 6 and 8 will be profiled vertically with samples taken from three depths:

1. The top of the perched water table,
2. The center of the perched water table, and
3. Just above the clay layer.

Perched groundwater samples will be collected at these depths utilizing a Geoprobe Groundwater Profiler (GGP), see attached manufacturer information in Appendix G, and handled in the same manner described in Section 3.2.1. The GGP has a one-inch diameter, which allows dedicated polypropylene tubing with a fitted bottom check valve to be lowered within the screen area for sample collection. Geoprobe locations GPB-1, 2, 7, 9 and 10 will be sampled just above the clay layer. Sampling locations and water descriptions

will be recorded in a dedicated field book by a Walden hydrogeologist. All site-related field logs and forms, as well as Walden field note criteria are in Appendix E.

3.6 Installation of Off-site Perched Water Monitoring Wells

Three off-site monitoring wells (MW-8 through MW-10) will be installed 10 feet below and 5 feet above the perched water table. This screen interval was agreed to by the NYSDEC in a March 7, 2002 conference call with Walden, but is subject to change based on Geoprobe groundwater sampling results. If sampling results show elevated concentrations of VOCs close to the clay layer, then the screen will be placed as close to the clay as feasible. [Note: As defined in Section 3.7, two on-site wells (MW-6 and MW-7) will be drilled for the pilot testing of a proposed air sparge system and therefore, off-site monitoring well numbering will begin with MW-8]. Proposed monitoring well locations are shown in Figure 4, and will be re-assessed after Task 3.1 is completed and on-site and off-site groundwater sampling results have been analyzed (Tasks 3.2 and 3.4). A Walden contractor will utilize a drill rig with a hollow-stemmed auger to construct the wells. Wells will be finished with flush-mounted protective steel manholes, airtight locking cap and constructed of two-inch PVC pipe. Figure 5 shows a construction schematic of the proposed monitoring well. Boring logs and monitoring well construction diagrams (Appendix E), which include soil description, soil interval and construction materials, will be completed by a Walden hydrogeologist at the time of well drilling.

Spilt spoon samples will be collected at five-foot intervals during all well drillings until the auger string is advanced to approximately 15 feet below the perched water table. Continuous spilt spoon samples will be taken thereafter until contact with the clay lens is encountered. Please note that the clay layer will not be breached and sampling will only encounter the top surface of the clay layer.

WHAT IS BASIS

3.6.1 Soil Sampling (Head Space) Procedures

The drill rig will advance a decontaminated split spoon into the subsurface two feet ahead of the lead auger. This sampling process will be stopped once the clay lerse is encountered. Upon retrieval, the split spoon will be opened and its contents will be logged (Appendix E). After soil has been characterized, a composite sample from the two-foot split spoon will be screened in the field using a PID. This will be done as follows:

1. Approximately 250ml of soil is to be placed into a wide mouth glass mason jar, covered with aluminum foil and then sealed with a rubber band.
2. Organic compounds in the soil will be allowed to "volatilize" into the headspace for 15 minutes.
3. After the necessary time period, a PID probe-head will be inserted thought the aluminum foil to measure the organic vapors, if present, in the headspace of the sampling jar.
4. The reading will be recorded in the soil-boring log.

3.6.2 Well Development and Surveying

The new monitoring wells will be developed a minimum of 24 hours after installation using a submersible pump and/or a dedicated polyethylene bailer. Well development will be considered complete after ten well volumes have been removed from the well. The TOC elevations of the new monitoring wells will be surveyed by a licensed land surveyor to further determine the groundwater flow direction.

3.7 Groundwater Sampling (On-site and Off-site)

The five on-site monitoring wells (Figure 3) along with the three proposed off-site monitoring wells (Figure 4) will be sampled for VOCs. Perched groundwater samples will be collected in accordance with procedures described in Section 3.2.1.

3.8 Surface Water Sampling

STANDING UPSTREAM? DOWN STREAM? MIDDLE OF STREAM? AVG VELOCITY? SOPS?

Approximately 500 feet west of the site, an intermediate stream exists behind the houses along Sussex Road. Two surface water samples will be collected from this stream at up and down gradient locations of the site. A grab sample will be collected by wading into the stream and positioning a hand-held sample container within to stream flow. All field data will be recorded in a dedicated field book. The collected samples will be placed into single-use glassware provided by the laboratory. The sampling glassware will be labeled with the site name, the Walden job number, sample location and identification, date, time, sampler's initials and the analytical method to which it will be analyzed. All samples will be stored in coolers maintained at 4 degrees Celsius during transport to the laboratory.

3.9 Perched Groundwater Air Sparge Pilot Study

Air sparging (AS) is an in-situ remedial process in which compressed air is released through a well point below the surface of groundwater and expanding air bubbles rise to the groundwater surface. If this rising air passes through a zone of groundwater containing volatile organic compounds (VOCs), a phase transfer takes place, in that dissolved VOCs volatilize into the passing air bubbles and are carried to the water surface where they remain in the gaseous state. These soil gasses can then be vacuumed from the vadose zone utilizing SVE well points, which are screened in close proximity to the water table. At the present time an operational IRM SVE system controls site-related vapors volatilizing from contaminated soil at

218 Lakeville Road (Figure 4). The existing IRM SVE system also controls the off-site migration of spill-related VOCs in soil and soil vapor. Typically, AS is combined with SVE to fully remove VOCs from groundwater and discharge them to a carbon absorption system. In effect, AS combined with SVE is in-situ air stripping. Injected air bubbles diffuse from the injection well point and move vertically (buoyancy) and horizontally (pressure-induced) from the AS well screen.

Walden proposes to conduct an on-site air sparge pilot study to support a full-scale air sparging system, which would work in combination with the existing IRM SVE system. The primary design parameters that will be evaluated in the AS pilot study are optimum air injection rates (measured in scfm at the injection depth), the corresponding radius of influence (ROI) and the maximum airborne PCE concentration in the vadose zone.

During the March 7, 2002 conference call, the NYSDEC agreed to provide Walden with a set of typical AS pilot test procedures, which will be reviewed prior to the implementation of an on-site AS pilot test. Walden will submit an amendment to this report where details of the test will be defined, as well as any changes that would need to be made to the HASP. This amendment will be presented to the NYSDEC with sufficient time to allow the NYSDEC a full and complete review period. No further discussion of the proposed AS pilot study is included in this WP.

3.10 Building Layout Survey of 218 Lakeville Road

To assess the potential for site-related PCE vapors to travel from source areas below the floor slab of Imperial Cleaners to adjacent interior building spaces (tenant spaces); Walden will evaluate the building interior partitioning walls and the plural air spaces. Walden will conduct a detailed evaluation of 218 Lakeville Road building interiors, HVAC equipment and building drawing to determine if interconnections between spaces exist. A summary of these efforts will be mapped on a site plan. If necessary, corrective measures to separate airflow between tenant spaces will be made immediately upon discovery of the plural space interconnections.

3.11 Installation of Down-Gradient UGA Double-Cased Monitoring Well and the Determination of Clay Lens Thickness

Based on previous on-site and off-site groundwater sampling results, it is necessary to install a well below the clay layer into the upper glacial aquifer (UGA). Walden proposes to determine the location of the double-cased monitoring well only after Task 3.7 is completed and the groundwater data is evaluated. Double-cased wells are constructed to prohibit the interconnection of two aquifers by a confining layer.

Double-cased well construction involves two steps: (1) drilling and setting an outer casing into the confining layer, then (2) drilling through that casing and the confining layer to a selected depth.

During the first step of the double-cased well construction, split spoon samples would be collected at five-foot intervals down to 15 feet below the perched water table. Once this point is reached, continuous split-spoon samples would be collected until two feet into the confining clay layer. An outer casing would then be placed into the borehole and grouted into the confining clay layer. This section of the well would be constructed of an eight-inch flush-mounted steel casing with a two-inch grouted annular space (between the borehole and outer casing). The annular space and the bottom of the outer casing would be grouted two inches below the casing to within two feet of the ground surface and then cemented to grade. A minimum of 24 hours would be allowed for the grout to cure before attempting to drill through the clay. Figure 7 shows a schematic of a double-cased well.

Once the grout has cured for a minimum of 24 hours, drilling would resume inside the outer casing utilizing a hollow stem auger. Soil samples would be collected continuously utilizing two-foot split spoon sampling until one successive spoon indicates that the clay has been fully breached. Three soil samples will then be taken five feet on center starting from just below the clay and analyzed for VOCs. Unsaturated soil below the clay lens will be confirmed by review of moisture content in the split spoon samples. Soil sampling procedures will follow the same manner as Section 3.6.1. A composite sample from the two-foot split spoon will be placed into single-use sampling glassware provided by the laboratory.

Drilling would continue with five-foot split spoon intervals collected down to approximately 145 feet below grade where the UGA water table resides. A Walden hydrogeologist would complete a boring log for this well, as well as other site-related drilling and construction forms (Appendix E). A two-inch PVC casing will then be placed into the inner borehole. A twenty-foot screened interval will be set fifteen feet below and five feet above the Upper Glacial Aquifer (UGA). A four-foot bentonite seal will be set above the filter pack, which will extend two feet from the top of the screen (Figure 7). A two-inch annular space will then be grouted to the bottom of the outer casing seal.

The double-cased well would be developed a minimum of 24 hours after installation using a submersible pump and/or a dedicated polyethylene bailer. As described in Section 3.6.2, well development will be considered complete when ten well volumes are removed. Once well development is complete, the well will be sampled for VOCs following the procedures in Section 3.2.1.

3.12 **Supplemental Investigation Report**

Once Tasks 3.1 through 3.10 are complete and all analytical data has been evaluated (Section 5.0) a Supplemental Investigation Report will be submitted to the NYSDEC. This report will summarize all site-related investigation work described in this WP and will evaluate/confirm perched groundwater flow direction, on-site and off-site PCE contamination, Upper Glacial Aquifer (UGA) contamination status and will include a summary of historical data. The report will summarize the air sparge pilot test and outline an air sparge remedial system design.

- PRESENT ON AND OFF-SITE EXPOSURE ASSESSMENT
- DUSR
- RAW & TABULATED DATA

IS THIS SUPPOSED TO REPRESENT THE RAWP?

4.0 ENVIRONMENTAL EXPOSURE ASSESSMENT

Walden will conduct a limited exposure assessment based on site-related soil and groundwater VOC contamination relating to the proximity of site-related workers and off-site residences will be evaluated to determine exposure pathways. The assessment will also evaluate contaminant fate and transport. Walden will follow the NYSDOH's exposure assessment guidelines, dated November 9, 2000, which are attached in Appendix F. In general, the exposure assessment will provide a scaled-down Human Health-Based Risk Assessment as defined by USEPA in the "Fractional Guidelines for Conducting Health Based Risk Assessments" OSWER Directive 9285.7, September 29, 1989, and will contain the following general topics:

- Data Collection, as described in Section 3.
- Evaluation of Data as compared to the NYSDEC SCG's
- Screening and Identification of Chemicals of Concern
- Human Health Exposure Assessment
    - On-site Workers
    - On-site Customers
    - Off-site Residents
- Qualitative Exposure
- Risk Characterization

Walden will utilize the existing site-related sampling database and all data collected during the work defined herein as it completes the exposure assessment. Exposure assessment results will be summarized in the Supplemental Investigative Report.

5.0 DATA EVALUATION

5.1 DUSR Preparation

The Data Usability Summary Report will provide a thorough evaluation of analytical data developed from a NYSDEC ASP Category B or a USEPA CLP deliverables package. The analytical data generated for this project will achieve detection limits specified in the NYSDEC Analytical Services Protocol (NYSDEC ASP), 10/95 revised guidelines. The elements of the analytical deliverable package that will be addressed in the DUSR after each sampling event are blank contamination, instrument calibration, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, laboratory controls, replicate analysis, sample holding times, sample preservation, data quantification and sample custody. The DUSR will describe sampling results and analytical parameters as well as protocol deviations and quality control problems. Walden will prepare the DUSR in accordance with NYSDEC requirements.

Mrs. Karen Savo-Matthews, a qualified environmental scientist, who will conduct a full data validation, will write the DUSR. Resumes of Walden personnel preparing the DUSR are included along with DUSR Guidelines in Appendix H.

6.0 IMPLEMENTATION SCHEDULE

6.1 Implementation of Tasks 3.1 - 3.10

Upon NYSDEC approval of this plan, Walden will implement work tasks defined herein in the order called out in Table 5. The approximate duration of each task is shown on the bar chart schedule shown in Figure 8. It is also anticipated that work noted in Table 5 is independent of NYSDEC review periods. Joseph M. Heaney III, PE, the Principal of Walden Associates, will be the professional engineer of record on this project, and will issue final set of construction plans and a system operations and maintenance plan, which will be submitted under separate cover.

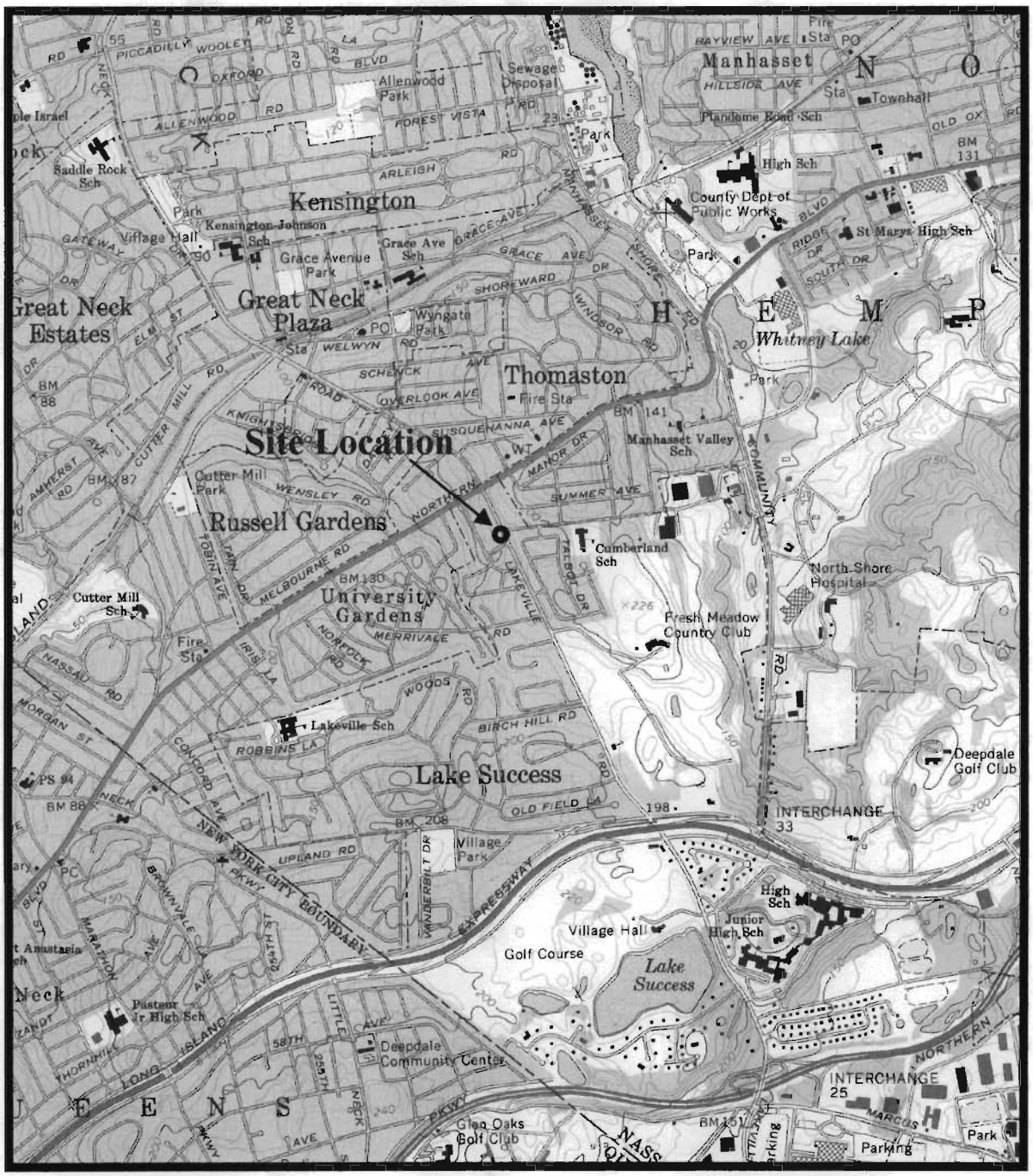
AFTER CONST. OF AS/SVE

FIGURE 1

Imperial Cleaners
218 Lakeville Road
Lake Success, New York

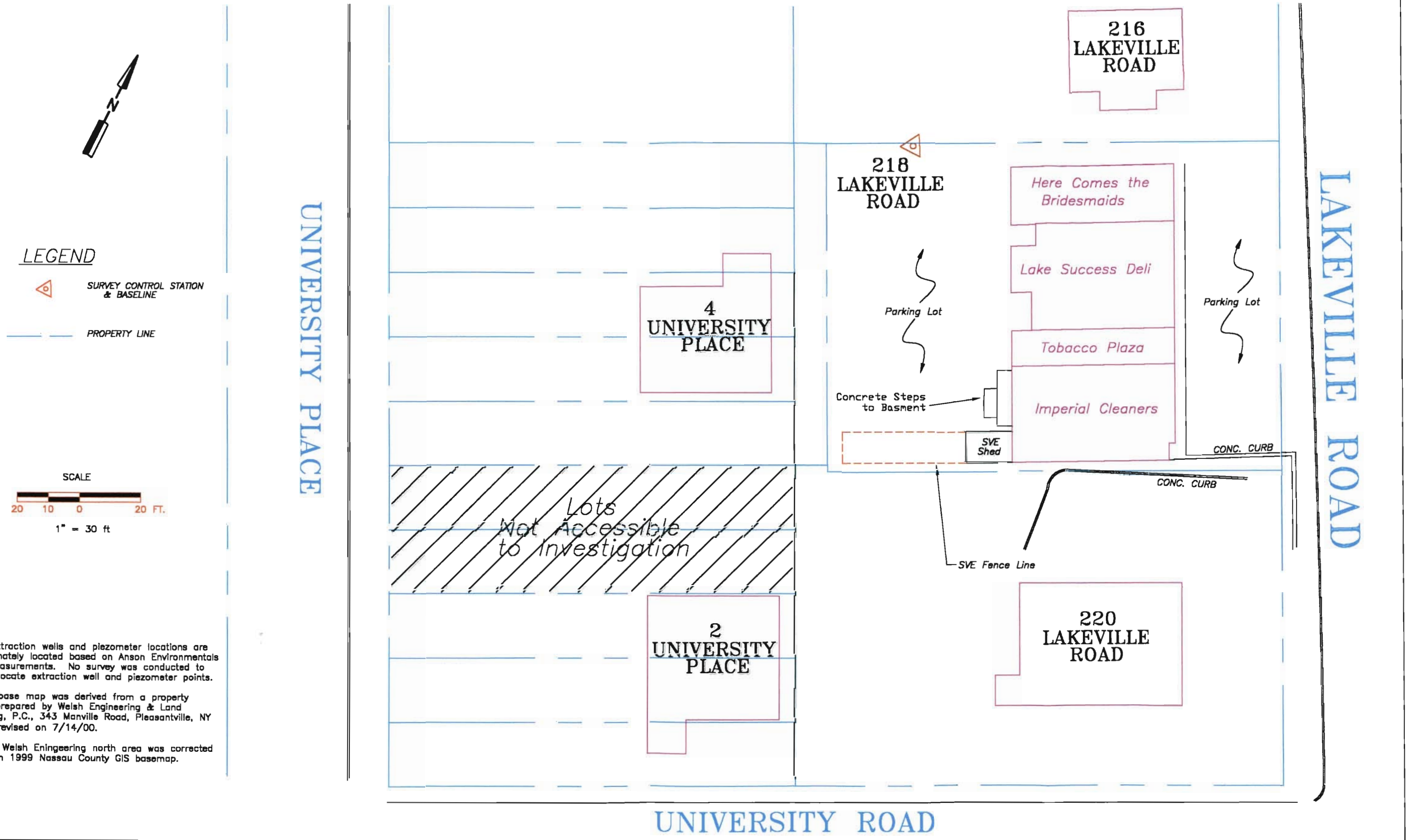
LOCATION MAP

N



(USGS QUAD Sea Cliff, New York) (Scale 1:24000)

FIGURE 2



NOTES

1. All extraction wells and piezometer locations are approximately located based on Anson Environmentals field measurements. No survey was conducted to exactly locate extraction well and piezometer points.

2. Site base map was derived from a property survey prepared by Welsh Engineering & Land Surveying, P.C., 343 Manville Road, Pleasantville, NY 10570, revised on 7/14/00.

3. The Welsh Eningeering north area was corrected based on 1999 Nassau County GIS basemap.

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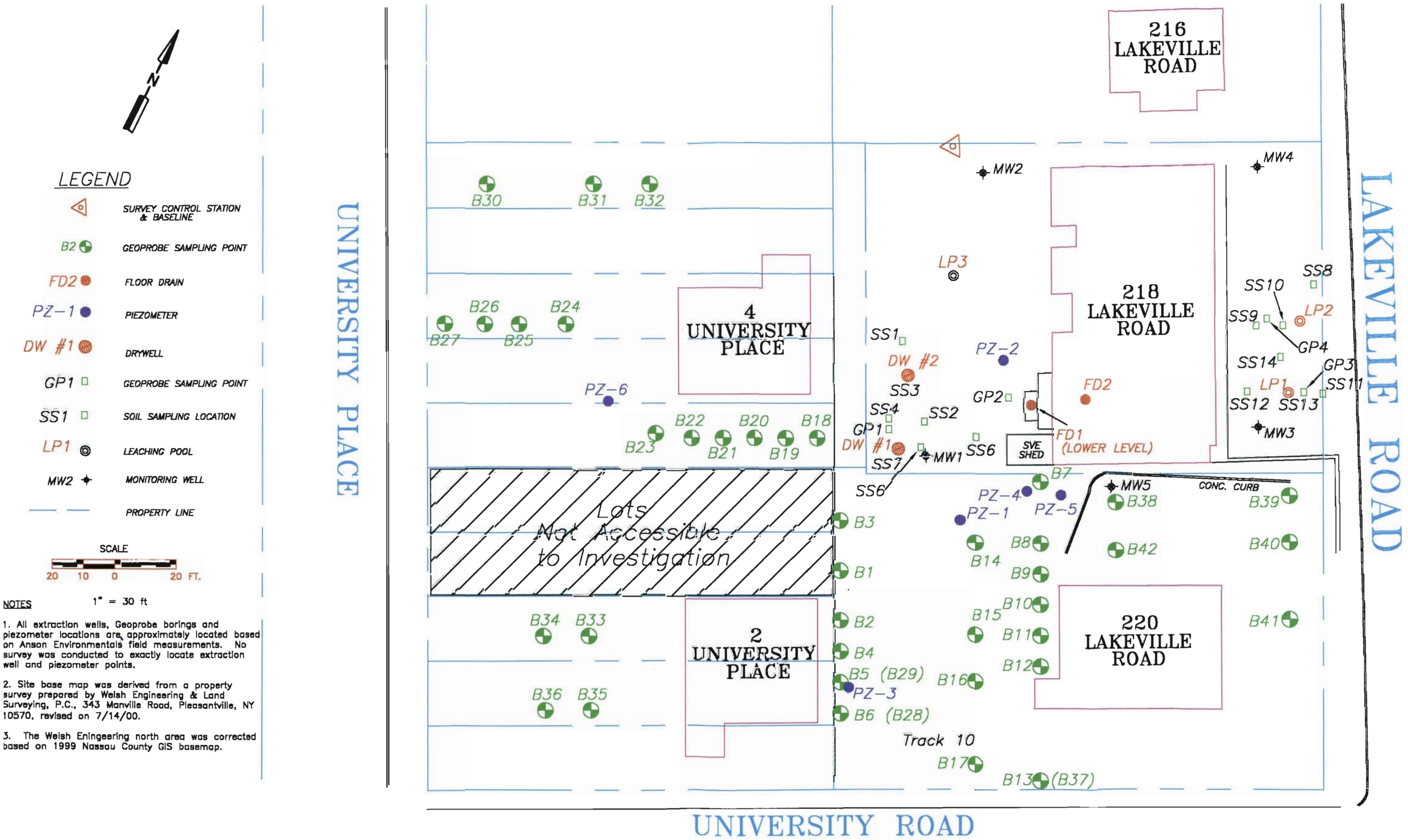
SITE MAP

218 LAKEVILLE ROAD
IMPERIAL CLEANERS
LAKE SUCCESS, NEW YORK

JOB #	FILE NAME	PLOT DATE
218 Lakeville	Fig2-Site Mapdwg	3/15/02

FIGURE 3



NOTES

1. All extraction wells, Geoprobe borings and piezometer locations are approximately located based on Anson Environmentals field measurements. No survey was conducted to exactly locate extraction well and piezometer points.

2. Site base map was derived from a property survey prepared by Welsh Engineering & Land Surveying, P.C., 343 Manville Road, Pleasantville, NY 10570, revised on 7/14/00.

3. The Welsh Eningeering north area was corrected based on 1999 Nassau County GIS basemap.

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COMPLETED SITE SAMPLING LOCATIONS
218 LAKEVILLE ROAD
IMPERIAL CLEANERS
LAKE SUCCESS, NEW YORK

JOB #	FILE NAME	PLOT DATE
218 Lakeville	Fig 3-Sampling_Loc.dwg	3/15/02

FIGURE 4

Notes:

1. This map was generated from a Nassau County GIS basemap.
2. Geoprobe borings GPB-3, 4, 5, 6 and 8 will be profiled vertically with samples taken at three depths within the perched water table.
3. Geoprobe boring will be used to locate the top of clay elevation as well as sampling locations.
4. Monitoring wells MW-1 through 5 are existing wells. Wells MW-6 and 7 are proposed on-site wells and are shown in Figure 6. Wells MW-8 through 10 are proposed.
5. Proposed locations are subject to change based on confirmed groundwater flow direction.
6. See Figure 5 for proposed monitoring well construction schematic.
7. See Figure 7 for proposed double-cased monitoring well construction schematic.

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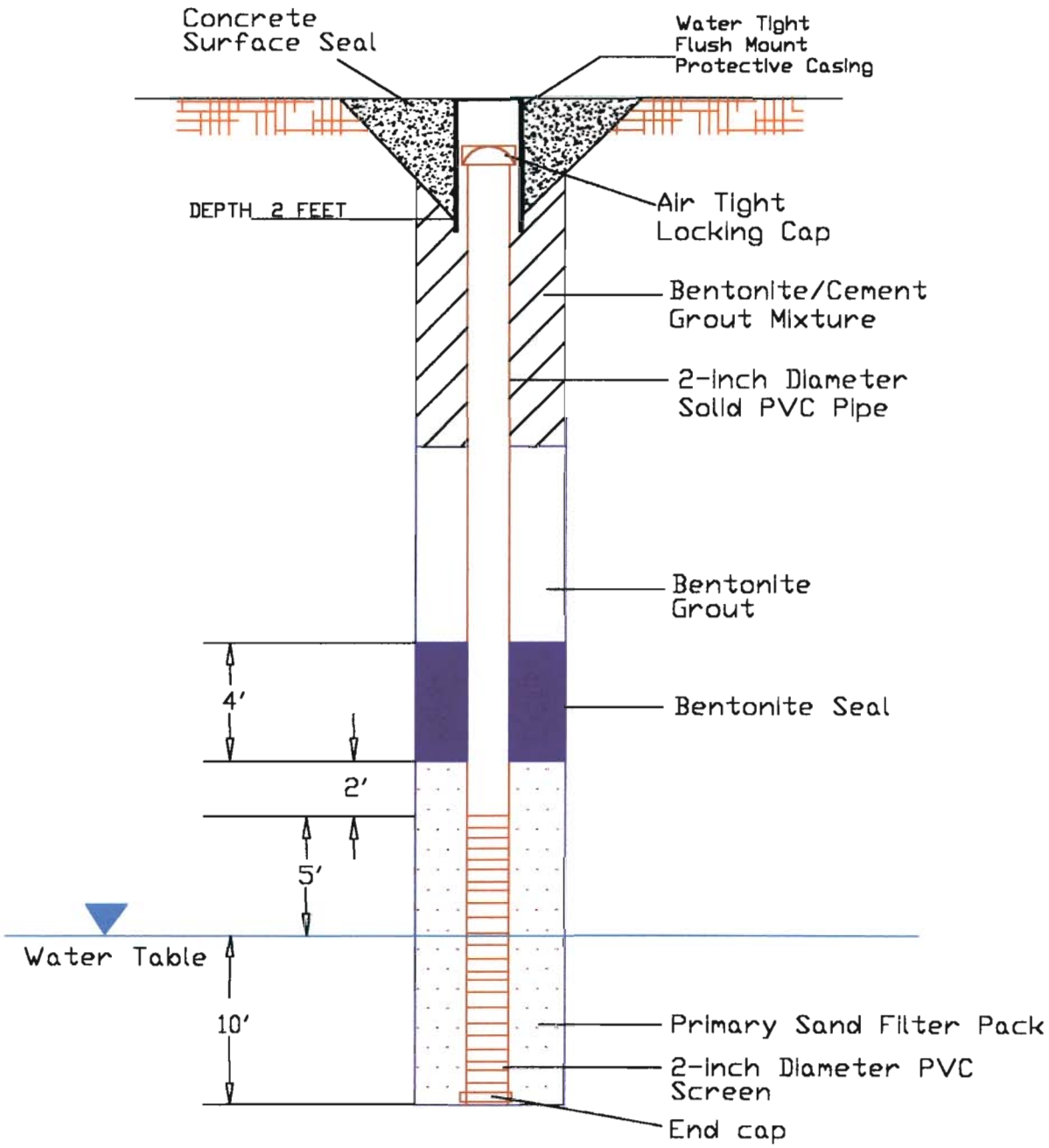
PROPOSED OFF-SITE GEOPROBE & MONITORING WELL LOCATIONS
218 LAKEVILLE ROAD
IMPERIAL CLEANERS
LAKE SUCCESS, NEW YORK

JOB #	FILE NAME	PLOT DATE
218 Lakeville	Fig 4.dwg	3/15/02

FIGURE 5

PERCHED GW MONITORING WELL CONSTRUCTION SCHEMATIC



Notes:

1. Wells will be installed 5' above and 10' below groundwater as observed during drilling.
2. All depths are measured from ground surface. Assumed depth to water.
3. Screen configuration is subject to change based on PCE perched groundwater sampling results.

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NOT TO SCALE

PROPOSED PERCHED GROUNDWATER MONITORING WELL SCHEMATIC
218 LAKEVILLE ROAD
IMPERIAL CLEANERS SITE
LAKE SUCCESS, NEW YORK

JOB #	FILE NAME	PLOT DATE
218 Lakeville	Fig 5 - well	3/15/02

FIGURE 6

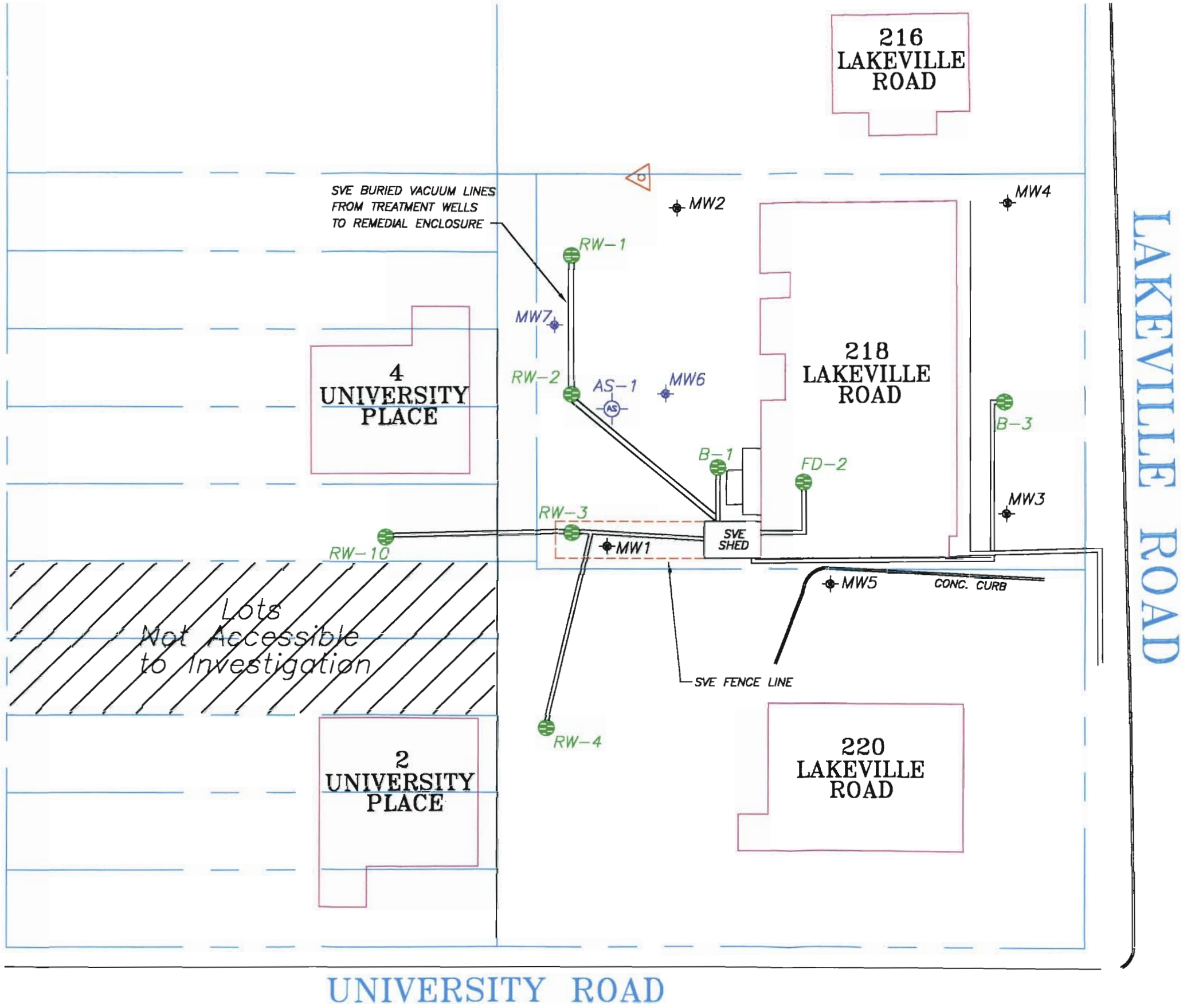
LEGEND

- SURVEY CONTROL STATION & BASELINE
- RW–1 — EXISTING SVE EXTRACTION WELL
- B–1 — EXISTING SOIL BORING SVE EXTRACTION WELL
- FD–1 — EXISTING FLOOR DRAIN SVE EXTRACTION WELL
- MW2 — EXISTING MONITORING WELL
- MW6 — PROPOSED MONITORING WELL
- AS–1 — PROPOSED AIR SPARGE WELL
- PROPERTY LINE

SCALE

20 10 0 20 FT.

1" = 30 ft



NOTES

1. All extraction wells and piezometer locations are approximately located based on Anson Environmentals' field measurements. No survey was conducted to exactly locate extraction well and piezometer points.

2. Site base map was derived from a property survey prepared by Welsh Engineering & Land Surveying, P.C., 343 Manville Road, Pleasantville, NY 10570, revised on 7/14/00.

3. The Welsh Eningeering north area was corrected based on 1999 Nassau County GIS basemap.

4. Monitoring wells MW–1 through 5 are existing and MW–6 and 7 are proposed.

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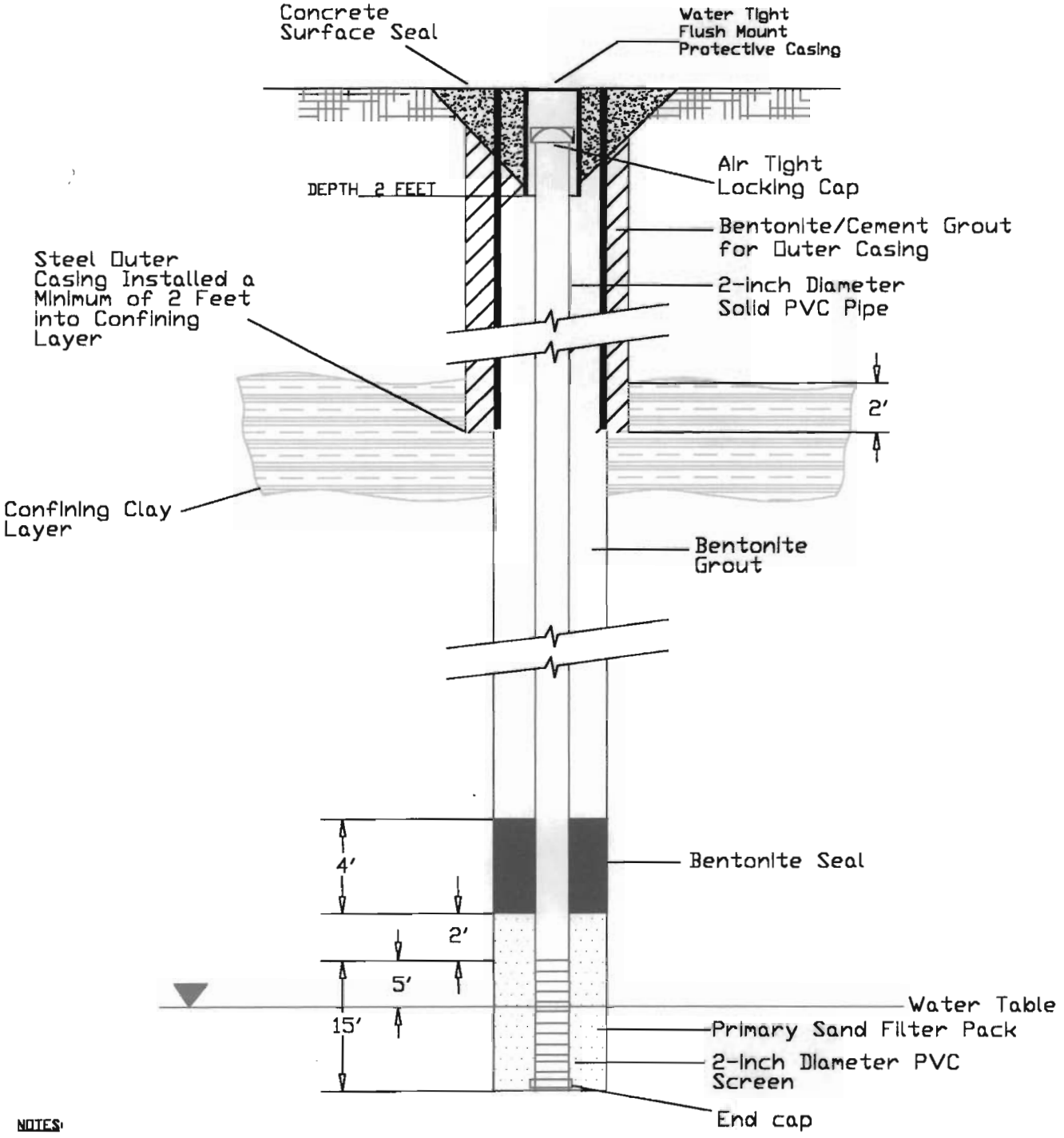
PROPOSED ON–SITE AIR SPARGE & MONITORING WELL LOCATIONS
218 LAKEVILLE ROAD
IMPERIAL CLEANERS
LAKE SUCCESS, NEW YORK

JOB No	FILE NAME	PLOT DATE
218 Lakeville	Fig4-AS.dwg	3/15/02

FIGURE 7

UPPER GLACIAL AQUIFER DOUBLE CASED MONITORING WELL CONSTRUCTION SCHEMATIC



NOTES:

1. ALL DEPTHS ARE MEASURED FROM GROUND SURFACE. ASSUMED DEPTH TO WATER.

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NOT TO SCALE

DOUBLE-CASED MONITORING WELL SCHEMATIC
218 LAKEVILLE ROAD
IMPERIAL CLEANERS SITE
LAKE SUCCESS, NEW YORK

JOB #	FILE NAME	PLOT DATE
218 Lakeville	Fig 8 - well	7/19/01

Imperial Cleaners
218 Lakeville Road
Lake Success, New York

AS PILOT TEST WORK PLAN?

Figure 8

Project Schedule

	Work Tasks	Month (1)	Month (2)	Month (3)	Month (4)	Month (5)	Month (6)
2.0	Sumittal of Past Completed Site Investigative Work						
3.1	Verify Site-Related Perched GW Flow (Top of Casing Survey)						
3.2	Sampling of Existing GW Monitoring Wells & Lab Analysis						
3.3	Half-Mile Well Survey (Denoting public drinking water supplies)						
3.4	Characterization of the Clay Layer						
3.5	Off-site Perched Groundwater Geoprobe Sampling and Laboratory Analysis						
3.6	Installation of Off-site Perched Water Monitoring Wells & Clay Layer Depth Determination						
3.7	Groundwater Sampling (On-site and Off-site) & Lab Analysis						
3.8	Surface Water Sampling						
3.9	Perched Groundwater Air Sparge Pilot Study & Report						
3.10	Building Layout Survey & Investigation						
3.11	Installation of UGA Double-Cased Monitoring Well & Clay Layer Thickness Determination						
3.12	Supplemental Investigation Report						

Notes:

1. Month 1 represents the start of work after Work Plan approval
2. Weekly operation and maintenance visits for the SVE/AS system are completed each month.
3. Monthly operation and maintenance reports are completed each month.
4. Perc Badge sampling for indoor air quality analysis is completed every six weeks.
5. Estimated time frames include general office work, correspondence (contractor, client & regulatory), laboratory analysis & field times.
6. Time frames do not represent the time to complete the task but rather the period in which the task will take place.
7. Site-related schedule items do not include NYSDEC review and/or coordination time.

Imperial Cleaners
218 Lakeville Road
Lake Success, New York

Table 1

Chronology of Site-Related Events

1995	AEL samples floor drains and drywells at 218 Lakeville Road and analyzes of them for VOCs. Sample results indicate elevated PCE and TCE.
1996	AEL cleans out floor drains, drywells and leaching pools including fluids and soil (soil is removed to 16ft). AEL also collects on-site groundwater and soil samples and sends them to Laboratory Resources for VOC analysis.
1997	AEL prepares and submits a Focused Remedial Investigation report to NYSDEC, USEPA and NYSDOH.
3/26/98 –5/16/98	AEL implements a property survey, a SVE pilot study and a soil and perched groundwater investigation. Five monitoring wells, 14 soil borings and 8 soil-gas borings are installed and sampled for this investigation.
1998	USEPA approves AEL's August Work Plan. The site is nominated for inclusion in NYSDEC's Voluntary Cleanup Program.
8/1/99	USEPA approves work plan (remediation).
5/7/00	AEL installs six 1-inch perched groundwater piezometers in the parking lot behind 218 Lakeville Road and samples groundwater for VOC analysis.
5/17/00	AEL collects soil samples from DW#1 and collects liquid samples from LP#1. These samples are analyzed by H2M. Sample results indicate elevated PCE and TCE in DW#1.
6/4/00-6/5/00	Brookside Environmental, Inc. excavates approximately 45 tons of hazardous soil from DW#1 and LP#2. AEL samples air in 218 Lakeville Road for PCE.
6/21/00	AEL conducts a soil-gas survey at 8 off-site locations. Environmental Testing Laboratories analyzes these soil-gas samples for VOCs.
7/10/00–7/11/00	NYSDOH samples air in 216, 218 and 220 Lakeville Road and 2 and 4 University Place for PCE.
9/12/00–9/13/00	NYSDOH samples air in 1, 2, 3, 4 and 5 University Place for PCE.
10/25/00–10/26/00	NYSDOH samples air in 4 University Place for PCE.
10/30/00–11/16/00	Forty-two soil borings are drilled by Zebra and are sampled by AEL for VOCs in soil and groundwater. Soil-gas is screened in the field utilizing a combination of PID and Sensidyne tubes. Monitoring wells 1 through 5 are also sampled for VOCs and all samples are sent to H2M Laboratories.
11/07/00-11/08/00	AEL collects groundwater samples from site-related monitoring wells.
11/13/2000-11/14/00	AEL collects groundwater samples from 6 site-related piezometers.
11/16/00–11/17/00	NYSDOH samples air in 5 University Place for PCE.
11/20/00–11/22/00	AEL installs 3 indoor carbon air filters within 2 and 4 University Place.
11/30/00–12/1/00	Land, Air and Water, Inc. installs SVE extraction wells RW-1, 2, 3 and 4. AEL monitors downgradient air using a PID and particulate meter during excavation.
12/4/00–12/5/00	Land, Air and Water, Inc. installs six piezometers 20 feet below grade to monitor the ROI of the SVE system, completes trenching for the SVE system and installs RW-10.
12/13/00– 12/15/200	SVE shelter is installed, along with SVE mechanical and electrical equipment.
12/18/00	AEL starts up the SVE system for the first time. Starter box fails and is repaired. SVE system is turned off.
12/20/00	Chris Alonge of NYSDEC is on-site. AEL collects SVE air samples for lab analysis.
12/22/00	AEL samples air in 218 and 220 Lakeville Road and in 4 University Place for PCE. AEL installs new carbon canisters in the SVE system. The system is shut off for holiday weekend.
12/28/00–12/29/00	AEL installs and collects perc badges in 218 and 220 Lakeville Road and 4 University Place and sends them to Galson Laboratories. 55-gallon drums filled with drill cuttings from extraction well installation was sampled. The system was off. Carbon filtration drums were changed.
1/2/00-Current	AEL implements weekly operation and maintenance checks. PID readings, vacuum levels and flow rates of extraction wells are recorded. PID readings of extraction well air are taken before entering the first carbon drum, after the first carbon drum and before final exhaust. During visits the moisture separator is checked and drained of water.

References:

1. Interim Remedial Measure/Supplemental Investigation Work Plan dated on January 21, 2001 written by AEL.
2. AEL On-site Activities Starting May 2000 dated on February 1, 2001.
3. AEL Environmental field book notes.
4. Correspondence between AEL, USEPA, NYSDEC and NCDOH.

Imperial Cleaners
218 Lakeville Road
Lake Success, New York

Table 2

On-site Groundwater Analytical Results for VOC
(All results in ug/l)

Compunds	Groundwater Standard	MW-1			MW-2			MW-3			MW-4			MW-5		
		A-98	N-00	NCDH	A-98	N-00	NCDH	A-98	N-00	NCDH	A-98	N-00	NCDH	A-98	N-00	NCDH
Acetone	N/A	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
Dichlorodifluoromethane	5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		1	<0.5	<10	<0.5
Chloromethane	5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
Vinyl Chloride	2	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
Bromomethane	5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
Chloroethane	5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
Trichlorofluoromethane	5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
1,1-Dichloroethylene	5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
Methylene Chloroide	5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
t-1,2-Dichloroethylene	N/A	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
1,1-Dichloroethane	5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
2,2-Dichloropropane	N/A	<0.5		8	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
c-1,2-Dichloroethylene	N/A	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
Chloroform	5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
Bromochloromethene	N/A	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
1,1,1-Trichloroethane	5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
1,1-Dichloropropene	N/A	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
Carbon Tetrachloride	5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
1,2-Dichloroethane	0.6	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
Trichloroethane (TCE)	5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	1	<0.5	<10	<0.5
1,2-Dichloropropane	1	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
Bromodichloromethane	50	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
Dibromomethane	N/A	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
c-1,3-Dichloropropene	N/A	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
trans1,3-Dichloropropene	0.4	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
1,1,2-Trichloroethane	1	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
1,3-Dichloropropane	N/A	<0.5		140	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
Tetrachloroethylene (PCE)	5	**38.9**	**150**	<0.5	<0.5	**150**	2	**17.6**	<10	23	**68.6**	**44**	**99**	3.9	**33**	**78**
Dibromochloromethane	N/A	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
1,2-Dibromoethane	N/A	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
1,1,1,2-Tetrachloroethane	N/A	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
Bromoform	50	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
1,1,2,2-Tetrachloroethane	5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
1,2,3-Trichloropropane	N/A	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
1,2-Dibromo-3-Chloropropane	N/A	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
Benzene	1	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	0.5	<0.5	<10	<0.5
Toluene	5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
Chlorobenzene	5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
Ethyl Benzene	5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
m/p-Xylenes	5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
o-Xylenes	5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
Styrene	N/A	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5	<0.5	<10	<0.5
Isopropylbenzene	100	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
n-Propylbenzene	100	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
Bromobenzene	N/A	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
1,3,5-Trimethylbenzene	100	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
2-Chlorotoluene	N/A	<0.5		<0.5	<0.5		0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
4-Chlorotoluene	N/A	<0.5		<0.5	<0.5		0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
tert-Butylbenzene	N/A	<0.5		<0.5	<0.5		0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
1,2,4-Trimethylbenzene	100	<0.5		<0.5	<0.5		0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
sec-Butylbenzene	N/A	<0.5		<0.5	<0.5		0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
p-Isopropyltoluene	100	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
m-Dichlorobenzene	N/A	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
p-Dichlorobenzene	N/A	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
n-Butylbenzene	100	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
o-Dichlorobenzene	N/A	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
1,2,4-Trichlorobenzene	N/A	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
Hexachlorobutadiene	N/A	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
Naphthalene	200	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
1,2,3-Trichlorobenzene	N/A	<0.5		3	<0.5		<0.5	<0.5		<0.5	<0.5		<0.5	<0.5	<10	<0.5
Methyl-t-Butyl Ether	N/A	<0.5		<10	<0.5		2	<0.5		2	<0.88		1	<0.5	<10	1
Carbon Disulfide	N/A	<0.5		<10	<0.5	<10		<0.5	<10		<0.5	<10		<0.5	<10	
2-Butanone	N/A	<0.5		<10	<0.5	<10		<0.5	<10		<0.5	<10		<0.5	<10	
4-Methyl-2-Pentanone	N/A	<0.5		<10	<0.5	<10		<0.5	<10		<0.5	<10		<0.5	<10	
2-Hexanone	N/A	<0.5			<0.5	<10		<0.5	<10		<0.5	<10		<0.5	<10	

Notes:

Monitoring well samples were collected from MW-1 through MW-5 by Anson Environmental, Ltd. in April 1998 and November 2000 and analyzed by Environmental Testing Laboratories for VOC's using method 624. Nassu County Department of Health collected groundwater samples in MW-1 through MW-5 in April 1998 which were analyzed by NCDH Center for Laboratories and Research Environmental Health Laboratories using EPA method 524.2.

Imperial Cleaners
218 Lakeville Road
Lake Success, New York

Table 3

Off-site Groundwater Analytical Results for PCE
(All results in ug/l)

Samples	PCE
B1	25
B2	<10
B4	140
B4	<10
B5	<10
B6	<10
B7	51
B8	<10
B9	<10
B10	<10
B11	<10
B12	<10
B13	<10
B14	<10
B15	<10
B16	<10
B17	<10
B18	210
B19	41
B20	<10
B21	<10
B22	46
B23	<10
B24	<10
B25	<10
B26	<10
B27	19
B28	<10
B29	<10
B30	1,200
B31	<10
B32	<10
B33	<10
B34	<10
B35	<10
B36	<10
B37	<10
B38	54
B39	<10
B40	<10
B41	<10
B42	53
GP1 (30-34')	3,830
GP1 (38-42')	5.9
GP1(46-50')	<0.5
GP2 (30-34')	<0.5
GP2 (38-42')	3.8
GP2(46-50')	1.7
GP3 (32-36')	61.4
GP3 (40-44')	<0.5
GP3(48-52')	3.1
GP4 (32-36')	7,210
GP4 (40-44')	<0.5
GP4(48-52')	<0.5
PZ1(10')	1,300
PZ2(10')	<10
PZ3	100
PZ4	<10
PZ5 (15')	400
PZ6(15')	900

Notes

Geoprobe groundwater samples (B1-B42) were collected in November 2000 and analyzed by H2M using NYSDEC ASP 10/95 for the TCL VOCs method 8260B. The GP1 to GP4 groundwater samples were collected in April 1998 and analyzed by Enironmental Testing Laboratories using EPA method 624. Piezometer samples were collected in November 2000.

Imperial Cleaners
218 Lakeville Road
Lake Success, New York

Table 4

On-site Soil Analytical Results for PCE
(All results in ug/kg)

Samples	PCE
SS1 (2-4')	195
SS1(30-32')	58
SS2 (12-14')	14.9
SS2(18-20')	26.4
SS2 (30-32')	10.5
SS3(18-20')	26.4
SS3(26-28')	8.2
SS4(18-20')	<77
SS4(24-26')	5,470
SS5(18-20')	16.4
SS5(28-30')	60.3
SS6(0-2')	32,100
SS6(26-28')	8
SS7(16-18')	6,020,000
SS7(26-28')	6,500,000
SS8(2-4')	<0.4
SS8(30-32')	10.7
SS9(16-18')	<0.6
SS9(28-30')	8.3
SS10(20-22')	34,800
SS10(28-30')	4.8
SS11(2-4')	3.7
SS11(30-32')	4.8
SS12(18-20')	10.4
SS12(26-28')	2.7
SS13(18-20')	<0.6
SS13(30-32')	<0.3
SS14(0-2')	78.5
SS14(32-34')	47.3
B31(24-26')	62
B32(24-26')	150
Floor-drain (FD)2 (9/95)	1,600,000
Floor-drain(FD)1 (9/95)	510,000
Floor-drain(FD)1 (10/95)	38,000,000
DW1(12/95)	250
DW2(12/95)	17
DW2 (4/96)	500
LP1(12/95)	1,200
LP2(12/95)	63
FD2 (4/96)	5,500,000
FD1 (4/96)	11,000
FD2(5-7')(12/95)	<10
FD2(9-11')(12/95)	<10
FD1(4-6')(12/95)	8,600

Notes

Soil samples SS1 to SS14 were sampled by AEL in April 1998 and analyzed by Environmental Testing Laboratories using EPA SW 8260. FD1 and FD2 were analyzed by Laboratory Resources in 1995 using method EPA 8240.

Imperial Cleaners
218 Lakeville Road
Lake Success, New York

Table 5

Task Completion Times

Task #	Task	Completion Time
3.1	Verify Site-Related Perched GW Flow (Top of Casing Survey)	1 Week
3.2	Sampling of Existing On-site Groundwater Monitoring Wells and Laboratory Analysis	4 Weeks
3.3	Half-Mile Well Survey (denoting public drinking water supplies)	1 Week
3.4	Characterization of the Clay Layer	2 Weeks
3.5	Off-site Perched Groundwater Geoprobe Sampling and Laboratory Analysis	4 Weeks
3.6	Installation of Off-site Perched Water Monitoring Wells and Investigation to Determine Clay Layer Depth	2 Weeks
3.7	Groundwater Sampling (On-site and Off-site) and Laboratory Analysis	4 Weeks
3.8	Surface Water Sampling and Laboratory Analysis	4 Weeks
3.9	Perched Groundwater Air Sparge Pilot Study	4 Weeks
3.10	Building Layout Survey and Investigation	1 Week
3.11	Installation of Down-Gradient UGA Double-Cased Monitoring Well and Determination of Clay Layer Thickness	3 Weeks
3.12	Supplemental Investigation Report	4 Weeks

Appendix A

Project Health and Safety Plan

218 LAKEVILLE ROAD ASSOCIATES
LAKE SUCCESS, NEW YORK

HEALTH AND SAFETY PLAN
COVERING THE ON-SITE AND OFF-SITE
INVESTIGATION OF PCE CONTAMINATION AT
IMPERIAL CLEANERS SITE
218 LAKEVILLE ROAD
LAKE SUCCESS, NEW YORK

MARCH 2002

Prepared For:
Mr. Christopher Alonge
DEC DER Project Manager
New York State Department of
Environmental Conservation
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WALDEN ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS
16 SPRING STREET
OYSTER BAY, NEW YORK 11771
(516) 624-7200, FAX (516) 624-3219
CONTACT: JOSEPH M. HEANEY III, PE

HEALTH AND SAFETY PLAN
IMPERIAL CLEANERS

218 LAKEVILLE ROAD

LAKE SUCCESS, NEW YORK

WALDEN PROJECT MANAGER

NAME: Joseph M. Heaney III, PE, CSP DATE: _____

SIGNATURE: _____

WALDEN FIELD TEAM LEADER

NAME: Stephen Byatt DATE: _____

SIGNATURE: _____

WALDEN ASSOCIATES SITE SAFETY OFFICER

NAME: Karen Savo-Matthews DATE: _____

SIGNATURE: _____

AMENDMENTS CONTAINED IN APPENDIX A

AMENDMENT 1. DATE: _____

AMENDMENT 2. DATE: _____

AMENDMENT 3. DATE: _____

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Section 3 Hazard Assessment

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Figure H-1 Directions to North Shore University Hospital from 218 Lakeville Road

APPENDICES

Appendix A – Site Safety Plan Amendments

Appendix B - Site and Safety Acknowledgements for and Daily Site Safety Meeting Sign-In Sheet

Appendix C – Heat Stress

Appendix D – Cold Stress

Appendix E – Chemical Hazards

Appendix F – Daily Air Monitoring Sign in Sheet

Appendix G – Confined Space Pre-entry Checklist and Confined Space Entry Permit

Appendix H – Hospital Route and Emergency Numbers

GLOSSARY OF ACRONYMS

ANSI	- AMERICAN NATIONAL STANDARDS INSTITUTE
APR	- AIR PURIFYING RESPIRATOR
ACGIH	- AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS
CFR	- CODE OF FEDERAL REGULATIONS
CGI	- COMBUSTIBLE GAS INDICATOR
CLEAN ZONE	- SUPPORT ZONE
CSEP	- CONFINED SPACE ENTRY PERMIT
DECON	- DECONTAMINATION
HNU-PID	- HNU PHOTOIONIZATION DETECTOR
HOT ZONE	- EXCLUSION ZONE
IDLH	- IMMEDIATELY DANGEROUS TO LIFE & HEALTH
MREM/hr	- MILLI-ROENTGENS EQUIVALENT IN MAN PER HOUR
NIOSH	- NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY & HEALTH
OSHA	- OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
OVA	- ORGANIC VAPOR ANALYZER
PEL	- PERMISSIBLE EXPOSURE LIMIT
PPB	- PARTS PER BILLION
PPM	- PARTS PER MILLION
SCBA	- SELF-CONTAINED BREATHING APPARATUS
SOP	- STANDARD OPERATING PROCEDURE
SPCC	- SPILL PREVENTION CONTROLS AND COUNTERMEASURES
TLV	- THRESHOLD LIMIT VALUE
TWA	- TIME WEIGHTED AVERAGE

STATEMENT OF COMMITMENT TO WORKER HEALTH AND SAFETY

Walden Associates employees may be exposed to evident risks from hazardous conditions while conducting site-related work. Walden's policy is to minimize the possibility of work-related injury through aware and qualified supervision, health and safety training, medical monitoring, and the use of appropriate personal protective equipment. Walden has established a guidance program to implement this corporate policy in a manner that protects personnel to the maximum reasonable extent.

This site-specific Health and Safety Plan (HASP) applies to Walden personnel, contractors and the New York State Department of Environmental Conservation and/or its representatives on the job site where operations involve actual or potential physical and chemical hazards that have been identified to Walden by others. This HASP is also intended to inform and guide all personnel (Walden employees and/or the State's representatives or subcontractors) entering the exclusion zone ensuring that each person signs and acknowledges the site hazards by signing off on this plan. Walden's contractors are retained as independent contractors and, as such, are responsible for ensuring the safety of their employees.

Walden may require that its personnel take certain precautions in accordance with this HASP, and Walden requests that others protect their personnel in a manner that they deem necessary or sufficient.

1.0 INTRODUCTION AND SITE ENTRY REQUIREMENTS

The site investigation shall be implemented based on applicable NYSDEC Voluntary Cleanup Agreement (VCA) guidelines and engineering controls. Walden Associates, Inc. Environmental Consultants (Walden) was retained by 218 Lakeville Road Associates, L.P. to investigate and remediate a release of tetrachloroethylene (PCE) associated with a former tenant's dry cleaning operation. In order to implement site-related investigative work, Walden has prepared this site-specific HASP for the 218 Lakeville Road Site, Lake Success, New York. This document describes the HAS guidelines developed for the referenced site to protect on-site personnel, visitors and the public from physical harm and exposure to hazardous materials or wastes. In accordance with the Occupational Safety and Health Administration (OSHA) 29 CFR Part 1910.120 Hazardous Waste Operations and Emergency Response Final Rule, this HASP, including the attachments, addresses the potential and actual safety and health hazards of each phase of site operations. Work covered under this plan is limited to the investigation of PCE-contaminated soil and groundwater. Walden will handle overall coordination and implementation of HASP issues for this project.

This site-specific HASP is based on the best available information to date. The HASP will be revised by Walden if new information about on-site conditions is received or identified. A written amendment will document all revisions made to the HASP (see Appendix A, for Site Safety Plan Amendment Form). Amendments will be instituted by Walden's Project Manager and the Site Safety Officer.

1.1 Training Requirements

All personnel entering the exclusion zone or decontamination zone (Section 6.1, Work Zones) must have met training requirements for waste site operations and emergency response operations in accordance with OSHA 29 CFR 1910.120 (e).

Documentation of Walden personnel training is maintained on file, and each Walden employee will have copies of his/her applicable 40-Hour OSHA Training, 8-Hour Refresher and Supervisor Training certificates on-site (located in the SVE shed). A summary of Walden personnel training status and Walden HAS training records is shown in Table 1-1. Each subcontractor working on the job must provide the Site Safety Officer with training documentation for its personnel.

1.2 Medical Monitoring Requirements

All personnel and visitors entering the exclusion zone or decontamination zone must have completed appropriate medical monitoring requirements required under OSHA 29 CFR 1910.120 (f). Medical monitoring enables a physician to monitor each employee's health and physical condition, fitness to wear respiratory protective equipment, and fitness to carry out on-site tasks.

If there are additional medical monitoring requirements for this site, evidence of compliance must also be included. Documentation of Walden personnel medical monitoring is maintained on field and summarized in Table 1-1. Subcontractors working on the job must provide the Site Safety Officer with documentation on their medical monitoring programs.

1.3 Fit-Testing Requirements

All personnel and visitors entering the exclusion zone or decontamination zone using a negative pressure air purifying respirator (APR) must have successfully passed a qualitative respirator fit-test in accordance with OSHA 29 CFR 1910.134 or the American National Standards Institute.

Documenting fit testing is the responsibility of each subcontractor. Documentation of Walden personnel fit-testing is maintained on file and summarized in Table 1-1.

1.4 Site Safety Plan Acceptance Acknowledgment

The Walden Site Safety Officer and the Project Manager shall be responsible for informing all personnel (Walden employees and/or owner or 'owners representatives') entering the exclusion zone or decontamination zone of the contents of this plan and ensuring that each person signs the Safety Plan Acknowledgment Form in Appendix B. By signing the Safety Plan Acknowledgment Form, personnel recognize the hazards present on-site and the policies and procedures required to minimize exposure or adverse effects of these hazards.

1.5 Daily Safety Meetings

Safety meetings will be held each day before work begins, to ensure that all on-site personnel understand site conditions and operating procedures, and to address safety questions and concerns.

The Walden Field Team Leader will lead the meetings. All personnel trained and prepared to enter the exclusion and decontamination zones will attend the meetings.

1.6 Key Personnel

The Walden Principal in Charge/Project Manager for this project is Joseph M. Heaney III, PE, CSP. The Field Team Leader is Stephen Byatt and Site Safety Officer is Karen Savo-Matthews. The Site Safety Officer is responsible for task-specific implementation of the HASP.

Walden Associates, Inc. will be the principal site manager to perform the investigation of the 218 Lakeville Road Site and will provide Health and Safety Consulting services when requested by 218 Lakeville Road Associates, L.P. ADI, Inc. will be the subcontractor to drill soil borings, install monitoring wells and to pump, transport and dispose of drilling cuttings. Zebra Environmental shall be the subcontractor to conduct an off-site Geoprobe investigation. These subcontractors are responsible for their own employees health and safety.

1.7 Roles and Responsibilities

The Walden Project Manager is responsible for overall project administration and for supervising the implementation of the HASP by project personnel on-site. When the Project Manager is absent from the site, the Field Team Leader shall assume the on-site responsibilities of the Project Manager. All applicable OSHA HAS standards shall be applied. The Site Safety Officer shall oversee daily safety issues. Each subcontractor (defined as an OSHA employer) is also responsible for the health and safety of its employees. If there is any dispute with regard to HAS or project activities, on-site personnel shall attempt to resolve the issue. If the issue cannot be resolved in the work zone, then the Project Manager shall be consulted.

The Walden Site Safety Officer is also responsible for coordinating HAS standards on-site. The Site Safety Officer will have met the emergency response and hazardous materials handling training requirements of OSHA 29 CFR 1910.120, completed supervisor's training and have appropriate experience pertinent to the on-site work. The Site Safety Officer is authorized to suspend site work based on safety concerns, and is responsible for:

1. Indoctrinating personnel with regard to all of the information in this HASP and any other safety requirements to be observed during site operations, including, but not limited to, decontamination procedures, designation of work zones and levels of

protection, air monitoring, fit testing, and emergency procedures dealing with fire and medical situations;

2. Coordinating site safety decisions with the Project Manager and the Field Team Leader;

3. Maintaining the designation of exclusion, decontamination and support zones on a daily basis;

4. Monitoring the condition and status of known on-site hazards, and maintenance and implementation of the air quality monitoring program specified in this HASP;

5. Maintaining the exclusion zone entry/exit log and site entry/exit log; and

6. Maintaining records of safety problems encountered, mitigative actions taken and documentation of any chemical exposures or physical injuries. The Site Safety Officer will document these conditions in a bound notebook and maintain a copy of this log on-site.

Any person who observes safety concerns or potential hazards that have not been addressed in the daily safety meeting should immediately report observations/concerns to the Site Safety Officer or other appropriate key personnel.

IMPERIAL CLEANERS
218 LAKEVILLE ROAD
LAKE SUCCESS, NEW YORK

TABLE 1.1

WALDEN ASSOCIATES, INC. HEALTH AND SAFETY TRAINING RECORDS

EMPLOYEE	DATE OF 40-HOURS	LAST 8-HOUR REFRESHER (2)	SUPERVISION	LAST PHYSICAL	LAST FIT TEST
Joseph M. Heaney III, PE, CSP	6/19/87	08/30/01	2/27/93	8/3/97 (1)	11/21/97
Robert Keane	4/25/91	08/31/01	N/A	8/8/97 (1)	11/21/97
Samantha Bennett	9/25/95	08/31/01	N/A	(1)	9/12/00
Karen Savo-Matthews	3/13/93	08/31/01	9/23/98	(1)	11/21/97
Stephen Byatt	10/29/98	08/31/01	N/A	10/22/98 (1)	9/12/00
Feng Lu	12/21/00	08/31/01	N/A	(1)	(1)
Sheref Fathi, PE	12/21/00	08/31/01	N/A	10/15/00	(1)

Notes:

(1) Walden employees are in need of (current HASP training/testing) physicals and would be completed prior to start of site work.

(2) An 8-Hour Refresher Course including respirator fit testing will be conducted before site work begins.

* All subcontractors to be working in the exclusion zone will have 40-Hour Training and relevant records covering this project available at the time they work on-site.

2.0 SITE BACKGROUND AND SCOPE OF WORK

2.1 Site Background

The 218 Lakeville Road Site is located immediately south of New York State Route 25A in Lake Success within the Township of North Hempstead, Nassau County (Figure 2-1). The establishment at 218 Lakeville road is a commercial center with three active tenants: Imperial Cleaners, Lake Success Delicatessen and Tobacco Plaza. In 1995 Anson Environmental, Ltd. sampled floor drains in Imperial Cleaners and on-site drywells of 218 Lakeville Road and found elevated tetrachloroethylene (PCE) concentrations. An extensive remedial work effort was conducted which included the excavation of approximately 45 tons of PCE contaminated soil, the installation of on-site monitoring wells, the definition of on-site and off-site soil and soil vapor, indoor air quality monitoring and the deployment of a soil vapor extraction (SVE) system. This work was conducted as an immediate remedial measure and to define the extent of the contamination. A perched water table was found at this location due to the investigation and is believed to be preventing PCE migration into the overburden.

2.2 Scope of Work

In order to further assess the extent of contamination, a site investigation will be conducted. The tasks for this investigation are as follows:

- Verify site-related perched groundwater flow,
- Sample existing site-related groundwater monitoring wells,
- Conduct a half-mile well survey,
- Sample off-site perched groundwater via Geoprobe,
- Install off-site perched groundwater monitoring wells and investigate the clay lens depth,
- Conduct perched groundwater air sparge pilot study,
- Conduct on-site and off-site groundwater sampling,
- Conduct a building layout survey of 218 Lakeville Road (Internal),
- Continue indoor air quality monitoring in 218 Lakeville Road and surrounding residences, and
- Install a down-gradient Upper Glacial Aquifer Double-Cased monitoring well and determine the thickness of the clay lens.

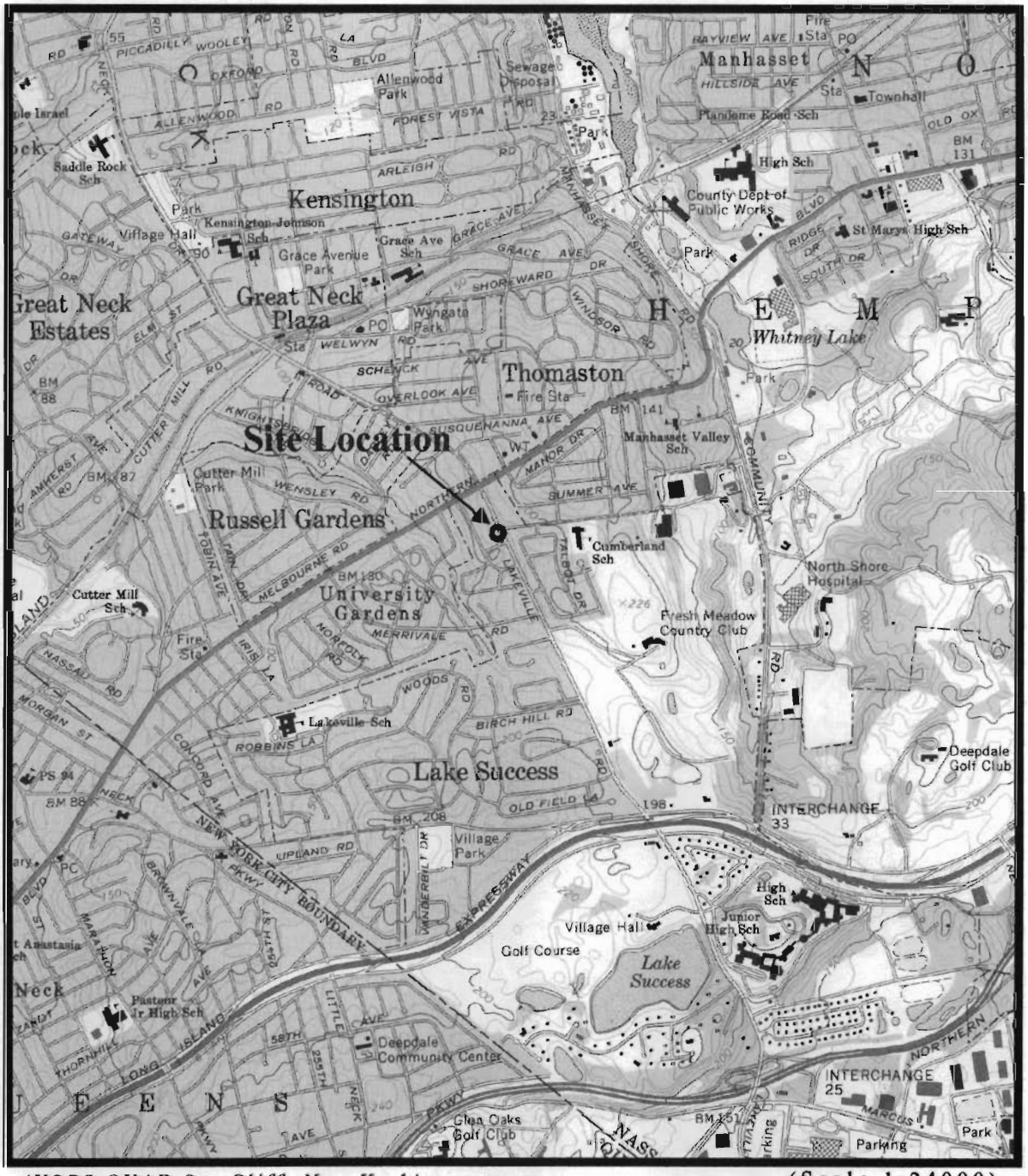
This HASP applies to all site-related work tasks involving all parties described in the Supplemental Investigation Work Plan.

FIGURE 2-1

Imperial Cleaners
218 Lakeville Road
Lake Success, New York

LOCATION MAP

N



(USGS QUAD Sea Cliff, New York) (Scale 1:24000)

3.0 HAZARD ASSESSMENT

This section identifies the activity-specific hazards associated with site operations and standard operating procedures (SOPs) that should be implemented to reduce the hazards; identifies general physical hazards that can be expected at most sites; and presents a summary of documented or potential chemical hazards at the site. Every effort must be made to reduce or eliminate these hazards. Those which cannot be eliminated must be guarded against by using engineering controls and/or personal protective equipment.

3.1 Activity-Specific Hazards and Standard Operating Procedures

3.1.1 Drilling

The drill rig presents a hazard with its moving parts and overhead equipment. All subcontractors will adhere to the specific guidelines for operating heavy equipment as outlined by OSHA in 29 CFR 1926.602. All field personnel except for the rig operators must remain away from the rig at a minimum distance equal to the height of the mast. All field personnel including drill rig operators must wear steel-toe work boots, hard hats and safety glasses. Table 3-1 presents personal protective equipment requirements in the exclusion zone. All persons unrelated to the project must remain outside the exclusion zone defined at a minimum as the shadow of the drill rig mast. If persons have business in the exclusion area other than Walden personnel or 218 Lakeville Road Associates, L.P. (owner) contractors, they must remain at a safe distance away from the rig as determined by the Site Safety officer.

3.1.2 Sample Collection

Sample collection presents the hazard of actual contact with soil and groundwater. Soil and groundwater sampling procedures must be conducted not only to protect the worker's health but to produce a representative sample of the contamination. Table 3-1 presents personal protective equipment requirements in the exclusion zone. Decontamination procedures, defined in section 7.0, must be reviewed and followed for each site-related sampling event.

3.2 General Site Hazards

Applicable OSHA 29 CFR 1910.120 (m) standards for illumination shall apply. All work at this site will be conducted during daylight hours.

Work in which a worker could fall, will be performed using appropriate ladders and/or protection (e.g. body harness and lifeline). All work at this site is expected to be conducted at the ground surface or in trenches. No overhead work is anticipated.

When the temperature is above 70 degrees F and personnel are wearing protective clothing, a heat-stress monitoring program shall be implemented (Appendix C). Employees shall be allowed break periods and beverages as necessary. All personnel routinely working on site (including the support zone) shall be familiar with the symptoms, signs and emergency care associated with heat stress, heat exhaustion and heat stroke as discussed in Appendix C of this HASP.

Cold stress is a result of cold, wetness and wind. A worker's susceptibility to cold stress can vary according to his/her physical fitness, degree of acclimatization to cold weather, age and diet. A cold-stress monitoring program shall be implemented as appropriate. Employees shall have access to break periods, shelter and beverages as necessary. All personnel routinely working on-site (including the support zone) shall be familiar with the symptoms, signs, and emergency care associated with cold stress, hypothermia and frostbite as discussed in Appendix D of this HASP.

In accordance with 29 CFR 1910.151 (c), all site-related operations involving possible eye injury (chemical splash, etc.), must have approved eye wash units readily available (in the Site Safety Officer's vehicle and in the SVE shed). Protective eyewear shall be donned in Level D, when directed by the Site Safety Officer.

Overhead and underground utilities shall be identified and/or inspected and appropriate safety precautions taken before conducting operations involving potential contact or interference.

3.3 Chemical Hazards

The major route of exposure to potential site-related contaminants will be respiratory in nature, thus inhalation would provide the mechanism for exposure. Tetrachloroethylene (PCE) is the on-site compound of highest concern. The NYSDOH anticipates PCE to be a carcinogin. Site-related work will use engineering controls and personnel protective equipment to reduce the amount of

potential exposure. Continuous air monitoring and personnel protection devises will serve to prevent exposure from chemicals. A summary of soil and groundwater sampling results is shown in Tables 2, 3 and 4 of the Supplemental Investigative Work Plan, October 2001 and a summary of pertinent health information is contained in Appendix E. If additional chemicals of concern are identified at the site, Appendix E will be supplemented with the appropriate information.

3.3.1 PCE-Contaminated Soil and/or Groundwater

Previous site sampling results indicate the presence of PCE in site-related soil/soil vapors and groundwater. The primary route of exposure to PCE is inhalation. PCE is largely used in dry cleaning facilities as a solvent and is considered moderately toxic to humans based on inhalation and ingestion. Overexposure symptoms include: local anesthetic, conjunctiva irritation, general anesthesia, hallucinations, distorted perceptions, coma, and pulmonary changes. PCE is moderately toxic by ingestion and the OSHA PEL for PCE is 100 ppm. The PPE defined in this section shall be employed to ensure that site workers contacting PCE-contaminated soils leave these soils in the exclusion zone.

IMPERIAL CLEANERS
218 LAKEVILLE ROAD
LAKE SUCCESS, NEW YORK

TABLE 3-1

PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

LOCATION	LEVEL OF PROTECTION/TASKS	DESCRIPTION
Support Zone	D	Steel toe boots and work clothes
Exclusion Zone and Contamination Reduction Zone	To be determined by the Site Safety Officer based on contamination present	
	D (modified)	Steel toe boots, nitrile or latex gloves, hard hat, safety glasses
	C	Full face respirator fitted with organic vapor cartridge and Level D
	B	Positive pressure, pressure demand self-contained breathing apparatus or positive pressure, pressure demand supplied air and Level C.

4.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) shall be selected in accordance with the site air monitoring program; OSHA 29 CFR 1910.120 (c) and (g), and 1910.132. Protective equipment shall be NIOSH-approved and respiratory protection shall conform to OSHA 29 CFR Part 1910.133 and 1910.134 specifications; head protection shall conform to 1910.135; eye and face protection shall conform to 1910.133; and foot protection shall conform to 1910.136.

4.1 Level D

Level D PPE shall be donned when the atmosphere contains no known hazards and work functions preclude splashes, immersion, or the potential for inhalation of, or contact with, hazardous concentrations of harmful chemicals. The majority of the work at the Imperial Cleaners Site, 218 Lakeville Road, Lake Success, New York will be conducted in Level D. Level D PPE consists of:

- Standard work uniform, coveralls or tyvek, as needed,
- Steel-toe and steel shank work boots,
- Hard hat,
- Gloves, as needed,
- Safety glasses, and
- Hearing Protection, as needed.

4.2 Level C

Level C PPE shall be donned when the concentrations of measured total organic vapors in the breathing zone exceed background concentrations (using a portable PID, or equivalent), but are less than 5 ppm. The specifications on the APR filters used must be appropriate for contaminants identified or expected to be encountered. Level C PPE shall be donned when the identified contaminants have demonstrated adequate warning properties and criteria for using APR have been met. Level C PPE consists of:

- Chemical resistant or coated tyvek coveralls,
- Steel-toe and steel shank work boots,
- Chemical resistant over boots or disposable boot covers,
- Disposable inner gloves (latex surgical gloves),
- Disposable outer gloves (nitrile gloves),
- Full-face APR fitted with organic vapor filters or filters appropriate for the identified or expected contaminants,
- Hard-hat,

- Splash shield, as needed, and
- Ankles/wrists taped with duct tape, and
- Hearing protection, as needed.

The Site Safety Officer will verify if Level C is appropriate by checking for high or potentially high total organic vapor concentrations using compound and/or class-specific detector tubes.

4.3 Activity-Specific Levels of Personal Protection

The required level of PPE is activity-specific and is based on air monitoring results (Section 5.0) and properties of identified contaminants and contaminants expected to be encountered (Section 3.3). Site-related work that involves the handling of contaminated soil (confined space soil vapor, soil sampling and disposal, groundwater sampling and disposal) shall utilize Level D protection with the possible upgrade to Level C.

5.0 AIR MONITORING AND ACTION LEVELS

According to 29 CFR 1910.120 (h) air shall be monitored to identify and quantify levels of airborne hazardous substances and health hazards, and to determine the appropriate level of worker protection needed.

5.1 Routine Air Monitoring Requirements

Air should be monitored using a portable PID or equivalent when any of the following conditions apply:

- Initial site entry,
- A potential IDLH condition or flammable atmosphere has developed,
- Work begins on another portion of the site,
- Contaminants, other than those previously identified, have been discovered,
- Each time a different task or activity is initiated,
- During trenching and/or excavating work, and
- Periodically during the course of the work day (every two hours minimum).

The Site Safety Officer will document all air monitoring data in a site logbook. Air monitoring instruments will be calibrated and maintained in accordance with the manufacturer's specifications and written records shall be kept of these activities.

Note: If site-related work is halted because air-monitoring thresholds are exceeded, then the Site Safety Officer shall assess the source and/or sources of air contaminants and make changes necessary to decrease contaminants to below threshold levels prior to allowing work to continue.

5.2 Activity-Specific Air Monitoring

All air monitoring results will be recorded in the site field logbook. If additional monitoring is required, then protocols will be developed and amended to this plan. Note that all site-related activities shall be conducted in Level D with the breathing zone periodically monitored by the Site Safety Officer. If PID readings are recorded above background for a sustained period of time (typically 90 seconds) than the Site Safety Officer shall upgrade PPE to Level C. At no time shall work continue if PID readings sustain 5ppm for 90 seconds or more.

6.0 SITE CONTROL AND STANDARD OPERATING PROCEDURES

6.1 Work Zones

The primary purpose for site controls is to establish the perimeter of the hazardous area, to reduce migration of contaminants into clean areas and to prevent access or exposure to hazardous materials by unauthorized persons. The Project Manager shall designate an exclusion zone, a decontamination zone and a support zone. These zones will float (move around the site) depending on the tasks being performed on any given day. The Site Safety Officer will outline these locations during the daily site safety meetings. The Site Safety Officer in the site log shall record this information.

Tasks requiring the OSHA 40-hour Hazardous Waste Operations and Emergency Response Operations training are carried out in the exclusion zone. The exclusion zone will be defined by the Site Safety Officer but will typically be a 20 to 30 foot area around work activities.

Protective equipment shall be removed within the decontamination zone. Disposable protective equipment shall be stored in receptacles staged in the decontamination zone and non-disposable equipment will be decontaminated according to the procedures outlined in Section 7.0. All personnel and equipment will exit the exclusion zone through the decontamination zone.

The support zone will be used for vehicle parking, daily safety meetings and supply storage. Eating, drinking and smoking are permitted only in the support zone. When a decontamination trailer is not provided, the eye washing unit, first aid equipment and drinking water shall be kept in the on-site SVE shed. Gross decontamination (as determined by the Site Safety Officer) will be conducted in the exclusion zone; all other decontamination will be performed in the decontamination trailer and/or in the area designated by the Site Safety Officer. This HASP, HASP attachments, a site map indicating the three work zones and a telephone will be kept in a designated office trailer. An eyewash and fire extinguisher shall be kept in the designated office trailer.

6.2 General Field Safety and Standard Operating Procedures

Walden's policy is to control hazards for all site areas by limiting entrance to exclusion zones to essential personnel and by implementing the following:

- Non-essential (as judged by the Site Safety Officer) personnel and unauthorized persons will not enter the exclusion or decontamination zone,
- Before entering the exclusion or decontamination zones, all personnel must be familiar with emergency response procedures (Section 9.0), site safety locations, first aid and communication equipment, and the locations of the map to the hospital and the list of emergency telephone numbers;
- The buddy system will be used at all times by field personnel in the exclusion zone; no one is to perform work within the exclusion zone alone. When in Level D or C, visual contact or radio contact shall be maintained at all times;
- Contact with contaminated and potentially contaminated surfaces should be avoided. Walk around (not through) puddles and discolored surfaces. Do not kneel on the ground or set equipment on the ground. Protect equipment from contamination;
- All personnel exiting the exclusion zone must exercise the decontamination procedures described in Section 7.0 of this HASP;
- Beards or other facial hair that interferes with the fit of a respirator will preclude admission to the exclusion zone. Contact lenses shall not be worn in the exclusion or decontamination zones, or if the worker may be expected to enter these zones under routine or emergency situations;
- Eating, drinking, or smoking is permitted only in designated areas in the support zone; and
- Each worker must be supplied with and maintain his/her own personal protective equipment.

NOTE: These policies will be enforced by the Site Safety Officer with the delegated authority of the Project Manager.

7.0 CONFINED SPACE

On January 14, 1993, OSHA published its Final Rule on permit required confined spaces for General Industry at 29 CFR 1910.146 et seq., with an implementation date of April 15, 1993. The rule requires that site-related work be performed with a Confined Space Entry Plan. The OSHA rule will be followed if site-related investigation leads to confined space entry. Note: At this time it is not anticipated that any permit or non-permit required confined spaces should be entered during site-related work. This section is included in the plan only as a contingency. OSHA defines confined space as:

1. is large enough and so configured that an employee can bodily enter and perform assigned work,
2. has limited or restricted areas for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults and pits are spaces that may have limited entry), and
3. is not designed for continuous employee occupancy.

OSHA further requires that an "entry supervisor" (the Site Safety Officer) decides at the time of entry whether the space is permit required or non-permit required space. All site work involving confined spaces will be non-permit required work. The Site Safety Officer will monitor the space immediately prior to entry and continuously during work to ensure that the atmosphere is not hazardous. OSHA defines hazardous atmosphere as:

1. Flammable gas, vapor, or mist in excess of 10 percent of its lower explosive limit (LEL),
2. Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent,
3. Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart G, Occupational Health and Environmental Control, or in Subpart Z, Toxic and Hazardous Substances, which could result in employee exposure in excess of its dose or permissible exposure limit, and
4. Any other atmospheric condition that is immediately dangerous to life or health.

7.1 Description of Permit Required Confined Space

The Site Safety Officer shall be responsible to determine when excavations are Permit Required Confined Space (PRCSs) and at such time shall implement the following procedures defined herein.

7.2 General Protocols

Only specific site workers will be allowed to enter PRCSs. These persons will be trained in accordance with 29 CFR 1910.146(g) prior to any PRCS entry and will receive site specific briefing on the project PRCSs.

The hazards expected to be associated with the PRCSs (volatile organic vapors) described in this plan are those associated with PCE-contaminated soil and groundwater which will be controlled by natural and/or forced mechanical ventilation, as needed. PRCS entry will be accomplished in accordance with alternate PRCS entry procedure allowed by 29 CFR 1910.146 © (5) (I). The space is still considered a PRCS, but this alternate procedure allows entry without many of the stringent entry requirements (i.e. retrieval systems, standby safety personnel). Atmospheric monitoring and training of entry personnel are required in all cases. If PRCSs are formed as a result of non-routine construction activities (trenching deeper than four feet), the spaces will only be entered after evaluation by the Site Safety Officer and according to proper guidelines. The following general protocols will be followed during all PRCS entries.

PRCSs will only be opened during the scheduled work period. At all times PRCSs will be secured from unauthorized entry. While entry is taking place, the space will be continuously monitored to assure that lockouts remain intact and foreign objects and unauthorized personnel do not enter the space.

Prior to any PRCS entry, the space will be monitored using appropriate instrumentation to measure hazardous atmospheres. The Site Safety Officer will calibrate and maintain the air monitoring equipment in accordance with manufacturers recommendations. Once space has been monitored and it is determined that the atmosphere is not hazardous, a written certification will be made by the individual who monitored the space on a Pre-entry/Entry Check List (Appendix G). During entry, the space will be periodically monitored for parameters indicated on the entry permit by an attendant outside of the PRCS and the monitoring results will be recorded on the pre-entry/entry checklist. If a hazardous atmosphere develops at any point, the space will be immediately evacuated and the following will take place before entry is again permitted.

1. The space will be evaluated to determine how the hazardous atmosphere developed,
2. Measures will be implemented to abate the hazard without entry and the space will be monitored to ensure that the hazardous atmosphere is completely abated, and

3. If the hazards cannot be abated, no entry will be allowed until entry plan is modified.

7.3 Air Monitoring Protocols

A specific regime of hazardous atmospheres must be monitored prior to entering the PRCS.

The hazards associated with entering project confined spaces are oxygen deficiency and the presence of combustible gas. These spaces will be monitored using a three-position combustible gas indicator and a PID prior to and during all entries. The meter will be operated, calibrated and maintained by the Site Safety Officer. The following action levels will apply:

1. Percent oxygen greater than 19.5 and less that 23.5 – entry may occur;
   Percent oxygen less than 19.5 or greater than 23.5 – space must be evacuated.

2. Percent combustible gas less than 10% LEL – entry may occur.
   Percent combustible gas greater than 10% LEL – space must be evacuated.

3. Reading of 0 ppm to 10 ppm hydrogen sulfide – entry may occur;
   Reading over 10 ppm hydrogen sulfide – space must be evacuated.

4. Reading of 0 ppm to 5 ppm of above site-specific background – entry may occur;
   Reading over 5 ppm above site-specific background – space must be evacuated.

8.0 CONTINGENCY PLAN/EMERGENCY RESPONSE PLAN

Site personnel must be prepared in the event of an emergency. Emergencies can take many forms: illnesses, injuries, chemical exposure, fires, spills, leaks, releases of harmful contaminants or sudden changes in the weather.

Emergency telephone numbers and a map to the hospital (Appendix H) will be posted in the SVE shed. Site personnel should be familiar with the emergency procedures, and the locations of site safety, first aid, and communication equipment.

8.1 Emergency Equipment On-Site

Private Telephones:	
Two-Way Radios:	Walden site personnel where necessary.
Emergency Alarms:	Air Horn
First Aid Kits:	On-site, in SVE shed.
Fire Extinguisher:	On-site, in SVE shed or when necessary on heavy equipment.

8.2 Emergency Telephone Numbers and Hospital Information

Nassau County Police Department	911
Nassau County Fire Department	911
Emergency Medical System	911
North Shore University Hospital	(516) 562-0100
National Response Center	(800) 424-8802
Poison Control Center	(800) 962-1253
NYSDEC Spill Hotline	(800) 457-7362

North Shore University Hospital is able to treat chemical exposures and has an emergency room. The address is: 300 Community Drive, Manhasset, New York11030.

A copy of this page shall be posted in the office trailer/vehicle, copy provided in Appendix H.

8.3 Personnel Responsibilities During an Emergency

The Project Manager is primarily responsible for responding to and correcting emergency situations. However, in the absence of the Project Manager or Field Team Leader, the Safety Officer shall act as the Project Superintendent's on-site designee, and perform the following tasks:

- Take appropriate measures to protect personnel including: withdrawal from the exclusion zone, total evacuation and securing of the site or upgrading or downgrading the level of protective clothing and respiratory protection,
- Ensure that appropriate federal, state and local agencies are informed and emergency response plans are coordinated. In the event of fire, the local fire department should be summoned immediately. If toxic materials are released to the air, the local authorities should be informed in order to assess the need for evacuation,
- Ensure appropriate decontamination, treatment or testing for exposed or injured personnel,
- Determine the cause of the incident and make recommendations to prevent recurrence, and
- Ensure that all required reports have been prepared.

The emergency coordinators cell phone numbers for this work are:

Project Manager –	Joseph M. Heaney III, PE	- (516) 635-4609
Field Team Leader –	Stephen Byatt	- (516) 850-5789

8.4 Medical Emergencies

Any person who becomes ill or injured in the exclusion zone must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. First aid should be administered while awaiting an ambulance or paramedics. Any person transporting an injured/exposed person to a clinic or hospital for treatment should take all pertinent information on the chemical(s) to which they may have been exposed.

8.5 Fire

In the event of a fire, the local fire department should be summoned immediately. The Project Manager or his designated alternate will advise the fire commander of the location, nature and identification of the hazardous materials on-site. If it is safe to do so, site personnel may:

- Use fire fighting equipment available on site, or,
- Remove or isolate flammable or other hazardous materials that may contribute to the fire.

8.6 Evacuation Routes

Evacuation routes established by work area locations of this site will be highlighted on a site map and periodically reviewed during the daily safety meetings. As the work areas change, the evacuation route and map will be altered accordingly, and the new route will be reviewed during the daily safety meetings.

Under extreme emergency conditions, evacuation should be conducted immediately, without regard for equipment. The evacuation signal will be a continuous blast of an air horn. When evacuating the site, personnel shall follow these instructions:

- Keep upwind of smoke, vapors or spill location,
- Exit through the decontamination corridor if possible,
- If evacuation through the decontamination corridor is not possible, site personnel should remove contaminated clothing once they are in a safe location and leave it near the exclusion zone or in a safe place,
- The Project Manager or Site Safety Officer will conduct a head count to ensure that all personnel have been evacuated safely. The head count will be correlated to the site and/or exclusion zone entry/exit log, and
- If emergency site evacuation is necessary, all personnel are to escape the emergency situations and decontaminate to the maximum extent practical.

8.7 Spill Control Procedures

In the event of a leak or a release, site personnel will:

- Inform their supervisor immediately,

- Locate the source of the spillage and stop the flow if it can be done safety, and
- Begin containment and recovery of the spilled materials.

8.8 Vapor Release Plan

If work zone volatile organic vapor exceeds 5 ppm, then a downwind reading must be collected either 200 feet from the work zone or on the property line, whichever is less. If readings at this location exceed 5 ppm over background, then work activities shall be stopped. At this point the Site Safety Officer would immediately implement the Community Air Monitoring Program, which is located in Appendix F of the Supplemental Investigative Work Plan, October 2001.

If 5 ppm of volatile organics are recorded over background on a PID at the property line then off-site readings should be taken within 20 feet of the nearest residential or commercial property, whichever is closest. If efforts to mitigate the emission source are unsuccessful for 30 minutes then the Site Safety Officer would:

- contact the local police, and
- continue to monitor air every 30 minutes, 20 feet from the closest off-site property. If two successive readings are below 25 ppm, air monitoring, off-site would be halted.

All property line and off-site air monitoring locations and results associated with vapor releases shall be recorded in the site safety logbook.

9.0 RECORDKEEPING – DAILY LOGS AND ACCIDENT REPORTS

If an accident, fire or release of toxic materials occurs during the course of the project, the Project Manager shall be telephoned immediately and receive written notification within 24 hours. Within two working days of any reported accident, Walden will complete and submit to 218 Lakeville Road Associates, L.P., an accident report addressing the following items:

- Name, organization, telephone number and location of the Contractor,
- Name and title of the person(s) reporting,
- Date and time of the accident/incident,
- Location of the accident/incident(i.e. site location, facility name),
- Brief summary of the accident/incident giving pertinent details including type of operation ongoing at the time of the accident/incident,
- Cause of the accident/incident, if known,
- Casualties (fatalities, disabling injuries),
- Details of any existing chemical hazard or contamination,
- Estimated property damage and effect on contract schedule,
- Action taken by Contractor to ensure safety and security, and
- Other damage or injuries sustained, public or private.

APPENDIX A

SITE SAFETY PLAN AMENDMENTS

IMPERIAL CLEANERS SITE, 218 LAKEVILLE ROAD, LAKE SUCCESS, NEW YORK

SITE SAFETY PLAN AMENDMENT FORM

SITE SAFETY PLAN AMENDMENT #____: _____

SITE NAME: _____

REASON FOR AMENDMENT: _____

_____

_____

_____

ALTERNATE PROCEDURES: _____

_____

_____

_____

_____

REQUIRED CHANGES IN PPE: _____

_____

_____

_____

_____ _____

PROJECT MANAGER (DATE)

_____ _____

FIELD TEAM LEADER (DATE)

_____ _____

SITE SAFETY OFFICER (DATE)

APPENDIX B

SITE SAFETY ACKNOWLEDGEMENT FORM

AND

DAILY SITE SAFETY MEETING SIGN-IN SHEET

IMPERIAL CLEANERS SITE, 218 LAKEVILLE ROAD, LAKE SUCCESS, NEW YORK

SITE SAFETY PLAN ACKNOWLEDGEMENT FORM

I have read and understand the procedures set forth in the Safety and Health Plan and Amendments for Imperial Cleaners Site 218 Lakeville Road, Lake Success, New York.

Printed Name	Signature	Representing	Date

IMPERIAL CLEANERS SITE, 218 LAKEVILLE ROAD, LAKE SUCCESS, NEW YORK

DAILY SIGN IN SHEET

_____ - Site Safety Officer DATE: _____

_____ - Project Manager TIME: _____

I have read and understand the procedures set forth for daily work for the Imperial Cleaners Site, 218 Lakeville Road, Lake Success, New York Contract D-257427 Project.

Printed Name	Signature	Representing

APPENDIX C

HEAT STRESS

HEAT STRESS

1. Heart rate (HR) should be monitored by the radial pulse for 30 seconds as soon as possible in the resting period.

   If at the beginning of the rest period a worker's radial pulse is measure and his heart rate exceeds 100 beats per minute, the worker's next work period should be reduced by 33%. Therefore, if the original work period was one hour, the following work cycle should be reduced to 40 minutes.

2. Heat Stroke is a true medical emergency. First aid should be directed toward immediate measures to cool the body quickly, as well as seeing that the victim receives medical attention as soon as possible.

   Prior to medical treatment, remove as much clothing as possible and proceed to cool the victim's body, taking care not to over chill the victim once his temperature falls below 102°F. One of the following cooling measures should be taken: (a) sponge the bare skin with cool water; (b) apply cold packs continuously; (c) wrap the victim in a sheet soaked with water; or (d) immerse the victim in a tub of cold water, while closely monitoring the victim's level of consciousness.

3. Prior to site activity, the Site Safety Officer may make arrangements for heat stress monitoring (i.e., monitoring heart rate, body temperature and body water loss) during actual site work if conditions warrant these measures. In addition, the Site Safety Officer would want to ensure that the team members have been acclimatized to the particular environmental conditions and that personnel are aware of the signs and symptoms of heat sickness and have been adequately trained in first aid procedures. As Site Safety Officer, one could also make sure there is sufficient personnel on-site, so as to rotate work assignments, schedule work during hours of reduced temperatures and ensure personnel do not consume alcoholic or caffeinated beverages but rather drink moderate levels of an electrolyte solution and eat well prior to commencing site work.

4. The worker could be experiencing a condition of heat rash. Allow workers to rest and relieve the itching associated with heat rash rather than return to work too soon. Itching

workers may not follow stringent decontamination procedures or scratch where it itches on-site and risk cross contamination.

Keeping the skin clean and dry will reduce the incidence of heat rash. This can be accomplished by wearing cotton garments (or other materials that absorb perspiration) underneath protective clothing. Upon removal of the protective clothing, the worker should wash and dry his skin thoroughly.

5. The sense of thirst is not an adequate regulator of water replacement during heat exposure. Therefore, as a general rule, the amount of water administered should replace the amount of water lost, and it should be administered at regular intervals throughout the day. For every 1/2 pound of water loss, 8 ounces of water should be ingested. Water should be replaced by drinking 2-4 ounce servings during every rest period. A recommended alternative to water is an electrolyte drink spilt 50/50 with water.

6. Although there is no specific test given during a baseline physical that would identify a person's intolerance to heat, there are physical factors and personal habits which may indicate possible intolerance to heat, such as, whether or not an individual smokes, one's dietary habit, body weight, as well as predisposed physical conditions such as high blood pressure, heavier conditions, diabetes or one's medication, that may influence an individual's ability to tolerate excessive heat.

7. Heat cramps are caused by profuse perspiration with inadequate fluid intake and salt replacement. Heat cramps most often afflict people in good physical condition who overwork in conditions of high temperature and humidity. Heat cramps usually come on suddenly during vigorous activity. Untreated, heat cramps may progress directly to heat exhaustion or heat stroke. First aid treatment: remove victim to a cool place and give sips of salted water (1 teaspoon of salt to 1 quart of water) - 4 ounces every 15 minutes over a period of one hour. A commercial preparation, e.g., Gatorade, may be used if split 50/50 with water.

   The salted water or solution should mitigate the cramps. Manual pressure should not be applied to the cramped muscles.

TABLE C-1

REQUIRED FREQUENCY OF HEAT STRESS MONITORING
FOR WORKERS IN IMPERMEABLE CLOTHING

Adjusted (2) Temperature (^{0}F)	**Work Time Allowed Before Monitoring Break (min.)**
90 or above	15
87.5-90	30
82.5-87.5	60
77.5-82.5	90
72.5-77.5	120

(1) Adapted from Eastern Research Group and National Institute for Occupational Safety and Health, Occupational Safety and Health Guidance Manual for Super Activities. September 26, 1984, pp. 8-75.

(2) Calculate the adjusted air temperature (Ta adj) by using this equation:

$$\text{Ta adj } ^0\text{F} = \text{Ta } ^0\text{F} + (13 \times \% \text{ sunshine})$$

Measure air temperature (Ta) with a standard thermometer, with the bulb shielded from radiant heat. Then estimate percent sunshine (100 percent sunshine = no cloud cover an a sharp, distinct shadow; 0 percent sunshine = no shadows).

TABLE C-2

HEAT STRESS SIGNS AND SYMPTOMS

Heat Stress Indicator	When to Measure	If Exceeds	Action
heart rate (pulse)	beginning of rest period	110 beats per minute	shorten next work period by 33%
oral temperature	beginning of rest period	99 °F (after thermometer is under tongue for 3 minutes) 100.6 °F or greater	shorten next work period by 33% prohibit work in impermeable clothing and shorten next work period by 33%
body weight	1. before workday begins (a.m.) 2. after workday ends (p.m.)	Decreases more than 5%	increase fluid intake

APPENDIX D

COLD STRESS

COLD STRESS (Hypothermia)

Cold stress is a function of cold, wetness and wind. A worker's susceptibility to cold stress can vary according to his/her physical fitness, degree of acclimatization to cold weather, age and diet.

Prevention

Institute the following steps to prevent or overexposure of workers to cold:

1. Maintain body core temperature at 96.8^0 F or above by encouraging workers to drink warm liquids during breaks (preferably not coffee) and wear several layers of clothing. Wool is recommended since it can keep the body warm even when the wood is wet.
2. Avoid frostbite by adequately covering hands, feet and other extremities. Clothing such as insulated gloves or mittens, earmuffs and hat liners should be worn. To prevent contact frostbite (from touching metal and cold surfaces below 20^0 F) workers should wear anti-contact gloves. Tool handles and control bars should be covered with insulating material.
3. Adjust work schedules if necessary, providing adequate rest periods. When feasible, rotate personnel and perform work during the warmer hours of the day.
4. Provide a heated enclosure for workers close to their work area. Workers should remove their outer layer(s) of clothing while in the shelter to allow for sweat evaporation.
5. In the event that wind barriers are constructed around an intrusive operation (such as drilling), the enclosure must be properly vented to prevent the build-up of toxic or explosive gases or vapors. Care must be taken to keep any heat source away from flammable substances.
6. Using a wind chill chart such as the one in Table D-1, obtain the equivalent chill temperature (ECT) based on actual wind speed and temperature. Refer to the ECT when setting up work warm-up schedules, planning appropriate clothing, etc. Workers should use warming shelters at regular intervals at or below an ECT or 20^0 F For exposure skin, continuous exposure should not be permitted at or below an ECT of -35^0 F.
7. Workers who become immersed in water or whose clothing becomes wet (from perspiration, rain, etc) must immediately be provided a change of dry clothing whenever the air temperature is 25.6^0 F or below.
8. Maintain an optimal level of worker fitness by encouraging regular exercise, proper diet, etc. If possible, acclimatize workers to site conditions for several days before work begins.

Monitoring

Personnel should be aware of the symptoms of cold stress. If the following symptoms of systemic hypothermia are noticed in any worker, he/she should immediately go the warm shelter:

Heavy, uncontrollable shivering;
Excessive fatigue or drowsiness;
Loss of coordination;
Difficulty in speaking; and,
Frostbite (see below).

Frostbite is the generic term for local injury resulting from cold. The stages of frostbite and their symptoms are as follows:

1. Frostbite or incipient frostbite: sudden blanching or whitening of the skin.
2. Superficial frostbite: waxy or white skin, which is firm to the touch (tissue underneath is still resilient).
3. Deep frostbite: tissues are cold, pale and solid.

TABLE D-1

WINDCHILL CHART

Wind Speed (mph)	Actual thermometer Reading (^{0}F)									
	50	40	30	20	10	0	-10	-20	-30	-40
	Equivalent Temperature (^{0}F)									
Calm	50	40	30	20	10	0	-10	-20	-30	-40
5	48	37	27	16	6	-5	-15	-26	-36	-47
10	40	28	16	4	-9	-21	-33	-46	-58	-70
15	36	22	9	-5	-18	-36	-45	-58	-72	-85
20	32	18	4	-10	-25	-39	-53	-67	-82	-96
25	30	16	0	-15	-29	-44	-59	-74	-88	-104
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109
35	27	11	-4	-20	-35	-49	-67	-82	-98	-113
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116
>40 (Little added effect)	Little Danger (For properly clothed person)				Increasing Danger (Danger from freezing of exposed flesh)			Great Danger		

APPENDIX E

CHEMICAL HAZARDS

TETRACHLOROETHENE or PERCHLOROETHENE (PCE)

Introduction

Tetrachloroethylene is a man-made substance widely used for dry cleaning fabrics and textiles and for metal-degreasing operations. It is also used as a starting material (building block) for the production of other man-made chemicals. Other names that may be used for tetrachloroethylene include perchloroethylene, perc, PCE, perclene, and perchlor. Although tetrachloroethylene is a liquid at room temperature, some of the liquid can be expected to evaporate into the air producing an ether-like odor; evaporation increases as temperature increases.

Exposure Pathways

Humans can be exposed to tetrachloroethylene from environmental, consumer product, and occupational sources. Common environmental levels of tetrachloroethylene (often called background levels) are usually several thousand times lower than levels found in some workplaces. Background levels found in the air we breathe and in the food and water we consume probably result from evaporation from industrial or dry-cleaning operations or from releases from areas where chemical wastes are stored. Tetrachloroethylene has been found in at least 330 of the 1117 National Priorities List (NPL) hazardous waste sites.

In general, tetrachloroethylene levels in air are higher in urban and industrialized areas than in more rural or remote areas. Higher-than-background concentrations of tetrachloroethylene have occasionally been measured in air close to chemical waste sites and in water taken from nearby wells.

Exposure to tetrachloroethylene may also occur from some consumer products. Products that may contain tetrachloroethylene include auto brake noise-reducers and cleaners, suede protectors, water repellants, silicone lubricants, belt lubricants and dressings, specialized aerosol cleaners, ignition wire driers, fabric finishers, spot removers, adhesives and wood cleaners. Although uncommon, small amounts of tetrachloroethylene have been found in food.

The levels of tetrachloroethylene in air in dry-cleaning shops, textile and chemical processing operations and degreasing operations can result in exposures that are much higher than those found in the outside environment. Levels of tetrachloroethylene in the workplace are usually measured in parts of tetrachloroethylene per million parts of air (ppm), while common environmental levels are usually measured in parts per billion (ppb) or parts per trillion (ppt).

Metabolism

Because tetrachloroethylene evaporates quickly, the most common exposure to tetrachloroethylene comes from breathing air containing it. This is certainly true for individuals

who work with the chemical, but it is probably also true for those who live in industrial and commercial areas where large amounts of the compound are used or disposed of. Tetrachloroethylene may also enter the body through drinking contaminated water or eating contaminated food. Because tetrachloroethylene does not pass through the skin to any significant extent, entry into the body by this path is of minimal concern, although skin irritation may result from repeated or prolonged contact with the undiluted liquid. Scientific reports indicate that tetrachloroethylene is present (and may in fact be concentrated) in the breast milk of mothers who have been exposed to the chemical.

Health Effects

In high concentrations in air, particularly in closed, poorly ventilated areas, single exposures to tetrachloroethylene can cause central nervous system (CNS) effects leading to dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking and possibly unconsciousness and death. As might be expected, these symptoms occur almost entirely in work (or hobby) environments. The potential long-term health effects that might occur in humans from breathing lower levels of tetrachloroethylene than those that produce CNS effects or from ingesting very low levels of the chemical found in some water supplies have not been identified. The effects of exposing infants to tetrachloroethylene through breast milk are unknown.

Animal studies, conducted with amounts much higher than typical environmental levels, have shown that tetrachloroethylene can cause liver and kidney damage, liver and kidney cancers and leukemia. Developmental effects in fetuses have been observed but only at tetrachloroethylene exposure levels that also produce toxicity in the maternal animal.

The U.S. Department of Health and Human Services has determined that tetrachloroethylene may reasonably be anticipated to be a carcinogen. Based on evidence from animal studies, tetrachloroethylene is thought to be capable of causing cancer in humans. It should be emphasized, however, that currently available information is not sufficient to determine whether tetrachloroethylene causes cancer in humans.

Short-term exposures to air containing more than 100 ppm of tetrachloroethylene have produced harmful effects in both humans and animals and more prolonged exposures to approximately 9 ppm caused harmful liver effects in mice. It should be pointed out that some of the highest environmental levels of tetrachloroethylene ever recorded (at waste disposal sites, for example) were still 150 times smaller than the concentrations shown to produce symptoms of toxicity in animals after repeated exposure. Drinking (or eating) the equivalent of approximately 60 to 80 mg (less than a spoonful) of undiluted tetrachloroethylene per kg; of body weight (I kg = 2.2 pounds) has produced effects similar to drinking alcohol. Tetrachloroethylene was used in the past as a medicine to eliminate worms in humans, but safer and more effective drugs are now available. More prolonged exposures in animals have produced harm to the liver at doses of approximately 100 mg/kg/day. These levels of exposure are more than 1,000 times higher than would be expected even if humans ingested the most contaminated drinking water ever reported.

Cancer: From data in animals, EPA has estimated that if people breathe air containing 1 ppm tetrachloroethylene all day every day for 70 years, there would be an added risk of 66 additional cases of cancer in a population of 10,000 people (or 65,5 00 additional cases in a population of 10,000,000) over the number of cases that would be observed in a population not exposed to tetrachloroethylene. If people consume 1.0 mg tetrachloroethylene/kg/day in food and water every day for 70 years, there would be at the most a risk of 5 10 additional cases of cancer in a population of 10,000, or 5 10,000 additional cases in a population of 10,000,000. It should be noted that these risk values are plausible upper-limit estimates. Actual risk levels are unlikely to be higher and may be lower.

Regulations

The government has made recommendations to limit the exposure of the general public to tetrachloroethylene in drinking water and the exposure of workers to tetrachloroethylene in the workplace.

The Environmental Protection Agency (EPA) has developed the following health advisories to describe concentrations of tetrachloroethylene in drinking water at which no adverse effects are anticipated to occur: 2.0 milligrams per liter of water (mg/L) for short-term exposure of children, 1.4 mg/L for longer term exposure of children, and 5.0 mg/L for long-term exposure of adults. In addition, a drinking water equivalent level (DWEL) of 0.5 mg/L has been established.

The Occupational Safety and Health Administration (OSHA) has a legally enforceable exposure limit of 25 ppm tetrachloroethylene in air for an 8-hour workday, 40-hour workweek based on non-cancer health considerations. The National Institute for Occupational Safety and Health (NIOSH) has classified tetrachloroethylene as a potential occupational carcinogen and recommends that workplace exposure be limited to the lowest possible level.

perchloroethylene. (tetrachloroethylene). CAS: 127-18-4. C12C:CC12.

Properties:
Colorless liquid, ether-like odor, extremely stable, resists hydrolysis, d 1.625 (20/20C), bp 121C, fp -22AC, bulk d 13.46 lb/gal (26C), refr index 1.5029 (25C), flash p none. Miscible with alcohol, ether, and oils; insoluble in water. Non-flammable.

Derivation:
(1) By chlorination of hydrocarbons and pyrolysis of the carbon tetrachloride also formed,
(2) from acetylene and chlorine via trichloroethylene.

Method of purification: Distillation.
Grade: Purified, technical, USP, as tetrachloroethylene, spectrophotometric.
Hazard: Irritant to eyes and skin. TLV: 50 ppm in air.
Use: Dry-cleaning solvent, vapor -degreasing solvent, drying agent for metals and certain other solids, vermifuge, heat transfer medium, manufacture of fluorocarbons.

APPENDIX F

DAILY AIR MONITORING RECORD FORM

IMPERIAL CLEANERS SITE, 218 LAKEVILLE ROAD, LAKE SUCCESS, NEW YORK

DAILY AIR MONITORING RECORD FORM

Date: _____ Site Safety Officer: _____

Time: _____ Air Monitor: _____

Tasks of Day: _____

_____

Weather Condition - Wind Direction: _____ Sky Cover: _____

Perimeter Monitoring Points: Station 1
(Selected by the Site Station 2
Safety Officer as the Station 3
Work site changes) Station 4

Last Calibration (Date) : _____ and Time:_____ Instruments Used:_____

Dust Suppressant necessary: Yes or No

Air Monitoring Action Levels:

PID readings sustained at background in breathing zone: continue.

PID readings sustained between background to 5 ppm in breathing zone: Level C PPE.

PID readings >5 ppm in breathing zone: stop work evaluate source of contaminants.

If work zone volatile organic vapors (PID readings) persistently exceed 5 ppm, then downward reading must be collected either 200 feet from the work zone or on the property line, whichever is less. If readings at this location are over 25 ppm over background, then work activities will be stopped.

APPENDIX G

CONFINED SPACE PREENTRY CHECKLIST
AND
CONFINED SPACE ENTRY PERMIT

IMPERIAL CLEANERS SITE, 218 LAKEVILLE ROAD, LAKE SUCCESS, NEW YORK

CONFINED SPACE PRE-ENTRY CHECKLIST

Date and Time: _____ Date and Time Expire: _____
Issued By: _____
Job Site: _____ Job Supervisor: _____
Equipment to be worked on: _____ Work to be performed: _____

Pre-Entry (See Safety Procedure)

1. Atmospheric Checks: Time: _____
Oxygen _____%
Explosive _____% LEL
Hydrogen Sulfide _____PPM
Carbon Monoxide _____PPM

1. Entry, standby, and back-up persons? Yes_____ No_____
Successfully Completed required training? Yes_____ No_____
Is it current? Yes_____ No_____

2. Source Isolation (No Entry):	N/A	Yes	No
Pumps or lines blinded,	( )	( )	( )
disconnected, or blocked	( )	( )	( )

3. Ventilation Modification	N/A	Yes	No
Mechanical	( )	( )	( )

2. Equipment	N/A	Yes	No
Direct reading gas monitor-tested?	( )	( )	( )
Powered communications?	( )	( )	( )
Protective Clothing?	( )	( )	( )
All electric equipment listed			
Class I, Division I, and Group D	( )	( )	( )

4. Atmospheric check after isolation and ventilation

Oxygen_____%	> 19.5%
Explosive _____% L.E.L.	< 10%
Toxic _____PPM	< 10 PPM H_2S
Volatile Organics _____PPM	< 5 PPM VOCs
Time_____	

3. Rescue Procedure:
_____
_____
_____
_____
_____

If conditions are in compliance with the above requirements and there is no reason to believe conditions may change adversely, then proceed to the Permit Space Pre-entry Check List. Complete and post with this permit. If conditions are not in compliance with the above requirements or there is reason to believe that conditions may change adversely, proceed to the Entry Check List portion of this permit.

We have reviewed the work authorized by this permit and the information contained herein. Written instructions and safety procedures have been received and are understood. Entry cannot be approved if any squares are marked in the "no" column. This permit is not valid unless all appropriate items are completed.

Pre-entry Check List Prepared by: Walden Associates, Inc.

Approved by: Site Safety Officer _____

Reviewed by: Project Health & Safety Professional _____
(Signature)

This permit is to be kept at job site. Return job site copy to Safety Office following job completion. Copies should be filed with: Site Safety Office.

IMPERIAL CLEANERS SITE, 218 LAKEVILLE ROAD, LAKE SUCCESS, NEW YORK

CONFINED SPACE ENTRY PERMIT

_____ Confined Space _____ Hazardous Area

Permit valid for 8 hours only. All copies of permit will remain at this job site until job is completed.

Site location and description_____

Purpose of Entry_____

Supervisor(s) in charge of crews Type of Crew Phone #

_____

_____

Bold denotes minimum requirements to be completed and reviewed prior to entry

Requirements Completed	Date	Time	Requirements Completed	Date	Time
Lock Out/De-Energize/try-out	____	____	Fire Extinguishers	____	____
Line(s) Broken-capped-blanked	____	____	Lighting (Explosive Proof)	____	____
Ventilation	____	____	Protective Clothing	____	____
Secure Area (Post and Flag)	____	____	Respirator(s) (Air Purifying)	____	____
Standby Safety Personnel	____	____			

NOTE: Items that do not apply enter N/A in the blank.

** Record Continuous Monitoring Results Every 2 Hours.

Continuous Monitoring ** Test(s) to be taken	Permissible Entry Level	Monitoring Results
Percent of Oxygen	19.5% to 23.5%	__ __ __ __ __ __ __ __
Lower Explosive Limit	Under 10%	__ __ __ __ __ __ __ __
Volatile Organics	Less than 5 PPM	__ __ __ __ __ __ __ __
Hydrogen Sulfide	+ 10 PPM * 15 PPM	__ __ __ __ __ __ __ __

* Short-term exposure limit: Employee can work in the area up to 15 minutes.

+ 8-hour time - Weighted average: Employee can work in area 8 hours (longer with appropriate respiratory protection).

REMARKS:

Name	Instrument(s) Used	Model/Serial #	Cal. Time/Date
_____	_____	_____	_____
_____	_____	_____	_____

Safety standby person is required for all confined space work.

Safety standby person(s)	Name of Safety Persons(s)
_____	_____
_____	_____

Supervisor Authorizing Entry_____ Ambulance: 911 Fire: 911
All Above Conditions Satisfied_____ Safety: 911 Gas Coordinator: (516) 624-7200

APPENDIX H

HOSPITAL ROUTE

AND EMERGENCY NUMBERS

TO BE POSTED IN SVE SHED

IMPERIAL CLEANERS SITE

218 LAKEVILLE ROAD

LAKE SUCCESS, NEW YORK

EMERGENCY TELEPHONE NUMBERS AND HOSPITAL INFORMATION

Nassau County Police Department	911
Nassau County Fire Department	911
Emergency Medical System	911
North Shore University Hospital	(516) 562-0100
National Response Center	(800) 424-8802
Poison Control Center	(800) 962-1253
NYSDEC Spill Hotline	(800) 457-7362

North Shore University Hospital is able to treat chemical exposures and has an emergency room. The address is: 300 Community Drive, Manhasset, New York.

HOSPITAL ROUTE SEE FIGURE H-1 – TAKE LAKEVILLE ROAD NORTH TO NORTHERN BOULEVARD. TAKE NORTHERN BOULEVARD 0.7 MILES EAST TO COMMUNITY DRIVE. – HOSPTIAL IS 0.3 MILES SOUTH ON LEFT OF COMMUNITY DRIVE.

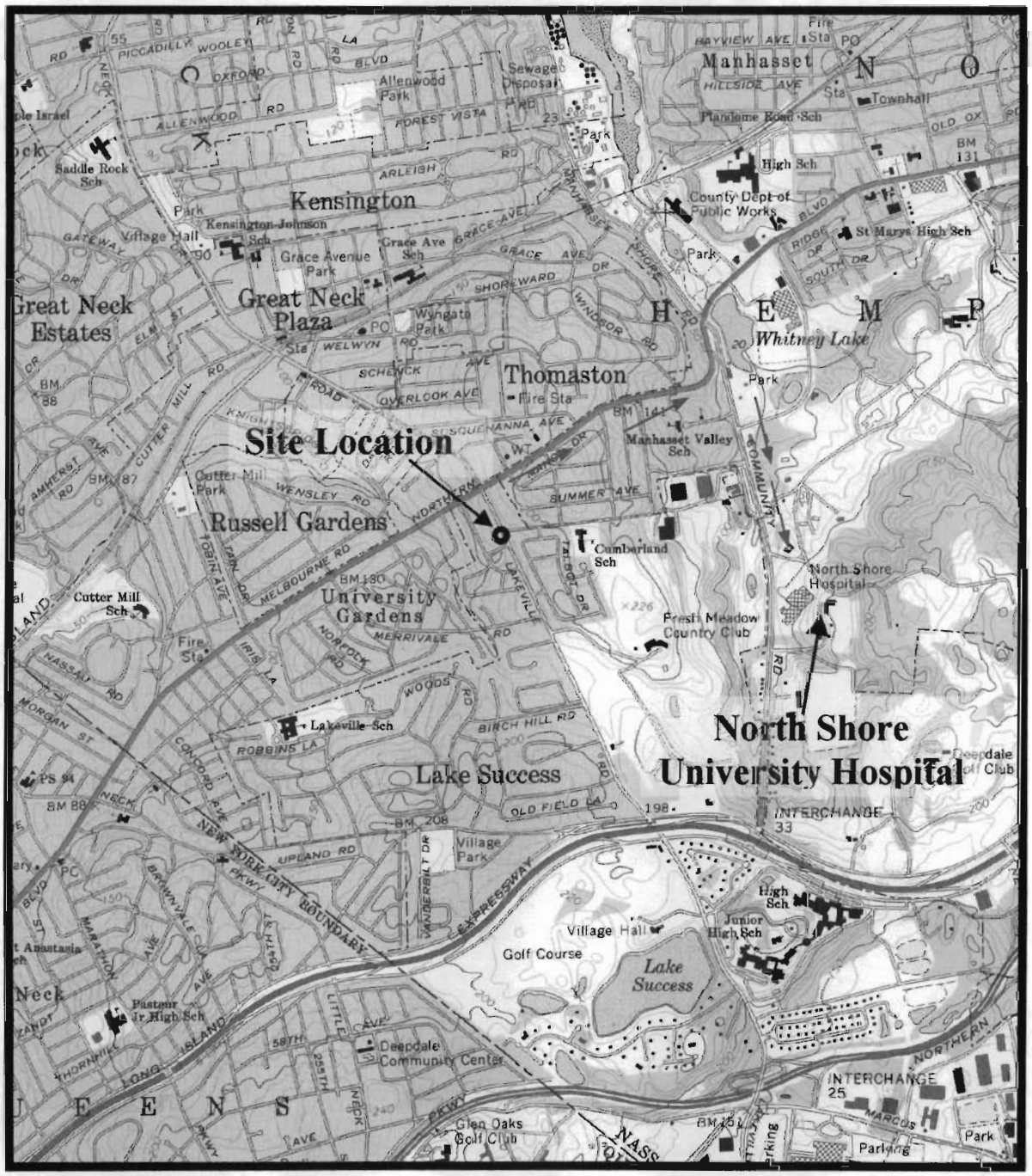
FIGURE H-1

Imperial Cleaners
218 Lakeville Road
Lake Success, New York

DIRECTIONS TO NORTH SHORE UNIVERSITY HOSPITAL

TAKE LAKEVILLE ROAD NORTH TO NORTHERN BOULEVARD. TAKE NORTHERN BOULEVARD 0.7 MILES EAST TO COMMUNITY DRIVE. NORTH SHORE HOSPITAL IS 0.3 MILES SOUTH ON THE LEFT SIDE.

N



(USGS QUAD Sea Cliff, New York) (Scale 1:24000)

Appendix B

NYSDEC Quality Assurance Guidelines for Voluntary Cleanup Sites

Quality Assurance Guidelines for Voluntary Cleanup Sites

A separate Quality Assurance Project Plan (QAPjP) is not required when the following quality assurance points are included in the Work Plan:

1. Project description and project goals. Include the site environmental history and the results of any previous sampling.

2. Project organization, including designation of the Project Manager, Quality Assurance Officer and Field Analyst, if field analysis is planned. These resumes should be included in the Work Plan Appendix.

3. Sampling procedure and equipment decon procedures. Include a sample chart that specifies the sample matrix, number of samples, analysis methods and data reporting level. EPA or NYSDEC Analytical Services Protocol (ASP) methods are acceptable. Also include a site map that shows proposed sampling sites and previous sampling results.

4. The laboratory must be named in the Work Plan and must be NYSDOH ELAP certified for the planned analyses. It most cases, the investigation and cleanup confirmation sample analysis reporting level will be NYSDEC ASP Category B deliverables*, in order to fully evaluate and document the project. When Category B deliverables are required, the laboratory must be NYSDOH ELAP CLP certified, since the CLP certification program evaluates the proficiency of the laboratory in the quality control parameters required by the analytical methods and the reporting format for the Category B deliverables package. On sites where we already have valid and usable investigative data, verified by Category B deliverables, intermediate samples (SPDES, interim remedial measures (IRM) and construction samples) usually only require a standard, one page, analysis report.

5. Include Standard Operating Procedures (SOPs) for field instruments and field screening methods.

6. Data validation is not required. The data should be evaluated according to the Division of Environmental Remediation (DER) Data Usability Summary Report (DUSR) guidelines.

* This reporting level gives the necessary documentation that will be reviewed to evaluate the usability of the data (see #6). It also gives calibration data that is needed to verify "not-detected" analytes that are possible compounds of concern, as indicated by site history or previous screening level data.

NOTE: Consultants' questions regarding this document may be directed to Mr. Tim LeBarron at 518-402-9758.

Appendix C

NYSDOH Community Air Monitoring Plan

New York State Department of Health
Generic Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical-specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a **continuous** basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored **continuously** at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

June 20, 2000

P:\BEEI\Bureau\Common\CAMP\GCAMPR1.DOC

Appendix D

Anson Environmental, Ltd. Documentation

The second part of the soils investigation included the installation of eight (8) soil gas borings designated SG#1 through SG#8, (Figure 1). The purpose of the soil gas sampling is to further delineate the extent of soil contamination. At each soil gas boring location, vapor samples were collected at 20-feet, 25-feet and 30-feet below grade using Geoprobe equipment. A vacuum pump was used to draw soil vapor through dedicated polyethylene tubing and a photo-ionization detector measured the vapor readings. The PID readings obtained from each soil gas sampling location are presented in Table 15.

Based on the soil gas sampling, elevated PID readings were recorded at SG #4, SG #5 and SG #6 locations. These soil gas borings are located in the parking lot area behind the subject building and rear entrance of Imperial Cleaners.

2.2 Site-Specific Geology

During the installation of soil borings, monitoring wells and previous borings, the site-specific geological conditions have been established to a depth of 54-feet below surface grade. Refer to the following Figure 2 for the geologic cross-section of the subject property. The soil consists of mainly sand and gravel. Perched water is located approximately 30 feet below ground surface and another more significant clay layer is located approximately 48 feet below ground surface.

According to the United States Department of the Interior Geological Survey (USGS) for the Sea Cliff quadrangle, the elevation above sea level for the subject property is approximately 170 feet. According to the USGS water table contour map dated March-April 1984, the elevation above sea level for the Upper Glacial Aquifer water table beneath the subject property is approximately 25 feet. Therefore, the water table of the Upper Glacial Aquifer is approximately 145 feet below grade at the subject property. The direction of water flow is towards the northwest.

2.3 Perched Water Investigation - 1998

The investigation of on-site perched water included the installation and sampling of five (5) monitoring wells and four (4) Geoprobe borings. The monitoring wells were installed using hollow-stem augers and are constructed of 4-inch PVC (sch.40) with 10-feet of screen (0.010-inch slot size). The screened interval of the wells extends from approximately 40-feet to 50-feet below grade. The wells were installed according to the NYSDEC's high-specification monitoring well protocol, in which the annulus around the well is filled with grout. All drill cuttings (approximately 12 yards) were stockpiled on-site until they were disposed of off-site.

Each well was developed using a submersible centrifugal pump to withdraw approximately 10 well volumes of water. Following well development and prior to sampling the wells, each well was purged 3 to 5 well volumes using a Grundfos Redi-

Flo2 variable performance pump. The development water and purge water was disposed of on-site into DW#1.

The perched water samples collected from the monitoring wells were submitted to Environmental Testing Laboratories for analysis using EPA method 624. Refer to Table 16 for the analytical results of the perched water samples submitted by AEL. Field and trip blanks accompanied the perched water samples and were submitted for laboratory analysis as a part of quality assurance and control.

The perched water samples collected from the monitoring wells were split with the NCDH. Refer to Table 17 for the analytical results of the perched water samples submitted by the NCDH.

Based on the laboratory analysis of the perched water samples collected from monitoring wells, volatile organic contamination was identified at monitoring wells #1, #3, #4 and #5.

In addition to monitoring well sampling, AEL collected perched water samples from four (4) Geoprobe borings designated GP-1 through GP-4. (Figure 3). The purpose of this perched water sampling was to obtain a vertical profile of perched water quality. At each boring location, three (3) perched water samples were collected at discrete depth intervals and submitted for laboratory analysis using EPA method 624. Refer to Table 16 for the analytical results and sample depths of the Geoprobe perched water sampling.

Based on the analytical results of the perched water samples collected from the Geoprobe borings, the majority of volatile organic contamination was identified at the shallow sample interval of 30-32 feet and 32-36 feet depth below grade.

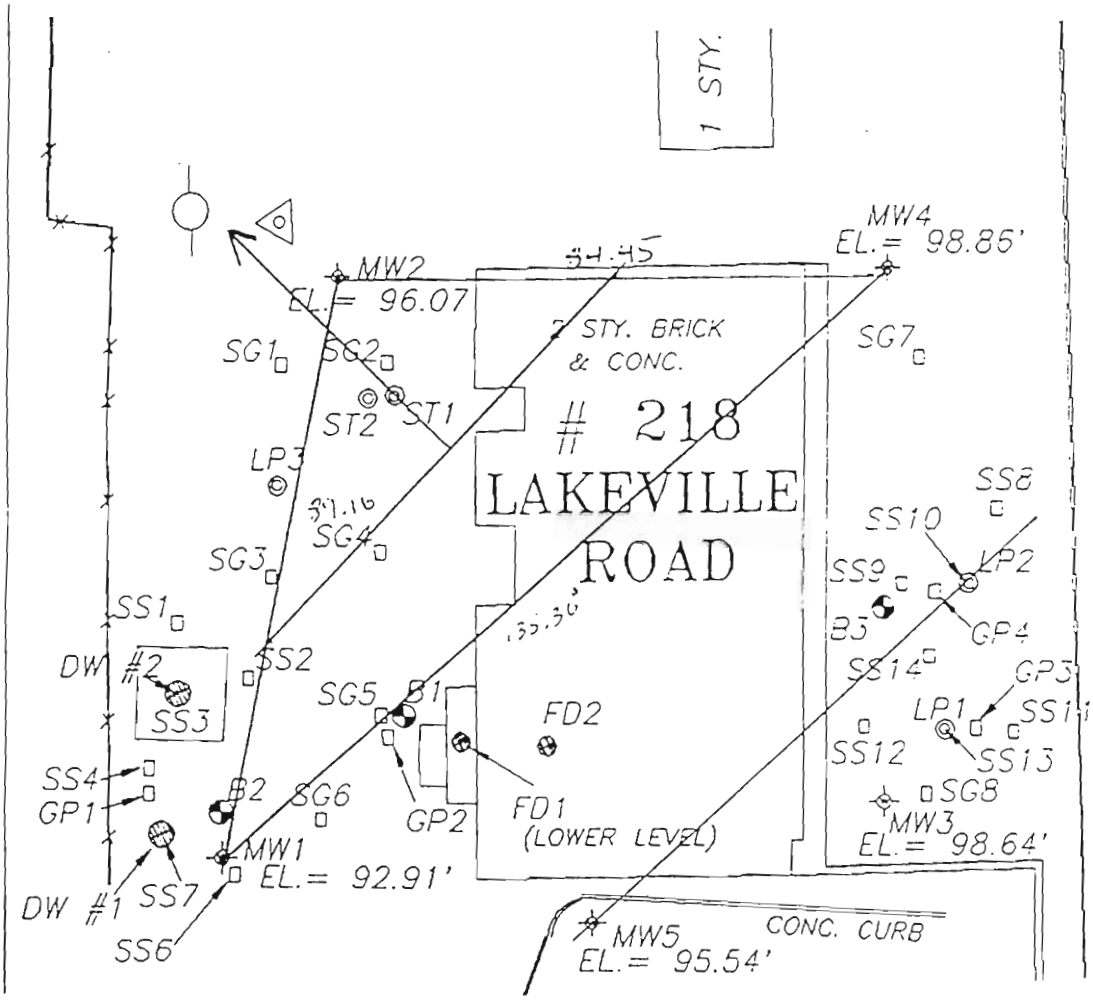
The direction of perched water flow is negligible. AEL collected depth to water readings from each monitoring well and had the elevation of each monitoring well surveyed by a New York State licensed surveyor. Based on these measurements, the direction of perched water flow is toward the northwest (Figure 3).

2.4 Extent of On-Site Contamination

Figures will be prepared to illustrate the vertical and horizontal extent of on-site soil contamination identified during soil sampling. The extent of on-site soil contamination will be illustrated in these figures that will be included in the supplemental investigation results report.

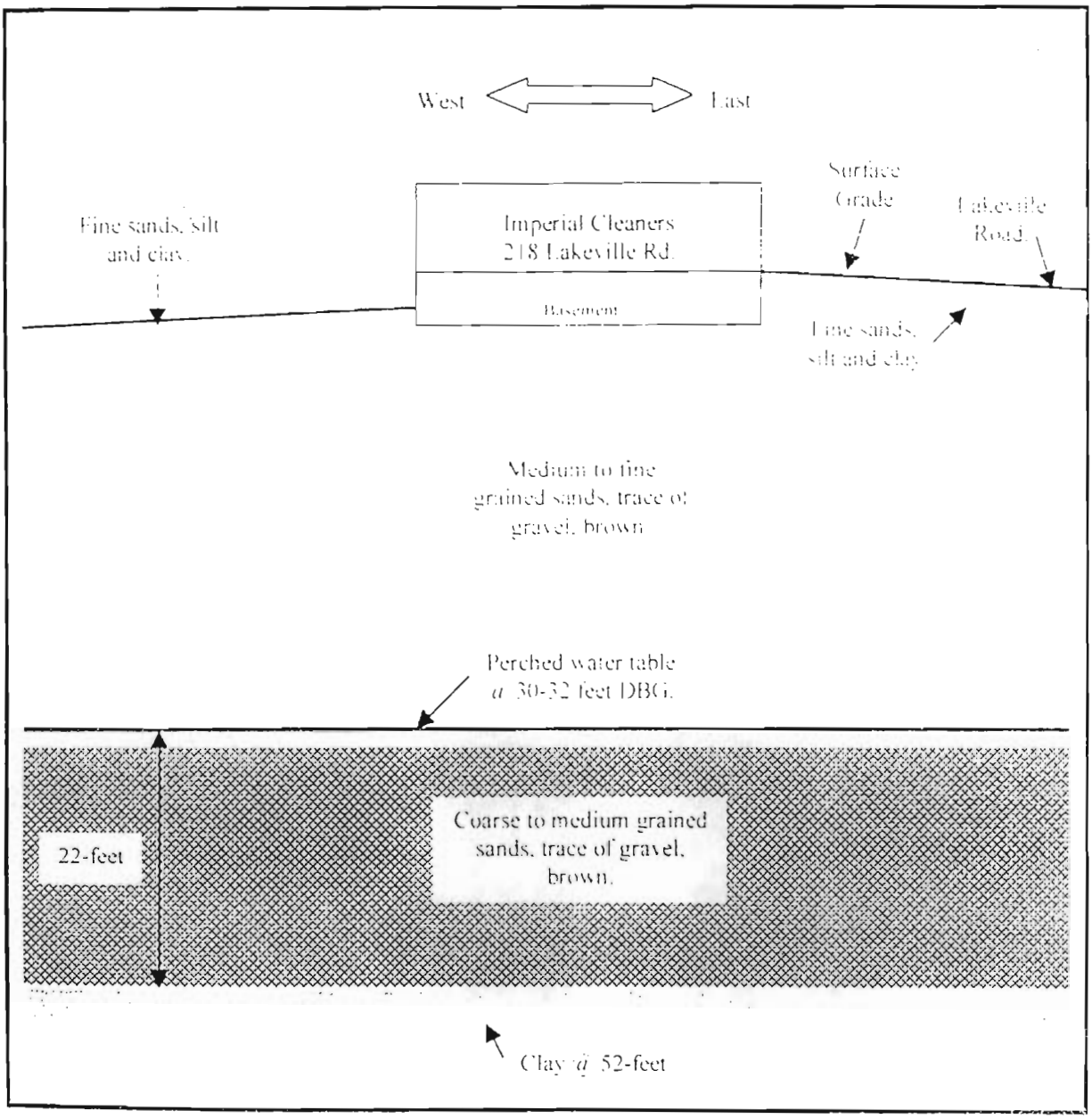
To avoid any potential contamination below the natural clay containment, the clay aquaclude was not punctured during investigations to date.

Figure 3 – Direction of Perched Water Flow.



Well #	Depth to Water	Relative Elevation	Head	Corrected Head
MW-1	28.51	92.91	64.40	.16
MW-2	31.83	96.07	64.24	0
MW-3	33.89	98.64	64.75	.51
MW-4	34.42	98.86	64.44	.20
MW-5	30.87	95.54	64.67	.43

Figure 2 – Cross-Sectional Diagram of Site Geology.



Appendix E

Site-Related Logs and Forms

BORING REPORT	WALDEN ASSOCIATES, INC. 16 SPRING STREET OYSTER BAY, NEW YORK 11771	SHEET 1 OF 1

DATE STARTED:	DATE FINISHED:	BORING NO.
CLIENT:		PROJECT NO.
PROJECT NAME & LOCATION:		PREPARED BY:
DRILLING CONTRACTOR:	LOGGED BY:	DRILLER:

EQUIPMENT	SOIL SAMPLER		AUGER	CORE BARREL	MON. WELL (MW)			DRILL RIG AND METHOD
	SS SPOON				CASING	SCREEN	CAP	
TYPE:								
SIZE:								
HAMMER WT./FALL				BIT				

SURFACE ELEVATION:		SURFACE CONDITIONS:	
WATER LEVEL AT	FT. AFTER HRS	FT. AFTER	HRS

DEPTH BELOW GRADE	SAMPLE				BLOWS / FT.	STRATA DEPTH	DESCRIPTION & REMARKS
	NO.	TYPE	DEPTH	MOISTURE			
5							
10							
15							
20							
25							

BORING REPORT	WALDEN ASSOCIATES, INC. 16 SPRING STREET OYSTER BAY, NEW YORK 11771	SHEET 2 OF 2
DATE STARTED:	DATE FINISHED:	BORING NO.
CLIENT:		PROJECT NO.
PROJECT NAME & LOCATION:		PREPARED BY:

DEPTH BELOW GRADE	OVA READINGS	SAMPLE TYPE AND NO	SAMPLE DEPTH FROM-TO	SAMPLE MOISTURE CONTENT	SAMPLE RECOVERY	BLOWS/6" OR CORE TIME	STRATA DEPTH ELEV.	DESCRIPTION & REMARKS TRACE=0-10% LITTLE=10-20% SOME=20-30% AND=35-50%
25								
30								
[illegible]								
[illegible]								
45								
50								
55								
60								

Facility/Project Name	Local Grid Location of Well _____ m. ☐ N. ☐ S. _____ m. ☐ E. ☐ W.	Well Number
Facility License, Permit or Monitoring Number	Grid Origin Location Lat. ___ ___ ___ Long. ___ ___ ___ or St. Plane _____ m. N. _____ m. E.	Date Well Installed (Start)
Type of Protective Cover: Above-Ground ☐ Flush-To-Ground ☐	Section Location of Waste/Source ___ ¼ of ___ ¼ of Sec. ___ T. ___ N, R. ___ ☐ E. ☐ W.	Date Well Installed (Completed)
Well Distance From Waste/Source Boundary	Location of Well Relative to Waste/Source u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	Well Installed By: (Person's Name & Firm)
Maximum Depth of Frost Penetration (estimated)		

Note: Use top of casing (TOC) for all depth measurements.

A. Protective casing, top elevation _____ m. MSL
B. Well casing, top elevation _____ m. MSL
C. Land surface elevation _____ m. MSL
D. Surface seal, bottom _____ m. TOC or _____ m. MSL

16. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

17. Sieve analysis attached? ☐ Yes ☐ No

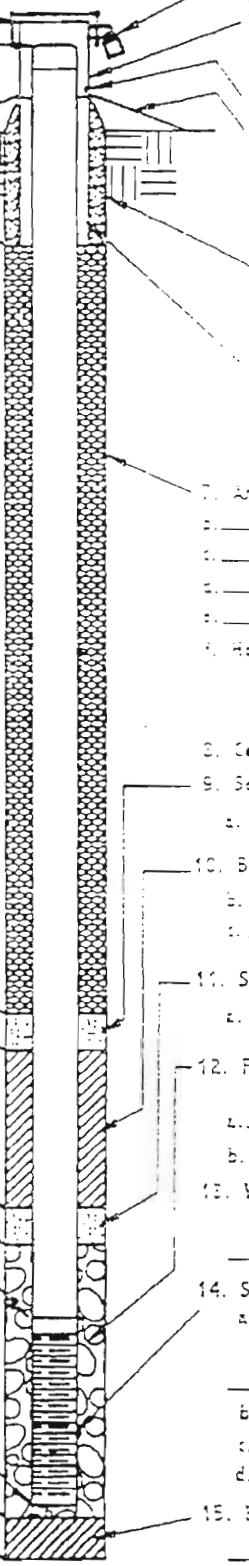
18. Drilling method used: Rotary ☐
Hollow Stem Auger ☐
_____ Other ☐

19. Drilling fluid used: Water ☐ Air ☐
Drilling Mud ☐ None ☐

20. Drilling additives used? ☐ Yes ☐ No
Describe _____

21. Source of water (attach analysis)
_____

E. Secondary filter, top _____ m. TOC or _____ m. MSL
F. Bentonite seal, top _____ m. TOC or _____ m. MSL
G. Secondary filter, top _____ m. TOC or _____ m. MSL
H. Primary filter, top _____ m. TOC or _____ m. MSL
I. Screen joint, top _____ m. TOC or _____ m. MSL
J. Well bottom _____ m. TOC or _____ m. MSL
K. Filter pack, bottom _____ m. TOC or _____ m. MSL
L. Borehole, bottom _____ m. TOC or _____ m. MSL
M. Borehole, diameter _____ mm.
N. O.D. well casing _____ mm.
O. I.D. well casing _____ mm.
P. 24-hr water level after completion _____ m. TOC or _____ m. MSL



1. Cap and lock? ☐ Yes ☐ No
2. Protective posts? ☐ Yes ☐ No
3. Protective casing:
a. Inside diameter: _____ mm.
b. Length: _____ m.
4. Drainage port(s) ☐ Yes ☐ No
5. Surface seal: Gravel blanket ☐
a. Cap Bentonite ☐
Concrete ☐
_____ Other ☐
b. Annular space seal: Bentonite ☐
Cement ☐
_____ Other ☐
6. Material between well casing and protective casing: Bentonite ☐
Cement ☐
_____ Other ☐
7. Annular space seal: a. Granular Bentonite ☐
b. ___ lbs/gal mud weight Bentonite-sand slurry ☐
c. ___ lbs/gal mud weight Bentonite slurry ☐
d. ___ % Bentonite Bentonite-cement grout ☐
e. _____ m^3 volume added for any of the above
f. How installed: Tremie ☐
Tremie pumped ☐
Gravity ☐
8. Centralizers ☐ Yes ☐ No
9. Secondary Filter: ☐ Yes ☐ No
a. Volume added _____ m^3 _____ Bags Size
10. Bentonite seal: a. Bentonite granules ☐
b. ☐ ¼ in. ☐ ½ in. ☐ ¾ in. Bentonite pellets ☐
c. _____ Other ☐
11. Secondary Filter ☐ Yes ☐ No
a. Volume added _____ m^3 _____ Bags/Size
12. Filter pack material: Manufacturer, product name & mesh size
a. _____
b. Volume added _____ m^3 _____ Bags/Size
13. Well casing: Flush threaded PVC schedule 40 ☐
Flush threaded PVC schedule 80 ☐
_____ Other ☐
14. Screen material: _____
a. Screen type: Factory cut ☐
Continuous slot ☐
_____ Other ☐
b. Manufacturer _____
c. Slot size: _____ in.
d. Slotted length: _____ m.
15. Backfill material (below filter pack): None ☐
_____ Other ☐

WELL SAMPLING LOG

CLIENT/PROJECT NO.	
WELL NO./OWNER	
SAMPLING POINT	
SAMPLE ID NO.	
SAMPLED BY	
DATE SAMPLED	TIME
WELL USE	
TOP OF CASING ELEVATION	
TOTAL WELL DEPTH	
WELL DIAMETER	
DEPTH TO WATER	
WATER TABLE ELEVATION (MSL	
FEET OF SUBMERGENCE	
VOLUME OF STANDING WATER IN WELL	
PURGING METHOD	
PURGING RATE (GAL/MIN)	
PURGING TIME (MIN)	
NO. CASINGS REMOVED	GALLONS
SAMPLE APPEARANCE	
ODORS OBSERVED	

	1ST VOLUME	2ND VOLUME	3RD VOLUME	4TH VOLUME
Ph				
TEMPERATURE (C)				
CONDUCTIVITY				

SAMPLES ANALYZED FOR	
LABORATORY	DATE SHIPPED
COMMENTS, LOCATION SKETCH	
WELL-HEAD SKETCH, ETC.	

MEMORANDUM

TO: Walden Staff and Office Manual

FROM: Karen Miranda

DATE: June 7, 2001

RE: Field Book Documentation

Field Book Documentation

In order to ensure consistent fieldwork documentation, the following guidelines has been put together. All personnel must utilize these guidelines when in the field.

1. Use a new, **BOUND** field book for each project number, or use an existing field book. If you use an existing field book, you must add the job number and field book number to the field book list.

2. Label the logbook cover and binding with the project name and number. Label inside cover with site information (name, address, contact(s), phone numbers, etc.). Copy-reduce site maps and location plans and attach to inside back cover. These will serve as convenient references when performing fieldwork.

3. Number **EACH** page of the logbook. At the top of each page, insert the job number, site name, date, and temperature/weather.

4. **ALL** entries must be made in ink. All cross outs must be initialed and dated.

5. The first entry should be who is onsite and one or two sentences describing the scope of work to be completed.

6. Date the beginning of each day's notes and use **MILITARY** time for each entry.

7. Try to maximize the use of each line. Cross out gaps and portions of blank pages so those notes cannot be altered.

8. Items that *must* be included in a logbook:

   - times of arrival and departure for **ALL** site personnel;
   - list of equipment used at site (Walden's and contractors);
   - description of daily activities;
   - locations of structures, USTs, ASTs, utilities, samples collected;

- conversations with client, contractor, and/or regulatory agencies (changes to scope of work, health and safety issues, and cost/payment issues are especially important);
- Note stand-by time for contractors and Walden staff;
- weather conditions;
- documentation that field instruments were calibrated and decontaminated;
- notations that photos were taken (important events).

9. Record the location of all sampling points by taking field measurements of fixed points. A minimum of three dimensions is necessary to relocate a sampling point. If possible, verify the dimensions of the items shown on site plans while in the field.

10. Print notes legibly so that others are able to read the logbook.

11. Prior to leaving the site at the end of the day, review the notes and adjust/correct as applicable.

12. Complete each day's notes with your signature.

13. Return the logbook to the project manager/group leader or to its proper place on the shelf at the completion of fieldwork.

A BOUND LOGBOOK IS THE LEGAL DOCUMENTATION FOR THE FIELDWORK PERFORMED AT A SITE. ALWAYS REMEMBER THAT YOUR NOTES MAY BE USED IN COURT.

Appendix F

NYSDOH Qualitative Human Health Exposure Assessment

New York State Department of Health
Qualitative Human Health Exposure Assessment

A qualitative exposure assessment consists of characterizing the exposure setting (including the physical environment and potentially exposed human populations), identifying exposure pathways, evaluating contaminant fate and transport.

An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: (1) a contaminant source; (2) contaminant release and transport mechanisms; (3) a point of exposure; (4) a route of exposure; and (5) a receptor population.

The source of contamination is the source of contaminant release to the environment (any waste disposal area or point of discharge); if the original source is unknown, it is the environmental medium (soil, air, biota, water) at the point of exposure. Contaminant release and transport mechanisms carry contaminants from the source to points where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (i.e., ingestion, inhalation, dermal absorption). The receptor population is the people who are or may be exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway are documented; a potential exposure pathway exists when any one or more of the five elements comprising an exposure pathway is not documented. An exposure pathway may be eliminated from further evaluation when any one of the five elements comprising an exposure pathway has not existed in the past, does not exist in the present, and will never exist in the future.

To perform a qualitative exposure assessment, site conditions are characterized to evaluate whether a site poses an existing or potential hazard to the exposed or potentially exposed population. Site characterization involves a review of sampling data for environmental media (e.g., soil, surface water, groundwater, air), both on-site and off-site, and an evaluation of the physical conditions of the contaminant sources or physical hazards near the site which may pose an additional health risk to the community.

Site contaminants are reviewed, and those selected for further evaluation are identified based upon consideration of the following factors:

Concentrations of contaminants in environmental media both on-site and off-site;

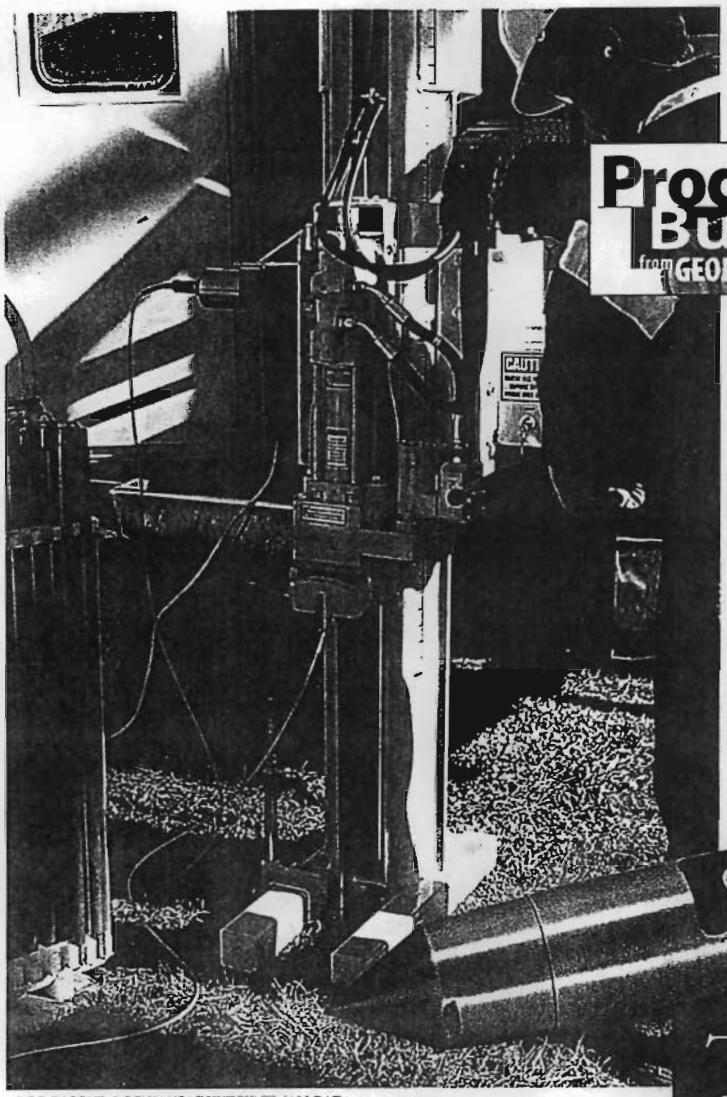
Field data quality, laboratory data quality and sampling design; and,

Comparison of on-site and off-site contaminant concentrations in environmental media with typical background levels

Appendix G

Geoprobe Systems Equipment Cut Sheets

Geoprobe's SC400 Soil Conductivity Probe: The Strong, Sensitive Type.



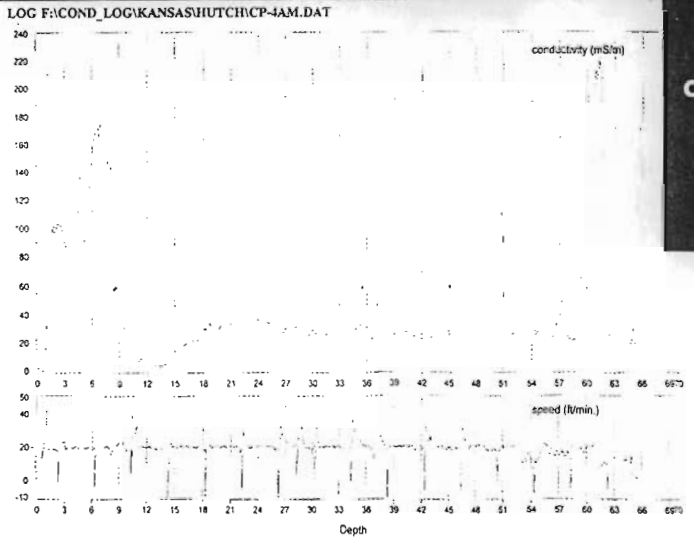
Product Bulletin from GEOPROBE SYSTEMS

Soil conductivity logging using percussion driven probes continues to increase in usage for site investigations. This increase can be attributed to the ease and speed with which logs can be made and the utility of these logs in distinguishing permeable (sand rich) zones from lower permeability silt or clay zones.

The equipment for performing soil conductivity logging also continues to improve, and the SC400 probe is at the forefront of this improvement. Geoprobe® Systems changed the structure of its original four-pole array model to yield a probe that is structurally sound ▶

Soil Conductivity logs can be run with any Geoprobe® machine, and are gaining wide usage in site investigation. ▶

The SC400: a radical change in driveable soil conductivity probing.



A typical SC400 log: sand zones have low conductivities while clay and silt zones have higher conductivities. The speed of probe advancement is also shown. ▶

Geoprobe® Systems

for the power to understand the subsurface

1-800-GEOPROBE

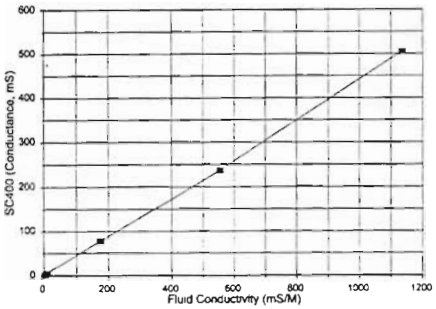
www.geoprobesystems.com

and robust, gives excellent sensitivity and linearity, and is less expensive. Retreiving soil conductivity logs is now easier than ever.

The SC400 is a four-pole "Wenner" array type probe; current is passed through the soil from the outer contacts of this array, voltage is measured on the inner two contacts. The robustness of this new probe is due to its structure: part of the probe's outer shell acts as the support for the insulated array section. **You won't bend this probe.** The outer surface of the probe is tapered to assure good contact with the soil. And the four-pole array compensates for any poor contact to measure true soil conductivity. The SC400 is specifically designed for use with Geoprobe® 1.25-inch probe rods.

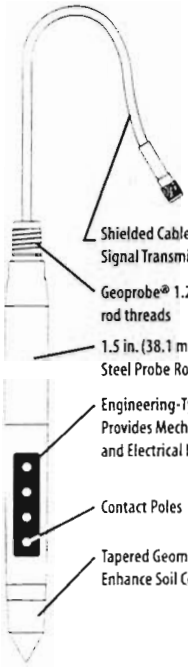
Additional literature and diskette demos on the use of soil conductivity for subsurface site investigation are available free of charge from Geoprobe® Systems.

CALIBRATION CURVE FOR SC400



Calibration of the SC400 is linear with excellent sensitivity for application in low conductivity soils.

SC400 Conductivity Probe Construction



SPECIFICATIONS

Length	15-in. (381 mm)
Diameter	1.5-in. (38.1mm)
Weight	6.26 lbs. (2.84 Kg)
Thread System	1.25-in. Geoprobe® Std.
Array type	4-pole Wenner*
Vertical resolution	1.75-in. (44.5 mm)
Measuring Range	0 - >1,000 mS/m

**The SC400 may also be used for dipole measurement.*

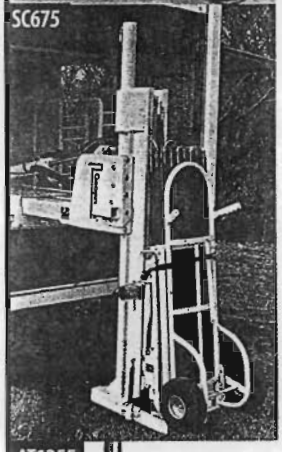
[Users of the Geoprobe® Systems Soil Conductivity measurement system who are switching to the SC400 from the SC200 may need to upgrade their SC acquistion software to include the SC400 calibration information. This upgrade is available free of charge from Geoprobe® Systems.]

GEOPROBE® SOIL CONDUCTIVITY SYSTEM

SC200, SC300, SC310, SC400

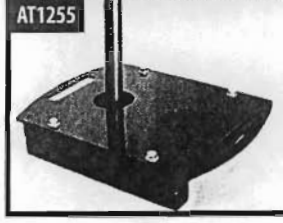
Several Geoprobe® conductivity probes, including an expendable model, are available.

SC675



Transport your tool string easily. The Rod Cart Carrier mounts to the Geoprobe® unit and folds piggy-back into the rear of your carrier vehicle.

AT1255



The rubber on Geoprobe's Probe Rod Wiper cleans rods as they are retracted from the subsurface.

Conductivity Wenner Probe, for use with 1.25-in. probe rods	SC400
Probe Test Jig for SC400 Probe	SC463
Stringpot Mounting Bracket	SC110
Stringpot Bottom Clamp	SC111
Stringpot Piston Weight	SC112
Soil Conductivity Instrumentation Case	SC150
Direct Image Software	SC151
Power Inverter	SC152
Extension Cord, 25 ft.	SC153
Stringpot	SC160
Stringpot Cordset	SC161
Probe Cordset Kit	SC165
Probe Rod Cart, holds 24 rods with 1.25-in OD	SC610
Rod Cart Carrier	SC675
Slotted Drive Cap for 1.25-in. probe rods	AT1202
Slotted Pull Cap for 1.25-in. probe rods	AT1203
Probe Rod Wiper for 1.25-in. probe rods and 1.5-in. tools	AT1255

For a complete Soil Conductivity Tools listing, refer to Geoprobe's 1998-99 Tools and Equipment Catalog and/or the Geoprobe® Price List.

Product Bulletin from GEOPROBE SYSTEMS

Geoprobe®
SC400
Soil Conductivity
Probe

No. PBSC40398

To place an order call
1-800-GEOPROBE
(1-800-436-7762)

www.geoprobesystems.com

GEOPROBE® SYSTEMS
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601 N. Broadway Salina, KS 67401
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Tel: 785.825.1842 Fx: 785.825.2097

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EASTERN REGION
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SOUTHEASTERN REGION
3679 N. Suwannee Point
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13714 Bayou Terrace Dr.
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Tel: 225.675.6395 Fx: 225.675.6746

WESTERN REGION
1448 Kramer Ridge
Reedley, CA 93654
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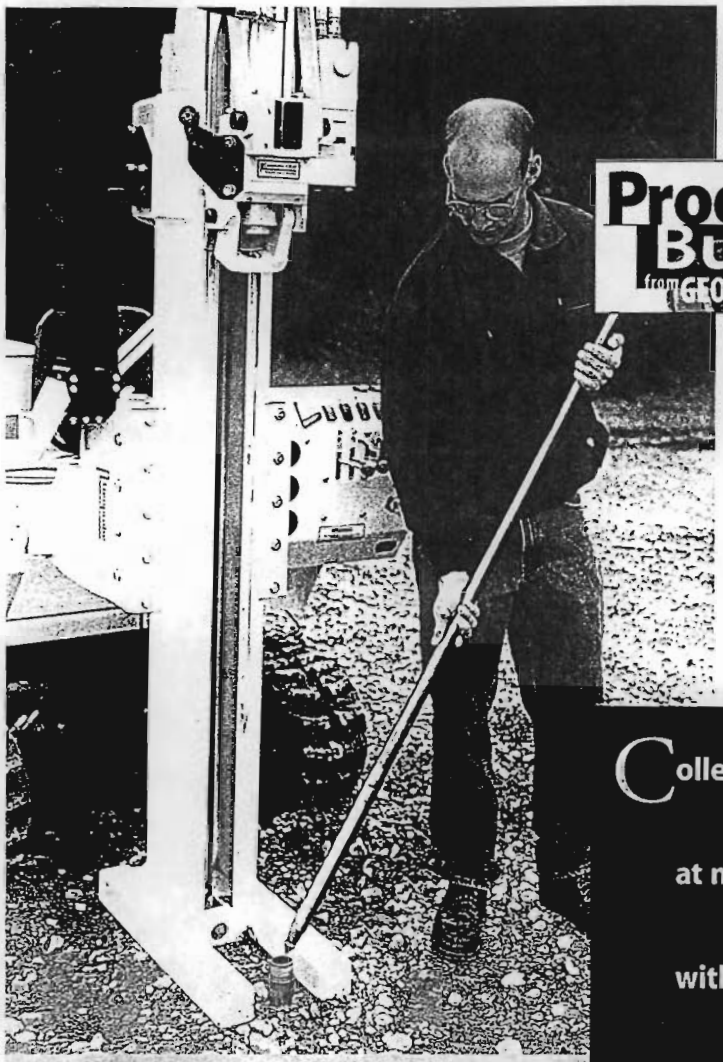
Geoprobe® Systems

Vertical Profiling Made Easy With Geoprobe's Groundwater Profiler



Geoprobe's Groundwater Profiler is lowered through 2.125-in casing to the desired initial sampling depth to prevent the screens from clogging. ▶

Product Bulletin from GEOPROBE SYSTEMS

Geoprobe's newest groundwater sampling tool – the Groundwater Profiler – enables your field operator to conduct vertical profiling of groundwater quality from a discrete interval using 6 in. or 12 in. (152 or 305 mm) screens. Profiling can be conducted to determine vertical distribution of contaminants, especially in sandy or coarser grained aquifers, as the tool is advanced incrementally into the formation. There's no need to retract the Profiler after each sample is collected. Purging water through the Profiler with a peristaltic pump as it ▶

Collect water samples at multiple depths without pulling the tool string.

Groundwater Profiler parts include an expendable point holder and expendable drive point allowing the user to grout the probe hole while removing the Profiler from the ground. A solid drive point is also available for applications that don't require grouting. ▶

Geoprobe® Systems

for the power to understand the subsurface

1-800-GEOPROBE

www.geoprobesystems.com

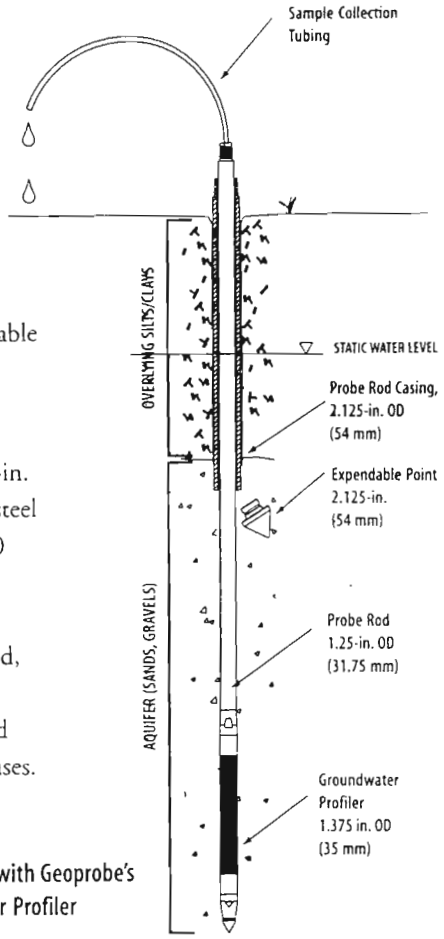
is advanced minimizes clogging of the screen.

The Profiler allows the user to not only obtain high integrity, discrete interval samples over a depth profile, but also lets the user **conduct hydraulic conductivity tests at each sampling depth** (i.e. slug tests) to determine the most probable contaminant flow paths.

Rather than small "port holes" that may be prone to clogging, the larger screen area of this tool provides a much greater surface area for the flow of groundwater into the system. This tool is 1.375 in. (35 mm) in diameter and can be telescoped through Geoprobe's 2.125-in. (54 mm) probe rods.

Development of the screen can also be conducted at each sampling depth to lower turbidity when required. Bottom up (positive pressure) grouting can be conducted when an expendable point is used.

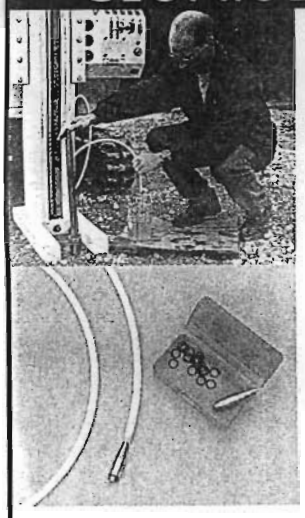
Geoprobe's Groundwater Profiler has both 6- and 12-in. (152 or 305 mm) stainless steel screens with 0.004-in. (0.10 mm) slot width which minimizes turbidity. The screens can be easily changed, and the Profiler is easy to disassemble for cleaning and decontamination between uses.



Sample Collection with Geoprobe's Groundwater Profiler

[Initially Electrical Conductivity (EC) logs or soil sampling should be completed prior to using the Groundwater Profiler to define site lithology and to determine appropriate depths for retrieving water samples. This minimizes the possibility of fine-grained materials clogging the screen.]

GEOPROBE® GROUNDWATER PROFILER



Since the drive head of the Profiler has an adequate ID, a tubing bottom check valve can be lowered into the screen area allowing for flow development. The Profiler comes with two Tubing Adapters [GP 13521] and a package of O-Rings [GW1515R].

Expendable Point Holder	GP 12956
O-Rings for Expendable Point, Pkg. of 25	OR AT14R
Center Stem, 6 in. length	GP 13066
Center Stem, 12 in. length	GP 12566
Drive Head, 1.25 in. pin	GP 12567
Drive Point, solid, 1.375 in. OD	GP 12568
Drive Point, expendable, 1.0 in. OD	AAC AT14
Tubing Adapter	GP 13521
O-Rings for Tubing Adapter, Pkg. of 25	OR GW1515R
Screen, stainless steel, 6 in. x 1.375 in. OD	GP 13062
Screen, stainless steel, 12 in. x 1.375 in. OD	GP 12557
Groundwater Profiler Kit, 6 in. screen, solid point	GP 14401
Groundwater Profiler Kit, 12 in. screen, solid point	GP 14402
Groundwater Profiler Kit, 6 in. screen, expendable point	GP 14403
Groundwater Profiler Kit, 12 in. screen, expendable point	GP 14404

Tubing Adapter and O-Ring [GP 13521 and GW1515R] | Drive Head [GP 12567] | Stainless Steel Screen 6 in. or 12. in. [GP 13062 or GP 12557] | Center Stem 6 in. or 12 in. length [GP 13066 or GP 12566] | Solid Drive Point [GP 12568]

Product Bulletin for GEOPROBE SYSTEMS

Geoprobe® Groundwater Profiler

No. PBGP1099

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Geoprobe Systems

Appendix H

NYSDEC Data Usability Summary Report Guidelines
&
Walden Resumes

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.

Revised 09/97

JOSEPH M. HEANEY, PE
PRINCIPAL-IN-CHARGE

PROFILE

Mr. Heaney directs and conducts environmental compliance audits for industrial clients and law firms and provides consulting services to major construction contractors on health and safety planning and environmental compliance. He has an extensive background in underground storage tank (UST) design and corrective action projects. He is involved in the design of soil and groundwater remediation systems associated with failed USTs and aboveground storage tanks and has taught seminars on state and federal UST regulations. He has had extensive experience managing NYCRR Part 360 Permit negotiations and Consent Order Terms and Conditions. Mr. Heaney is an expert in health and safety issues related to 29 CFR 1910.120 requirements. He has taught yearly 8–hour refresher, 40-hour, and Supervisors HASP courses and conducted orientation training for project site workers.

EXPERIENCE

- Conducts site surveys to define the nature and extent of contamination and cleanup responsibility.
- Directs site investigations and remediation projects.
- Responsible for contractor performance and supervision of field oversight and worksite health and safety programs including confined space entry work.
- Directs and conducts site investigations associated with failed USTs and closures of solid waste disposal facilities.
- Directs and conducts ASTM presale/repurchase environmental assessments.
- Directs and conducts regulatory compliance audits.
- Develops and institutes UST compliance programs including registrations, testing, remedial soil removal, excavation, and sampling.
- Models wastewater treatment processes and their effect on receiving water quality.
- Conducts field sampling plans, quality assurance programs, and health and safety plans.

EDUCATION

Master of Science in Environmental Engineering
Manhattan College (1987)

Bachelor of Science in Civil Engineering
Lafayette College (1985)

REGISTRATIONS

Professional Engineer
New York, New Jersey, Connecticut and Pennsylvania
Certified Safety Professional - by Exam April 1995

SELECTED PROJECTS

Municipality, NY – Conducted detailed survey of 90 USTs owned by a town in New York. Developed and coordinated a tank compliance program designed to register, test, remove, close, and design and oversee the construction of new tank facilities. Negotiated tank closure criteria with the state based on risk. Coordinated a compliance program which includes registration, scheduling and conducting leak tests, bidding and oversight of UST removal, and design and

construction oversight of new tank facilities. Coordinated all aspects of the program with various regulatory agencies involved to indicate a thoughtful cohesive five-year management approach.

Oil Refinery, NM – Managed a Phase I CERCLA site investigation of a 42–acre site. Prepared a work plan, a quality control management plan, and a site–specific health and safety plan (HASP). Coordinated a two–month field effort with tasks including soil gas survey, magnometer survey, soil and groundwater characterization, and surface water and sediment survey. A large portion of the work involved confined space entry and work in Level B PPE. The site investigation concluded that the site can be kept off the NPL list.

School District, NY – Conducted a Phase II field investigation to determine the extent of on–site contamination from tannery waste. Developed quality assurance and health and safety plans, coordinated field activities, reviewed analytical data, and prepared data validation reports. The study results were used to direct minimal removal action and remove the site from NYSDEC 2A status.

Land Developer, NY – Negotiated a consent order related to investigation, characterization, and closure of an illegal solid waste disposal site within a housing development. The developer's contractor had over–excavated the site and replaced salable material with approximately 100,000 cubic yards of C&D. Coordinated a work plan to characterize the site material to show that it met the state's definition of clean grade adjustment fill and it could be left in place.

Class I Railroad, Various Sites – Managed site investigations of numerous railyards characterized by failed USTs and ASTs. Primary contaminants of concern are industrial solvents and diesel fuel. Negotiated site closure criteria with state regulators. Designed treatment systems to conduct site remediation including soil roasting, bioremediation, design of barrier and product recovery systems, and dissolved phase pump–and–treat systems. Work allowed railroad to close out the site and sell the properties.

Municipality, NY – Prepared a health and safety plan, a confined space plan, and a Bloodborne pathogen protection plan for municipal employees. The plans were developed after site tours, interviews with key employees, and review of existing policy. Conducted 8–hour refresher training of all Hazwoper–trained personnel in accord with 29 CFR 1910.120 Subpart E requirements. Evaluated chemical storage and inventory records at 17 facilities and prepared 1993 SARA Title III Tier II reports.

Bulk Fuel Terminal Operator, NY – Designed and coordinated a confined space/HASP for construction activities for a bulk fuel storage facility. Plans were written to minimize the impacts that the work would have on overall project costs while providing the highest level of worker protection. The confined space entries were 12–foot deep pits excavated into jet fuel–contaminated soil to make structural tie–ins. Provided one–day training for the HASP to pertinent personnel.

Municipal Landfill Cap, NY – Prepared site–specific HASP and confined space entry plans associated with the capping of a hazardous waste municipal landfill and trained contractor personnel in the use of these plans. The plans addressed worker training, use of subcontractors, hazard identification and control,

emergency contingency planning, and use of PPE. The initial orientation training was given to laborers and supervisory staff while specific detailed training on air monitoring instruments was given to delegated contractor personnel. The HASP and confined space plan scopes were evaluated for thoroughness, negotiated with NYSDEC and USEPA, and adopted with minimal delay. Conducted periodic reviews of workplace conformance with HASP requirements at contractor request.

Private Developer, CT – Evaluated potential hazardous waste site for developer involved in residential projects. Developed a site–specific health and safety plan for developer personnel, on–site personnel, and subcontractors to conduct a preliminary evaluation and removal action. Provided one–day orientation training to site personnel on the HASP. The HASP was conducted and materials were characterized as solid waste, excavated, and removed from the site with minimal deviation from project scheduling or costs.

Financial Institution, NY – Performed Phase I and Phase II audits at a metal fabricating facility. Conducted soil gas sampling, surface and subsurface soil sampling, drum sampling, soil excavation, and UST removals. Prepared specifications and bid documents for remedial contractors. Coordinated the staging, overpacking consolidation, and disposal of 250 55-gallon drums. Work returned the property to salable condition.

Textile Finishing Facility, NJ – Conducted an ECRA site investigation, which included soil and groundwater sampling and UST removals and designed a petroleum product recovery system. Provided oversight services during remediation activities.

Private Residence, NY – Managed the removal of a leaking UST from this property, which released substantial amounts of heating oil to the subsurface. Negotiated a scope of work with NYSDEC to allow for cost–effective closure of NYSDEC spill file. Designed a remediation system to recover free product beneath resident's basement floor and removed 150 tons of contaminated soils in backyard.

Metalworking Facility, WI – Evaluated an alternative water supply system to provide potable water to residents where groundwater was contaminated. Designed a water distribution system and developed capital and annual operation and maintenance costs.

Electronics Manufacturer, NY – Conducted a sampling program to characterize wastewater flow. Designed a tertiary wastewater treatment plant to meet the state's groundwater discharge requirements. Prepared construction drawings, specifications, and bid documents, provided construction oversight, and developed operations and maintenance manuals for this wastewater treatment plant.

Paper Mill, NJ - Conducted a wastewater-sampling program to characterize flow and containment loading for mill expansion program. Designed a secondary treatment system to allow the facility to continue to meet NJDES permit requirements. Prepared construction specifications and bid documents and provided construction oversite during the installation of the 6-MGD facility.

Investment Firm, CA - Performed Phase I audits at six facilities which manufactured airplane parts including forged aluminum assemblies, fasteners, wire bundles and sanitary disposal systems. Phase II audits were performed, based on information from the initial investigation. The results of Phase II sampling were used to aid the client in negotiating a favorable sales price for the facilities.

Pulp and Paper Mill, MA - Performed a pilot study to determine the fate of VOCs in the mill's wastewater treatment system. Study involved four wastewater bench scale units to assess degradation of "sticky" removal solvents in the mill's activated sludge treatment process. Study results indicated that 95% of solvents were biodegraded and were published by USEPA.

Chemical Manufacturing Company, NJ - Implemented a creek sampling plan to characterize metal residuals in sediments near four Superfund sites. The study goal was to evaluate creek hydrodynamics and sediment transfer scenarios and assess PRP contributions to containment found in these wetlands.

Metalworking Facility, PR - Evaluated low-cost wastewater treatment alternatives. Designed an overland flow treatment system to remove BOD and TSS. The system included discharge diffusers, a recovery/stormwater retention pond, a recycle pump and piping, and flow monitoring and chlorination facilities.

Pulp and Paper Mill, KY - Performed a waste stream characterization study and analyzed treatment system efficiency, recommending curtain baffles and an aeration system. Prepared detailed specification and engineering drawings, which allowed mill personnel to bid the construction project.

Pulp and Paper Mill, PA - Performed a lagoon sludge characterization study to evaluate remedial alternatives including on and off-site land filling. Work included preparation of a subsurface investigative work plan to collect representative sludge sample, a groundwater-monitoring program to assess leakage from the lagoon and a geophysical survey to locate bedrock fractures. The study result allowed construction of an on-site solid waste landfill and passed on considerable savings to the mill.

Mining Facilities, Multi Site (Canada and US) - Conducted detailed Phase I and compliance audits of several evaporated salt and subsurface salt mining operations over a six-month period. The audit results were used to negotiate indemnification claims against the former parent company. The results were also used to produce an environmental lender report for principal bankers involved in lending the company over $100 million dollars for the purchase.

Sand and Gravel Company, NY - Aided in NYCRR Part 360 Consent Order negotiations to reduce NYSDEC fines and to provide favorable terms for compliance. Developed investigative strategy, which focused on reclamation of the site with minimum evasive work or removal actions. Prepared work plan, HASP and sampling, and analysis plan for this project.

Cemetery, Queens, NY - Conducted detailed negotiation with NYSDEC Region II chief solid waste engineer to void a work plan prepared by others, which suggested a full-scale removal action for this illegal solid waste fill location. Developed a closure scenario, which follows NYCRR Par 360 allowances to

allow on-site non-hazardous materials to remain in place. The plan took into consideration New York State cemetery rules and operational considerations. The justification for relaxed investigative procedures was a detailed filling history recorded by cemetery personnel which was made part of the revised work plan. The investigation is ongoing.

Water District, NY – Developed a water supply master plan, which included a Hardy Cross analysis of water distribution system and a study of lead in the distribution system. Performed an analysis of water rates and designed a granular activated carbon water treatment system.

Water District, NY – Developed a water rate study to balance revenues with costs over a five-year period, designed an automatic telemetry system to transmit well operational data to a central control area. Designed an air stripping treatment unit to remove TCE from three wells.

Municipality, NY – Designed air stripping water treatment and well upgrades for four pumping stations in this water district impacted by a significant TCE plume.

Water District, NY – Designed air stripping water treatment for four pumping stations.

Water District, NY – Designed a granular activated carbon water treatment plant for this water district to remove PCE.

Phase I Audit, Lake Grove, NY - Conducted a Phase I Audit of this 94 area open space to assess banks potential liability, which would result if the bank were to foreclose on the property. Primary issues on the property was illegal dumping of asbestos and solid waste. Arranged for subcontractor to collect and remove solid waste and to construct earthen berms around the property to stop this problem in the future. The audit results, quantified the banks risk and allowed it to knowingly proceed with foreclosure.

Phase I Audit, Hicksville, NY - Conducted an ASTM site assessment of this former electroplating operation located on a 14-acre site. Audit results indicated unregistered USTs and unresolved subsurface clean up of plating wastewater, which had leaked through the facility's wastewater. Negotiated with seller to break a sale contract so that client would not face potential subsurface contamination after property transfer.

Multi-facility Audit - Conducted a Phase I assessment of this major manufacturer of flooring products, which included over 950 retail facilities and four production locations. The assessment involved compilation of information on each retail facilities' former landuse from which a summary of 50 worst-case facilities were developed. These facilities were either former dry cleaners or gasoline service stations. Ten of these facilities were physically audited along with the four production facilities. The audit results were used by the lending institution to assess risk in the restructuring of corporate debt.

Photographic Film Manufacturer, NY – Conducted NYSDEC first multimedia consent order required compliance audit of this 1,500,00 square-foot manufacturer. The facility produced tri-acetate film base and place emulsion coating on film base and paper products. The audit was performed over 15 days

KAREN SAVO-MATTHEWS
PROJECT MANAGER

PROFILE

Ms. Savo-Matthews develops site investigation work plans and coordinates field and reporting activities for RI/FS and Phase II investigations. She conducts soil, groundwater and soil vapor investigations at commercial and industrial facilities, and supervises well drilling, well installation and soil boring activities. She develops sampling protocols, collects and analyzes environmental samples and evaluates data in accordance with site-specific work plans. Ms. Savo-Matthews supervises the use of the portable gas chromatograph (PGC), and interprets PGC data to describe and evaluate site conditions. She provides litigation support regarding hydrogeologic, laboratory and PGC analytical data.

EXPERIENCE

- Develops and directs soil, groundwater and soil vapor sampling programs to define the extent and characteristics of contamination.
- Investigates and remediates hydrocarbon contamination in soil and groundwater related to leaking underground storage tanks.
- Interprets groundwater conditions in connection with environmental audits.
- Develops and maintains hydrogeologic and chemical databases in DB/3D, and assists in the production of three-dimensional subsurface models.
- Prepares, negotiates, and oversees the implementation of project specific field sampling plans and quality assurance project plans.
- Utilizes laboratory quality and portable gas chromatograph instruments to analyze groundwater, soil and air samples.
- Utilizes air-monitoring instrumentation to evaluate site conditions and health and safety compliance.
- Serves as site safety officer for HAZWOPER and confined space entry projects.
- Serves as project manager and implements Phase I audits conducted for banking clients to ensure that problematic property is not transferred.

EDUCATION

Bachelor of Science in Geology
Rensselaer Polytechnic Institute (1992)

SELECTED PROJECTS

Municipality, Old Bethpage, NY - Project Manager for a quarterly monitoring program, which was established in order to assess the progress of the groundwater cleanup. Maintained database of hydrogeologic and chemical data. Used database to create three-dimensional images used in a cost recovery action. Participated in conducting a detailed chemical inventory of all Town facilities.

on site as a third party independent consultant. Area of audit concern included: RCRA, SARA Title III, OSHA issues, air issues, TSCA, PCB storage, pesticides and herbicides, wastewater and stormwater, and detailed review of sewer cross connections. A significant punch list of compliance items was developed and a compliance scheduled established. This schedule allowed the facility to fully disclose its compliance issue while avoiding further enforcement action.

Metal Finishing Facility, NY - Provide litigation support services for retained environmental counsel in this PRP cost allocation issue. The facility had produced numerous military and automotive components over its 100+ year operations. Primary unit operations included metal shaping and machining, electro-plating, and product assembly. The goal of the project was assessment of contribution to on-site wastes by the current and former owner so that a remediation cost settlement could be reached. Units produced were weighted by size and were used to allocate plating waste disposal costs and groundwater remediation of a TCE plume.

Remedial Response Contractor, NY - Prepared a detailed corporate health and safety policy manual for this remediation contractor in accord with 29 CFR 120 requirements. Contractor's key personnel were interviewed to review standard operating procedures, type of work performed, and job responsibilities. The policy included a respiratory protection plan, fit testing requirements, and standard work practices. The plan was prepared in five working days based on need.

Private Landfill, NY - Prepared a site-specific health and safety plan for the remediation and capping of this NYSDEC class 2A inactive hazardous waste landfill in accord with 29 CFR 1910.120 requirements. The project work included level B drum sampling, consolidation and loadout, excavation and relocation of approximately 40,000 cubic yards of waste material, installation of a venting system and placement of a HDPE cap. The project planning included confined space planning and dust monitoring. Acted as the health and safety officer for the project.

Corporate Client, SC - Conducted a human health based risk assessment following USEPA procedures of pond sediments contaminated with PAHs, PCBs, and pesticides. The goal of the assessment was to judge if dredging and upland disposal of spoils presented greater risk to human health and the environment then leaving sediments in place. To aid the study, prepared sediment and biota sampling plan to generate necessary data of pond conditions. Presented risk assessment results to regulators, which allowed closure of the pond sediment issue with out costly dredging.

Public School System, NY - Conducted a potable water survey of sinks and drinking water fountains to assess the extent and source of elevated lead and copper. The study involved a risk assessment to demonstrate minimal risk to the Board of Education. The results of sampling indicated a localized problem within the school which was traced to improperly grounded electrical service which produced stray electric current and degraded piping and plumbing fixtures. Retained a plumber to replace severely degraded plumbing fixtures.

Illegal Landfill. Staten Island. New York - Implemented a site investigation workplan which was prepared to identify the extent of contamination and the impact to human health and the environment at this illegal landfill. The fieldwork included: the installation and sampling of a monitoring well network, collection of water level elevation measurements, and collection of surface water and sediment sampling of a wetland located adjacent to the property. Based on the results of the investigation, alternative closure plans were recommended to the client.

Landfill. Chester. New York - Conducted a supplemental site investigation to further evaluate the nature and extent of contamination of illegally placed fill material. Fieldwork included redeveloping and sampling the existing monitoring well network, excavating test pits, sampling sediment and surface water from the downgradient wetland, and conducting an explosive gas investigation. Based on the results of the investigation a Conceptual Closure Plan was prepared and successfully negotiated with the New York State Department of Environmental Conservation.

Landfill. Glendale. NY - Prepared and negotiated the scope of work for groundwater and an explosive gas investigation with the New York State Department of Environmental Conservation.

Pre-Condemnation Site. Merrick. New York - Supervised the removal of five large capacity underground storage tanks. Designed a monitoring well network to determine local groundwater flow direction, and the extent of hydrocarbon contamination in groundwater. Successfully negotiated a limited remedial action consisting of the injection of Oxygen Release Compound (ORC) in to the subsurface using a geoprobe unit. ORC injection created a barrier preventing contaminated groundwater from migrating off-site, and increased the biodegradation of contaminants on-site.

Service Station. Yonkers. NY - Conducted a hydrogeologic investigation to determine the impacts of leaking underground storage tanks to the underlying fractured bedrock aquifer. Installed four bedrock monitoring wells and negotiated a remedial action with the New York State Department of Environmental Conservation Region III consisting of the installation of ORC socks.

National Laboratory. Upton. NY - Oversaw the collection of soil and groundwater samples. Analyzed groundwater samples for EPA Method 502.2 using purge and trap, dual PID, and ECLD methodologies.

Service Station, Merrick, NY - Conducted a geoprobe investigation in order to define the off-site extent of hydrocarbon contamination. The PGC was used on-site to analyze groundwater samples for selected hydrocarbons. Obtaining real-time data eliminated the need to collect numerous samples for laboratory analysis, and also reduced the number of borings needed to define the affected area. Oxygen releasing compound (ORC) was placed in several permanent monitoring wells to enhance microbial degradation.

Munitions Manufacturer, Eau Claire, WI - Conducted an extensive soil vapor survey at this CERLA site. Supervised the use of several PGCs analyzing waste and air samples for twelve volatile organic compounds. Prepared the field sampling plan for the Remedial Design phase of the investigation.

Railroad Facilities, Various Sites - Conducted aquifer testing programs. Supervised soil boring programs, monitoring well installations, and test pit excavations. Reviewed data collected during investigations and prepared reports summarizing findings. Prepared site-specific health and safety plans.

STEPHEN J. BYATT
PROJECT HYDROGEOLOGIST

PROFILE

Mr. Byatt implements subsurface investigative work to assess the nature and extent of contaminant releases. He collects environmental samples from soil, groundwater, sediments, and wastes. He directs well drillers in the drilling and construction of monitoring wells during well drilling. He has been responsible for health and safety procedures and practices. He conducts detailed RCRA inspections to insure compliance. He has served as a site safety officer on various environmental projects. Mr. Byatt is an ArcView operator with map generation and modification skills.

EXPERIENCE

- Responsible for implementing quarterly groundwater monitoring and sampling at NYSDEC STIP corrective action projects.
- Provides geographic information and technical advice using ArcView, and AutoCad.
- Directs environmental sampling in accordance with the firm's Quality Assurance Project Plan (QAPP) guidelines.
- Oversaw and implemented emergency spill response and mitigation and coordinated long-term remedial projects associated with UST releases.
- Responsible for contractor performance of HASP procedures and supervises field personal in Hazwoper procedures.
- Develops site investigation work plans and coordinates drilling and laboratory services.
- Provides oversite and coordination of UST tightness testing scheduled at various facilities on a periodic basis.
- Experienced GIS Specialist who is familiar with the application of GIS database to municipal clients.

EDUCATION

Bachelor of Science in Geology
Lehigh University (1997)

SELECTED

PROJECTS

Tightness Test Oversite, Various Sites Town of Hempstead – Has coordinated tightness testing required for continued operation of UST's located throughout the Town of Hempstead. All work is called out on an annual basis in accord with the Town tank management plan. Coordination work includes ensuring the tanks are filled to capacity, overflow tubes are removed form the tanks, tightness testing contractor is scheduled and regulatory agencies are notified. Has coordinated tightness testing since joining Walden Associates.

Quarterly Groundwater Sampling, NY - Performed purging and sampling of groundwater monitoring wells. Develops piezometer water table maps, updates site specific database of sampling information. Compiled analytical data for wells and wrote NYSDEC required quarterly report on sampling.

Abandoned Industrial Facility, NY - Developed work plan to remove underground storage tanks and evaluate soil and groundwater impacts from on-site drum storage. Directed excavation contractor in removal of 500 cubic yards of contaminated materials.

Cemetery Property, NY - Supervised and coordinated an off-site geoprobe subsurface investigation to sample soil gas and groundwater impacted by a buried gasoline tank leak. Groundwater samples were analyzed on site by a mobile laboratory to trace the extent of a fast migrating plume. Soil gas results were utilized to document no impact on adjacent residential dwellings. Groundwater results were used to sight a total of six monitoring wells.

Sanitation Transfer Station, NY - Supervised and coordinated the placement of 36 geoprobe installed temporary piezometers to define the extent of free phase petroleum resulting from a gasoline transfer pipe leak. The floating product in piezometers was monitored over the course of one week to define the location of the free phase. Supervised the installation of six groundwater-monitoring wells within the free phase to be used for product recovery efforts.

Vehicle Maintenance Facility, NY - Coordinated and oversaw the removal of eight underground storage tanks. Collected closure samples to meet NYSDEC STAR criteria. Directed excavation contractor in the removal of contaminated soil from the location. Conducted and documented a quarterly groundwater monitoring sampling program for the facility's six monitoring wells. Compiled both soil and groundwater sampling documentation in accord with NYSDEC STIP requirements.

Local Municipality New York – Currently developing several map production aspects for local municipality GIS efforts. Work is being done in Arc View utilizing NCDPW base map provided under license agreement. These include the acquisition of digital geographic data;

graphic specifications, and review of digital map data integrity. Work product has included maps with depict watershed areas, areas covered for open space preservation and economic coverage depiction.

Petroleum Contamination, NY – Provided underground tank removal supervision at a project site where petroleum products were stored. The work included the removal of the tanks and over excavation of contaminated soils in accordance with NYSDEC regulations. Directed the collection of closure samples based on NYSDEC STAR's requirements. Compiled site closures data and reported data to NYSDEC in a closure request letter report.

Manufacturing Site, NY – Conducted site surveys to define the nature and extent of contamination and cleanup responsibilities. Implemented project field sampling plan which included collection of surface and subsurface soil samples, groundwater well sampling, and drum sampling. Compiled data tables from laboratory results and prepared project field investigative report.

Town of Hempstead, NY - Implements a tank management compliance plan for 115 of the Town's storage tanks. Work includes physical inspection of 23 Town facilities to identify tanks, review of compliance records, and regulatory interviews. Updates a five-year schedule for compliance implementation. Implements a compliance plan including tank registrations, tank abandonment, tank removal oversight, and modifications. Prepares a budget estimate and compliance schedule to coordinate the compliance plan. Updates budget tracking software regularly.

Town of Hempstead, NY - Conducted project oversight and construction management for a new 10,000-gallon underground fuel storage tank for Town facility. Provided day-to-day oversight of all aspects of this construction project.

Town of Hempstead, NY - Conducted project oversight and construction management for a new vehicle fueling station which contained (2) 10,000 gallon diesel tanks and (1) 6,000 gallon gasoline storage tank for Town's Department of Highway garage. The construction was done in accordance with NFPA 30 and 30A-design specification and was submitted and approved by local Fire Marshall's office.

Town of Hempstead, NY - Perform regular operational and maintenance tasks associated with a product recovery system which includes three manifold together monitoring wells, a central pump controller, and

product storage tank. The system installation was accomplished for 50% of Contractor quotes and in half the proposed time.

Abandoned Industrial Site-Astoria, NY - Conducted project oversight of groundwater monitoring well installation and drilling for soil sampling. Surveyed site for top of casing on all monitoring wells. Collected soil and groundwater samples and compiled analytical data including monitoring well construction logs, soil boring logs and groundwater sampling logs. Developed a scaled site plan of project sampling location utilizing AutoCAD Version 13.

UST Tank Removal, NY - Coordinated the excavation and removal of this former fueling station including 2000, 8000 and 1000 gallon underground diesel storage tanks. Collected STARs required sidewall and bottom excavation samples to document closure of this excavation site. Directed the contractor to overexcavate and stockpile approximately 1,000 tons of diesel fuel contaminated soil. Prepared site closure documentation including a site drawing, closure data compilation and letter reports of on-site work.

PROFESSIONAL SOCIETIES

Suffolk County Bar Association, Environmental Law Committee
Water Environment Federation.
National Groundwater Association