Amended Remedial Investigation Work Plan

Hartsdale Village Square
Aristocrat Cleaners
212 East Hartsdale Avenue
Hartsdale, New York 10530

Brownfield Cooperative Agreement
Site #: C360111

August, 2011

Submitted To:

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Amended Remedial Investigation Work Plan

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I certify that this Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance/or Site Investigation and Remediation (DER10).

Date

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1.0 INTRODUCTION

On January 12, 2010, Hartsdale Village Square, Aristocrat Cleaners (Site) was accepted into the New York State Brownfield Cleanup Program (BCP) by the New York State Department of Environmental Conservation (NYSDEC) and was assigned Brownfield Cooperative Agreement (BCA) Site #C360111. In accordance with BCP requirements an evaluation of the environmental setting and conditions is being conducted in the form of a remedial investigation (RI) as described in DEC Program Policy *DER-10 – Technical Guidance for Site Investigation and Remediation*. The RI has been initiated and investigations regarding the occurrence of chemical impacts to environmental media at and in the nearby vicinity of the Site resulting from historic dry cleaning operations have been conducted. As a results of that work, the presence of chemicals associated with the dry cleaning process have been identified in soil, soil vapor, groundwater and indoor air at and in the nearby vicinity of the Site.

A remedial investigation work plan (RIWP) dated March 2010 was previously prepared for the Site and provided to the NYSDEC. The NYSDEC provided comments on the RIWP to Hartsdale Village Square LLC (the Volunteer as defined in ECL 27-1405(1)(b).) in correspondence dated April 6, 2010 and concluded that revisions were needed to develop an approvable work plan.

The purpose of this amended RIWP is to address comments received from the NYSDEC on the March RIWP submittal, and to include results of discussions subsequently held between the Department and EnviroTrac Ltd. on July 5 and 7, 2010 in order to facilitate completion of the RI.

2.0 PHYSICAL SETTING

2.1 Property Location

The Site (Tax Map ID No.:21.8211-6) is located at 212 East Hartsdale Avenue in the Village of Hartsdale, New York in the middle of a small strip mall comprising addresses 212 through 218 (see green colored area in Figure 2-1), and facing the nearby Metro-North train station. The site is situated in Greenburgh, Block 8211 Lot 6, east of the Municipal Parking Garage, is zoned retail, and has retail frontage on East Hartsdale Avenue of 87' 4".

Table 2-1: Property Use Summary, 212-218 E. Hartsdale Avenue

No	Address	Property Use	Area (sq ft)
1	212	Dry Cleaner	1700
2	214	Grocery Store –Market	2200
3	216	Liquor Store	1022
4	218	Commercial Office	3000
		Total	7922

Figure 2-1: Site Location - *41.0' 48.8" Latitude (North): 73 47' 46.7" Longitude (West)*

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SITE MAP

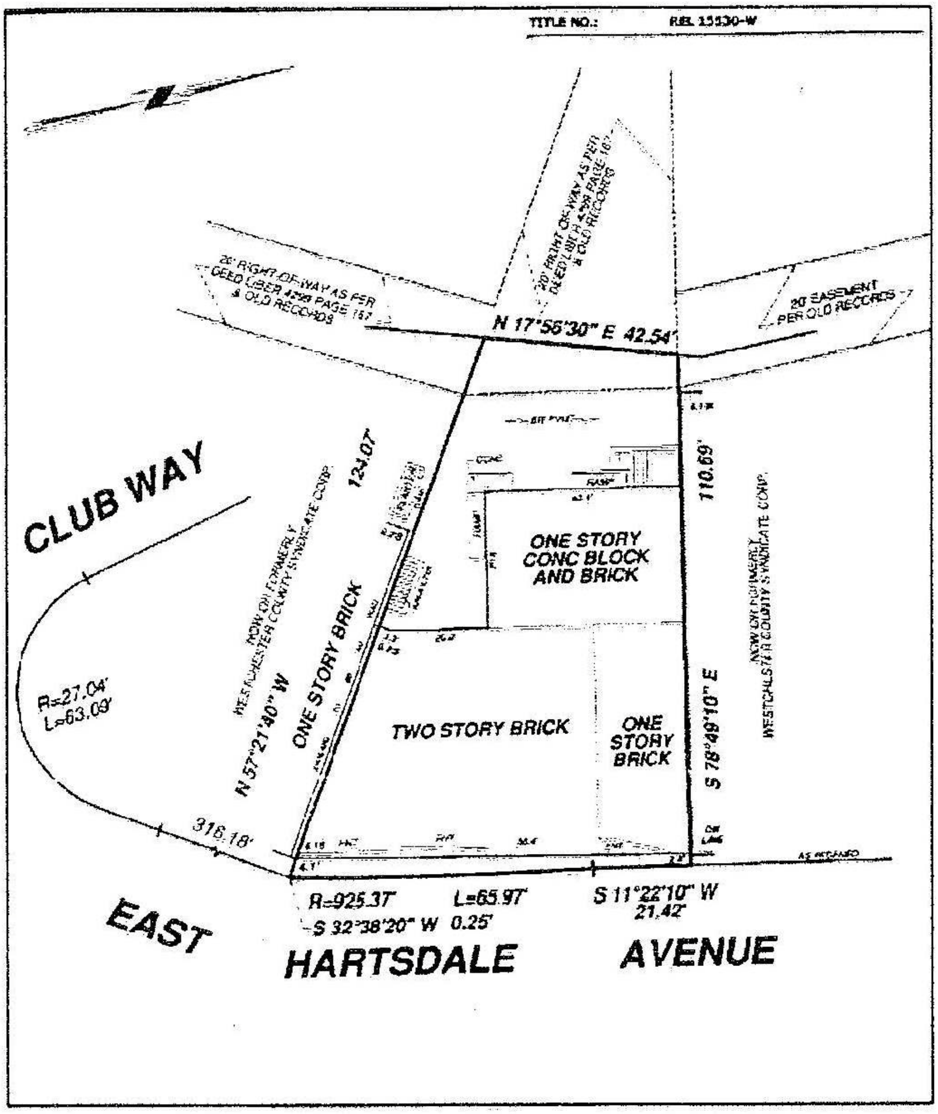

Figure 2-2: Site Map

2.2 Site and Vicinity Characteristics

2.2.1 Topographic Setting

The site is situated 179 feet above sea level above mean sea level. The topography slopes down to the strip mall from the Scarsdale Golf Club through the 2-level parking deck. The strip mall sits in a bowl on the top of schist bedrock noted in outcrops in the surrounding slopes that forms a bench adjacent to the Metro-North Train Station at a 10-feet lower level adjacent to the Bronx

River that runs South. Detail of the White Plains NY USGS topographic quadrangle where the site is located is presented below,

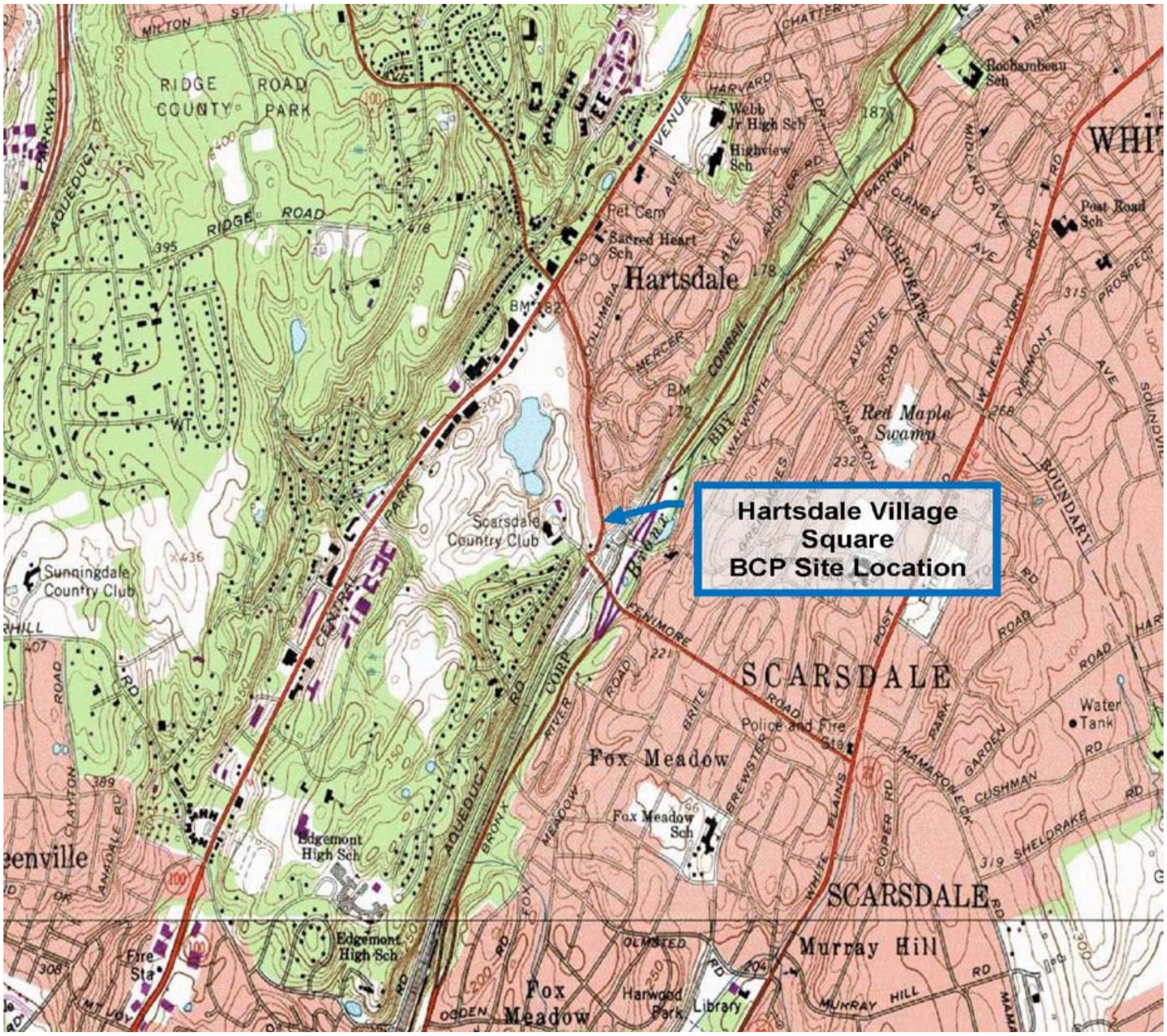

Figure 2-3: Topographic Map

2.2.2 Surrounding Land Use

The Site is located on the west side of East Hartsdale Avenue, a two-lane shopping street with a wide sidewalk. The area is characterized as a mixed residential and commercial district with the Hartsdale Metro-North railroad station located approximately 300 feet to the southeast.

Table 2-2: Surrounding Land Use Summary

Direction	Surrounding Land Use:	Land Use:
North	Mixed Use: Strip Mall Gym & Residential Condos	Mixed Use
East	Train Station and Parking. Mixed Use: Strip Mall, Residential Condo, Senior citizen	Transportation Mixed Use
South	Mixed Use: Strip Mall with food	Mixed Use
West	Parking Garage, Golf Course	Parking Garage, Golf Course

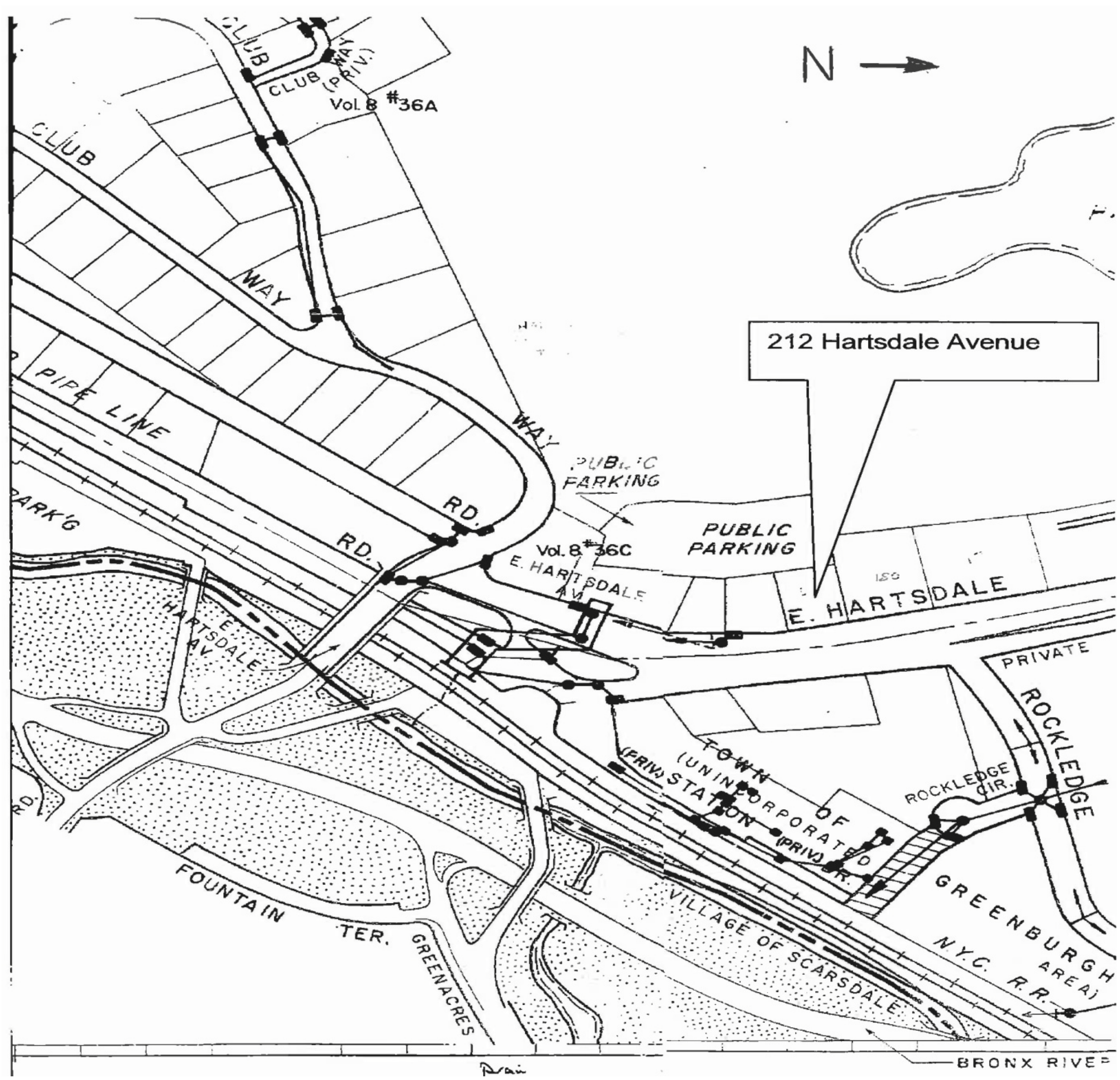

Figure 2-4: Site Plan

AERIAL PHOTOGRAPH

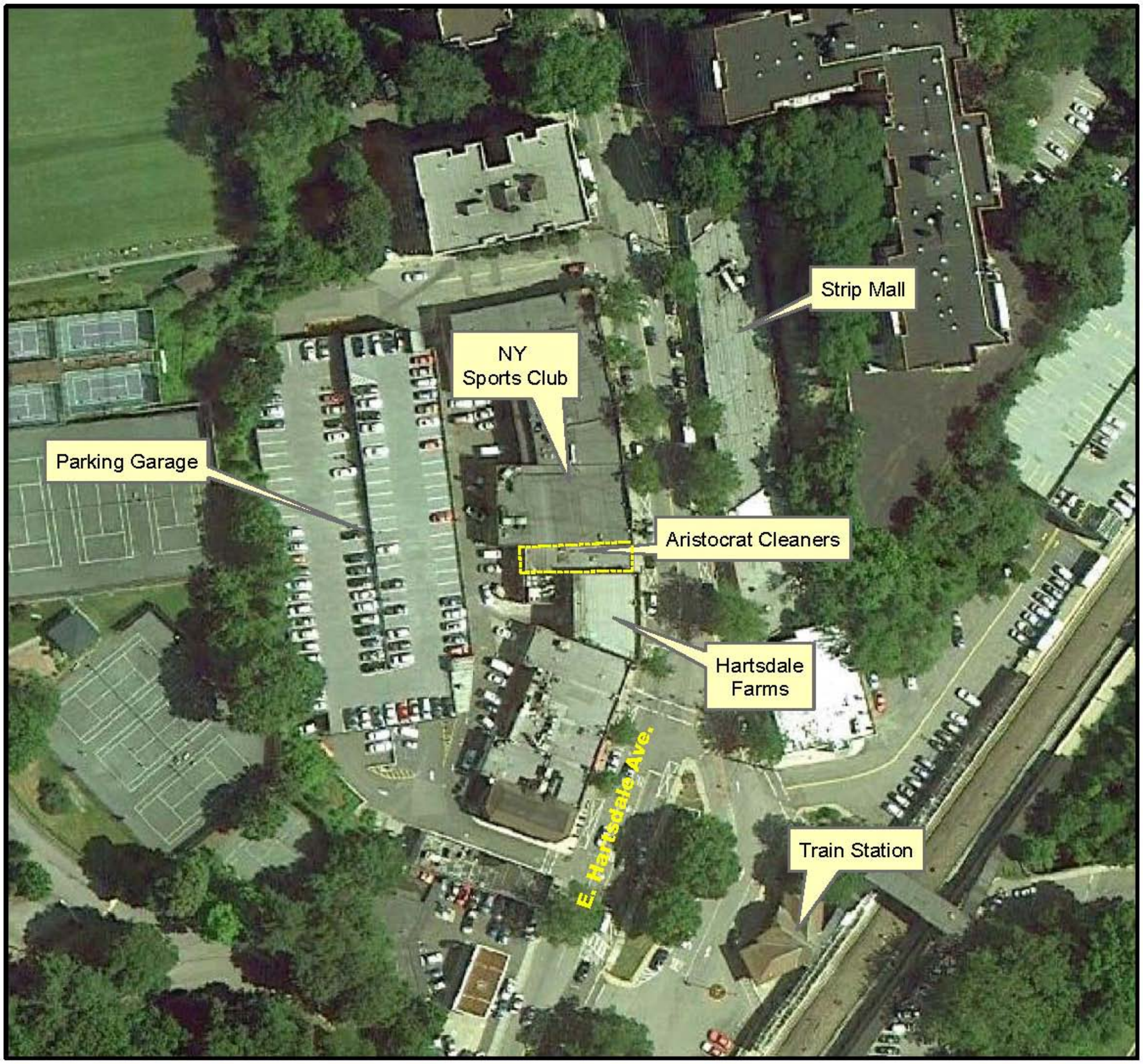

Figure 2-5: Surrounding Land Use Survey

2.2.3 Site Operations

The dry cleaning business has been in operation 1994. A detailed review of site operations including a historic summary of dry cleaning methods and processes employed at the Site is presented in the March 2010 RIWP submittal previously provided to the NYSDEC.

2.3 Geology and Hydrogeology

A detailed review of the geology and hydrogeology in the vicinity of the Site was presented in the March 2010 RIWP submittal previously provided to the NYSDEC. The content provided herein represents a summary of information more pertinent to the implementation of the Amended RI scope of work.

Geology

Surficial geology in Westchester County consists of a wide range of sediments deposited by glaciers. Glacial sediments include clay-rich glacial till on hillside and upland areas, and sandy outwash or ice contact deposits and glacial lake deposits in the County's valleys). Glacial till is generally clay-rich and contains varieties of angular and variously sized rock fragments and boulders.

Prior testing conducted at the Site has revealed the presence of more than 30 feet of well sorted medium to course sand and gravel deposits comprising an ancestral stream. No impervious zones or confining layers were identified.

According to literature, the bedrock under the site is a highly fractured metamorphic Shale, and Biotite Schists and Gneiss in 6 inch to 1 foot strata, injected with granite and quartz dikes. The rock strata steeply dip into the ground at @ 70^{o} and a strike Southeast-Northwest parallel to the strike of the rail line and Bronx River valley. The tightly-banded bedrock pattern in Westchester County is clearly visible around the site, particularly in the rocky outcrops in the valley sides. The depth to bedrock at the Site has not been determined.

Hydrogeology

Glacial till is the most common soil substrate on hillsides and upland areas in Westchester County and is normally not used for water supply both because it lies in higher, unsaturated elevations and because it general exhibits low permeability that prevent the installation of viable wells.

Bedrock aquifers underlie all parts of Westchester County. Groundwater migrates through fractures in these formations. Wells in bedrock aquifers yield water where they intersect water-bearing fractures. Well yields in bedrock aquifers are generally low but are acceptable for domestic well purposes. Occasional higher-capacity wells are, and can be, sited in the County's bedrock aquifers.

The specific nature of groundwater flow and chemical migration potential at the Site has not been defined based on prior testing conducted. There were no perched water table conditions noted during prior drilling conducted at the Site and it was noted that the water table is normally found approximately 10 feet below grade, an elevation corresponding to just beneath the basement floor slab of the dry cleaner, except during flooding conditions when it rises to higher elevations.

3.0 SUMMARY OF PREVIOUS ENVIRONMENTAL INVESTIGATIONS

Environmental assessments and studies have been conducted at the Site since 2008 and the following phases of data gathering and field investigation work were conducted:

2008

- Phase I Environmental Site Assessment

2009

- Limited Phase 2 Site Investigation
- Research for Preliminary Assessment
- Ambient Air Assessment
- Soil Assessment
- Groundwater Investigation

2010

- Soil Vapor Assessment

Comprehensive presentations pertaining to this work are included in the March, 2010 RIWP submittal. The following summaries provide an overview of the scope of work conducted and findings developed during these investigations.

3.1 Phase I Site Assessment

A Phase I Site Assessment was conducted by Sun Tao Associates, Inc. in June 2008. The subsequent report indicated that one of the storefronts has been a dry cleaning operation for more than 38 years and recommended that "…an appropriate investigation on the environmental impacts (to detect the presence of hazardous substances or petroleum products) …is necessary").

3.2 Limited Phase 2 Site Investigation

Marksmen Enterprises, LLC (Marksmen) was retained by Hartsdale Village Square, L.L.C. to conduct a limited Phase 2 site investigation the Site. This work entailed the collection of soil samples on June 5, 2009 from various depths below grade in the basement and from a location adjacent to the rear door of the dry cleaner.

Soil samples S-1 through S-4 were collected from four locations at the dry cleaning facility as indicated in the following figure.

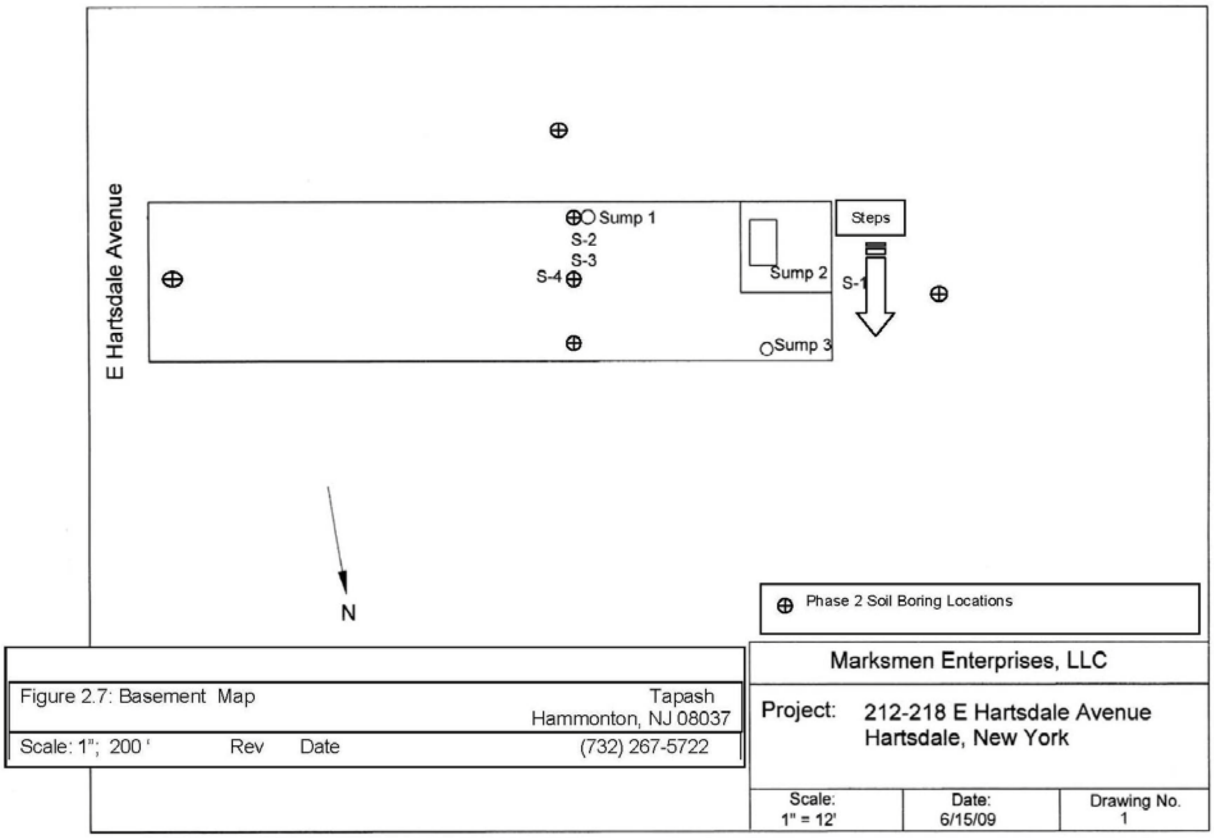

Figure 3-1: Soil Sampling Locations S1 through S4

Table 3-1: Quantitative Results Summary – Soil Sampling, June 5, 2009

Sample Designation	PID Reading (ppm)	Olfactory Observation
S-1	12.2	Fuel Oil Odor
S-2	Greater than 5,000	Strong Dry Cleaner Odor
S-3	69.5	Strong Fuel Oil Odor
S-4	10.2	Fuel Oil Odor

The soil samples consisted predominantly of urban fill that graded into native medium coarse sand at deeper levels. Selected soil samples were analyzed by Aqua ProTech Laboratories (APL) for VOCs using the EPA 8260B protocol.

Table 3-2: Soil Analytical Results Summary - June 5, 2009

Sample Number Sample Depth (inches) Sample Dilution	S-1 72 1:1	S-2 15 1:1	S-2 15 1:10	S-2 15 1:20	S-2 15 1:1000	S-3 20 1:10	S-4 60 1:1
Compound Name	Concentration (μg/kg)						
Toluene	U	5.24	U	U	U	1.77	U
Ethylbenzene	U	5.21	U	U	U	U	U
Xylenes	U	*36.4*	U	U	U	9.63	U
1,2-Dichlorobenzene	U	*81.1*	417	U	U	U	U
1,1-Dichlorethene	U	*18.5*	U	U	U	U	U
cis-1,2-Dichloroethene	3.42	13400	6820	3270	U	62.4	U
trans-1,2-Dichloroethene	U	*83*	*17.5*	U	U	U	U
Trichloroethene	2.05	18800	39900	46500	U	245	U
Tetrachloroethylene	64.8	78900	464000	4960000	1160000	6490	U
Vinyl chloride	U	302	U	U	U	*96.9*	U
Naphthalene	2.36	13	76.9	U	U	45.6	U
Total TICs	275.7J	28.1	--	--	--	20307J	U

Notes:

U = not detected
NL = no criterion listed
J = Estimated value

Based on results of this work Tapash called the spill into the NYSDEC Hot-line on June 22, 2009 As per ECL 17-1743, 6 NYCRR 613.8 and 17 NYCRR 32.3 notifying the NYSDEC of the discharge. Case No 0903393 was assigned to the spill.

3.3 Research for Preliminary Assessment

In July, 2009 Tapash conducted enquiries and gathered documentation for use in scoping investigation components and to demonstrate due diligence. This included contacting the Greenburgh City Clerk and requesting all records pertaining to the Site. These records included construction plans and aerial photographs.

The following information was researched: The dates of initial construction and the nature of major additions or alterations. plans for future construction;, land use records, archival records, usage records; historical aerial photos, site map and plans to map out potential sources of impairment, such as underground tank location. Interviews with personnel knowledgeable of the property history were completed.

Tapash visited the County Planning Dept of Westchester who provided information on the environmental features around the Town: an aerial map of the Village and geology and hydrology map and text, soils maps and Water supply, topographic maps, a wetlands map, information about the classification of waters, a map of slopes and surrounding wells and boring logs and aqueducts from their Environmental Atlas.

Aerial photographs from the period 1943 to 2004 revealed the location of old and new buildings in relation to the Spill and that the site had been developed between 1953 and 1967.

3.4 Ambient Air Assessment

Ambient air testing was conducted by Tapash on August 12th 2009 with the collection of air samples in the dry cleaner at the following locations: 1) in the work area on the first floor; and 2) adjacent to the central sump in the basement. Samples collected using 6-liter Summa canisters were analyzed by Accutest Laboratories for EPA Method TO-15 VOCs. A ten minute collection period was used for these samples. Results of this testing are summarized below.

Table 3-3: Summary of Analytical Results - Ambient Air, August 12, 2009

	Concentration (ug/m^{3}))	
Compound Name	Dry Cleaner Basement	Dry Cleaner Work Area
Acetone	54.4	19
Benzene	4.8	0.61
Chlorobenzene	8.8	ND
Chloroform	0.59	ND
Carbon Tetrachloride	0.69	ND
cis-1,2 Dichloroethene	4	ND
Trans-I ,2-Dichloroethane	ND	ND
Ethylbenzene	3	0.48
Methylene Chloride	1.4	0.56
Tetrachloroethylene	868	159
Toluene	14	2.1
Trichloroethylene	18	2.6
Vinyl Chloride	0.31	ND
Xylenes (Total)	15	2

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3.5 Soil Assessment

Seven soil borings (BOR-1 through BOR-7) were installed by Tapash on August 12, 2009 with a direct push drilling rig. Macro-core soil samples were taken continuously during drilling to assess site stratigraphy. The soil samples were logged by the on-site geologist. Bedrock was not encountered as a result of drilling to depths ranging from 10 to 30 feet. Locations of these soil borings are provided in the following figure.

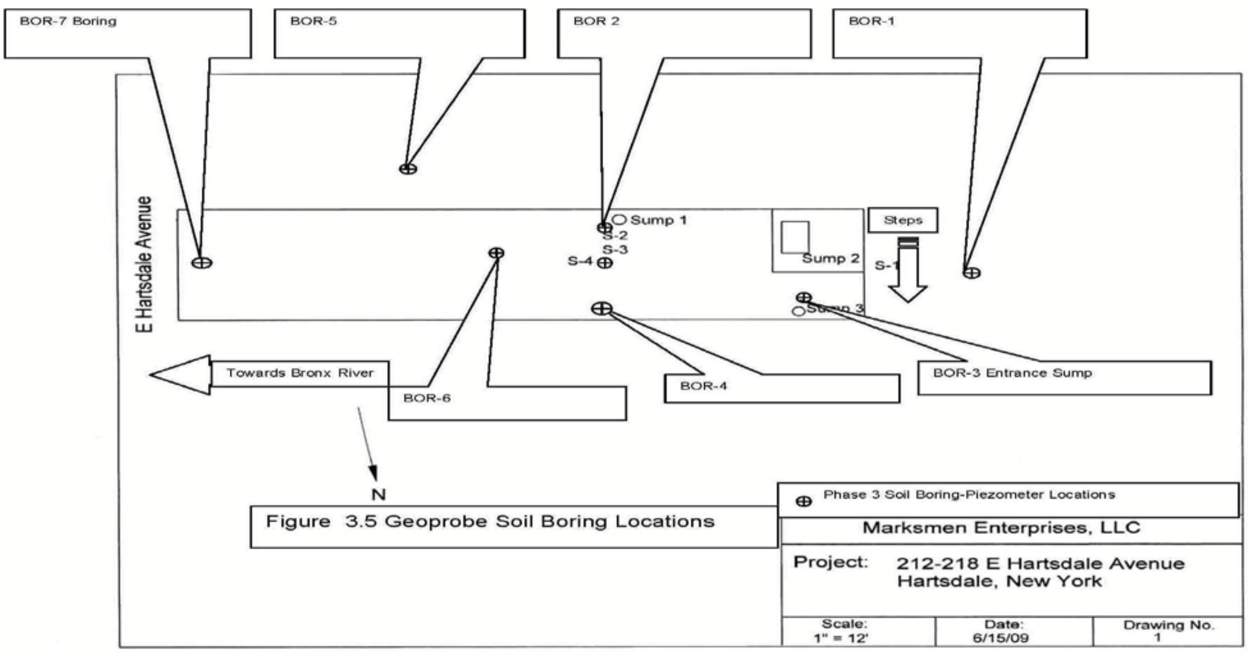


Figure 3-2: Soil Boring Locations, BOR-1 through BOR-7

Relative abundance of VOCs present in soil samples collected from these borings was screened with the MiniRae Photoionization Detector (PID). Results of this testing are provided in Table 3-4..

Table 3-4: Soil Monitoring Data, August 12, 2009

Soil Monitoring Data

Date Time	Min(ppm)	Alarm		Avg (ppm)	Alarm	Max(ppm TVo)
8/12/2009 7:26	0	10.1		**100.8**	**H**	**Calibration 100 ppm TVo**
Bor-2					**H**	**Bor-2, 2-3' Silty Sand 1698 ppm**
8/12/2009 9:40	17	372	H	**3207 ppm**		**TVo**
8/12/2009 9:41	24.5	580.4	H	**1233**	**H**	**Bor-2, 2-3' Silty Sand**
8/12/2009 9:53	2.6	32.5		**461**	**H**	**Bor-2, 8-9' 8.9 ppm TVo**
8/12/2009 10:00	2.4	29.3		**146.9**	**H**	**Bor -2, 9-12' 37 ppm TVo**
						High TVo ppm Concentration
8/12/2009 10:11	16.5	365.6	H	**1708.6**		**were noted during drilling Bor-2**
8/12/2009 10:30	0.2	1.2		**10.6**		**Bor-2, 15' 37 ppm TVo**
8/12/2009 10:55	0	0		**0**		**Bor-2, 18' 4.9 ppm TVo**
Bor-6						
8/12/2009 12:37	0	0		0.7 ppm		Bor-6, 2-3' 13 ppm TVo
8/12/2009 12:48	0	2.2		10.3		Bor-6, 4-7', 13.7 ppm TVo
8/12/2009 13:11	0	0		0.1		Bor-6, 7-10', 1.1 ppm TVo
Bor-4						
8/12/2009 13:42	4.3	4.9		7.2 ppm		Bor-4, 4' 5.4 ppm TVo
8/12/2009 13:45	4.3	5.3		6.4		Bor-4-6' 5.5 ppm TVo
8/12/2009 13:55	3.1	3.4		3.8		Bor-4, 8-10' 5.4 ppm TVo
8/12/2009 13:55	3.1	3.4		3.8		Bor-4, 8-10' 5.4 ppm TVo
Bor-7						
8/12/2009 14:37	3.2	3.7		4.5ppm		Bor-7, 4' 6.6 ppm TVo
8/12/2009 14:38	3.6	4		4.6		Bor-7, 6' 7.3 ppm TVo
8/12/2009 14:54	3.9	4.1		4.5		Bor-7, 10' 9.7 ppm TVo
8/12/2009 14:55	3.7	4		4.3		Bor-7 10' 8.5 ppm TVo
Bor-3						
8/12/2009 15:10	4.6	4.7		4.9ppm		Bor-3, 1' 7 ppm TVo
8/12/2009 15:20	4.9	7.6		16.4		Bor-3, 4' 9.7 ppm TVo
8/12/2009 15:35	4.5	4.9		5.4		Bor-3, 6' 5.4 ppm TVo
Bor-5						
8/12/2009 17:06		0		0		Bor-5, 13'

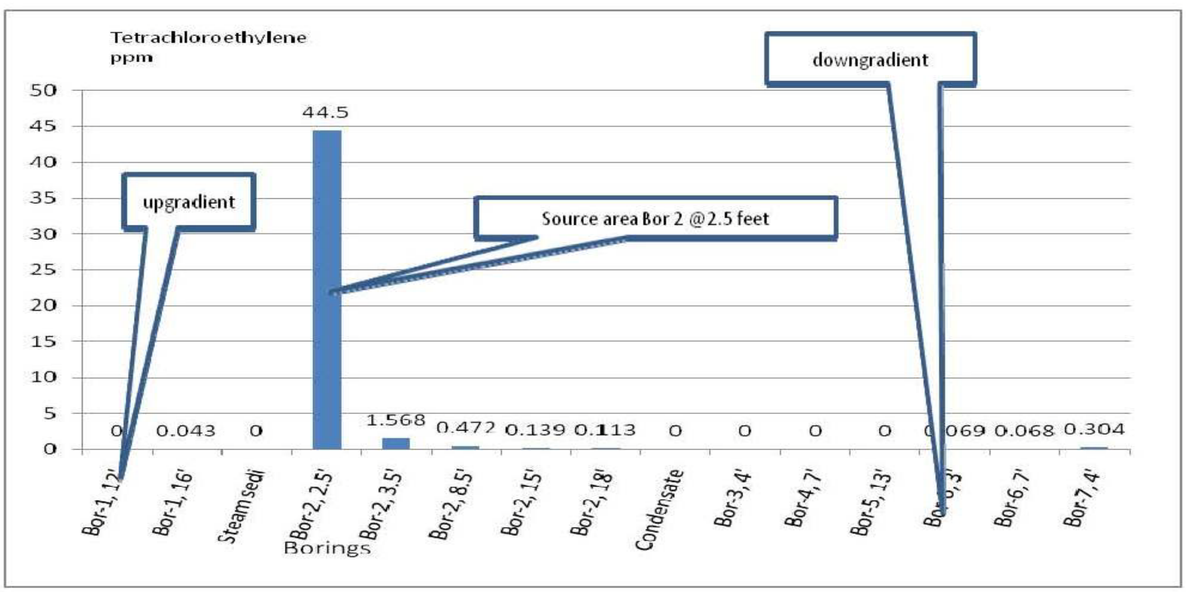
Soil samples were field screened in the field for specific VOCs using the Photovac Voyager Gas Chromatograph (GC) by head-space analysis. The GC was calibrated with a 1 ppm Benzene, Trichloroethylene and Tetrachloroethylene standard supplied by Accutest Laboratories.

Following is a summary of results of this testing.

Table 3-5: GC Field Screening Data August 12, 2009

Photovac Voyager GC - Field Screening file:

Date	Location	Depth	Analysis	Run	Soil Toluene	Tetra	ppm Xylene
Aug 12 2009	Calibration			B9081301	1 ppm	1 ppm	1 ppm
Aug 12 2009	Bor-1	12'	VO-GC-PID	311	ND	ND	3.567
Aug 12 2009	Bor-1	16'	VO-GC-PID	312	ND	0.043	0.684
Aug 12 2009	Sediment under Steam exhaust			313	ND	ND	0.665
Aug 12 2009	Bor-2	2-3'	VO-GC-PID	303	ND	44.5	47.1
Aug 12 2009	Bor-2	3-5'	VO-GC-PID	304	ND	1.568	33.8
Aug 12 2009	Bor-2	8-9'	VO-GC-PID	306	ND	0.472	10.7
Aug 12 2009	Bor-2	15'	VO-GC-PID	307	ND	0.139	3.633
Aug 12 2009	Bor-2	18'	VO-GC-PID	308	ND	0.113	3.527
Aug 12 2009	Condensate		VO-GC-PID	310	ND	ND	ND
Aug 12 2009	Bor-3	4'	VO-GC-PID	319	ND	ND	0..160
Aug 12 2009	Bor-4	7'	VO-GC-PID	318	ND	ND	0.273
Aug 12 2009	Bor-5	13'	VO-GC-PID	316	ND	ND	0.09
Aug 12 2009	Bor-6	3'	VO-GC-PID	313	ND	0.069	0.753
Aug 12 2009	Bor-6	7'	VO-GC-PID	314	ND	0.068	0.316
Aug 12 2009	Bor-7	4'	VO-GC-PID	317	ND	0.304	0.679
Aug 12 2009	Calibration			B9081301	1.733 ppm	2.755 ppm	1 ppm



10% of the soil samples collected during the installation of borings BOR-1 through BOR-7 were submitted to Accutest Laboratories (a NY State ELAP Certified lab) and analyzed for Volatiles +

10 Tentatively Identified Peaks (TICS) using the EPA 8021 protocol, Base Neutrals + 10 TICs using method 8270, TPHC-DRO and Lead analysis.

Table 3-6: Summary of Analytical Results - Soil Borings BOR-1 and BOR-2 – August 12, 2009

	Concentration (ug/kg)				
Compound Name	Bor-1 12' deep	Bor-2 2'	Bor-2 8-9'	Bor-2 10-12'	Bor-2 15'
Benzene	ND	ND	NA	ND	ND
1,2 Dichlorobenzene	ND	56.4	NA	ND	ND
cis-1,2 Dichloroethene	2.9	508	NA	0.38	ND
Trans-I ,2-Dichloroethane	ND	ND	NA	ND	ND
Ethylbenzene	ND	2.9	NA	ND	ND
Methylene Chloride	ND	ND	NA	ND	ND
Tetrachloroethylene	62,600	79,400	NA	7.1	3.7
Toluene	0.39	0.97	NA	ND	ND
Trichloroethylene	21,8	5,980	NA	ND	ND
Xylenes (Total)	1.4	51.9	NA	ND	ND
Total TICs Volatiles	739	622	NA	0	0
Acenaphthene	NA	ND	ND	ND	NA
Anthracene	NA	35	ND	ND	NA
Benzo(a)Pyrene	NA	ND	ND	ND	NA
Chrysene	NA	ND	ND	ND	NA
Fluoranthene	NA	16	ND	ND	NA
Fluorene	NA	141	ND	ND	NA
Phenanthrene	NA	207	ND	ND	NA
Pyrene	NA	27.8	ND	ND	NA
Total TICs Semi-volatiles	NA	50,900	ND	0	NA
TPH-DRO (mg/kg)	NA	679	12.7	ND	NA
Lead (mg/kg)	NA	9.5	5.2	3.8	NA

BOR-1A was drilled adjacent to the stair well into the basement and **BOR-1B** through the rear access road/parking lot to 18.5 feet deep. The boring Bor-1B at first drilled through 10 feet of urban sand fill and encountered the water table at 9.4 feet in a grey medium sand with silt.

BOR-2 was drilled through the 3"-thick concrete floor adjacent to the central sump in the basement into gray silty fine sand and encountered the water table at 6" below the slab.

Table 3-7: Summary of Analytical Results - Soil Borings BOR-3, BOR-4, BOR-5, BOR-6 and BOR-7 - August 12, 2009

	Concentration (ug/kg)					
Compound Name	Bor-3 2'-deep	Bor-3 4' deep	Bor-4 4'deep	Bor-5 13'	Bor-6 3'	Bor-7 10'
Benzene	ND	NA	ND	ND	ND	ND
1,2 Dichlorobenzene	ND	NA	ND	ND	ND	ND
cis-1,2-Dichloroethene	ND	NA	2.2	0.42	ND	0.88
Trans-I ,2-Dichloroethane	ND	NA	ND	ND	ND	ND
Ethylbenzene	ND	NA	0.73	ND	ND	ND
Methylene Chloride	ND	NA	ND	ND	ND	ND
Tetrachloroethylene	149	NA	20.3	ND	126	22
Toluene	ND	NA	1.4	ND	ND	ND
Trichloroethylene	ND	NA	1.7	ND	ND	ND
Xylenes (Total)	ND	NA	2.6	ND	ND	ND
Total TICs Volatiles	26000	NA	140.2	0	76500	0
Acenaphthene	903	ND	ND	ND	141	ND
Anthracene	519	ND	22.4	ND	31.7	ND
Benzo(a)Pyrene	458	ND	72.7	ND	ND	ND
Chrysene	410	ND	145	ND	ND	ND
Fluoranthene	929	ND	129	ND	ND	ND
Fluorene	2200	ND	ND	ND	328	ND
Phenanthrene	3540	ND	108	ND	466	ND
Pyrene	1320	ND	106	ND	ND	ND
Total TICs Semi-volatiles	62900	0	10280	170	80400	1520
TPH-DRO (mg/kg)	10700	0	760	53.9	1110	0
Lead (mg/kg)	150	3.1	17.1	3.5	6.3	4.6

BOR-3 was drilled through the basement floor slab adjacent to the sump at the entrance to the basement and encountered the water table at 6" below the slab.

BOR-4 that was side-gradient to the central sump was drilled adjacent to the north wall of the basement and encountered the water table at 6" below the slab.

BOR-5 was drilled through the side access parking lot to 18.5 feet deep through urban sandy fill into gray speckled coarse sand and encountered the water table at 10.25 feet.

BOR-6 was downgradient from the central sump, the water table was found at 6" below the slab.

BOR-7 was drilled at the far end of the basement nearest the Bronx River and encountered the water table at 6" below the slab.

3.6 Groundwater Investigation

3.6.1 Monitor Well Installation

Following completion of the soil boring installations described in Section 3.5 groundwater monitoring wells designated MW-1 through MW-7 were installed at each of the seven locations. The wells were screened across the water table with approximately 10 feet of screen to a depth of 10.5 feet below the basement floor slab (i.e., approximately 18-20 feet below grade). Each well was constructed of 1"-diameter .020 slot PVC well screen and solid PVC riser. The well screen was backfilled with Moiré well sand with a cap of 00 sand and a bentonite plug and then tremie grouted with cement. A protective water-tight locking cap was installed. Each well was developed by pumping for about 10 minutes or until clear discharge water is obtained. After well installations depth to groundwater was measured under non-pumping conditions.

3.6.2 Groundwater Sampling

Groundwater samples were collected from monitoring wells MW-1 through MW-7 on August 26, 2009 from each well, two weeks after the wells were installed and developed. Each well was sounded for total depth and the depth to water was measured. The water column and well volume was calculated and at least 3-5 well volumes were purged prior to sample collection.

One round of groundwater samples was collected for unfiltered groundwater samples that was analyzed by Accutest Laboratories for Volatile Organics +10 TICs, Base Neutrals + 10 TICs, Total Diesel-Range Organics (DRO) and Lead.

Table 3-8: Summary of Analytical Results – Groundwater Monitoring Wells MW-1 – MW-7 - August 26, 2009

	Concentration (ug/L)						
Compound Name	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7
Benzene	ND	ND	0.66	ND	ND	ND	ND
1,2 Dichlorobenzene	ND	0.28	20.6	ND	ND	ND	ND
cis-1,2 Dichloroethene	1180	208	30	351	39.8	414	107
Trans-I ,2-Dichloroethene	9.8	2.5	ND	6	0.38	2.2	2.5
Ethylbenzene	2	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	747	424	13.4	34.3	120	51.2	150
Toluene	5.5	ND	ND	ND	ND	ND	ND
Trichloroethylene	220	75	4	3.7	14.2	13.8	13.2
Xylenes (Total)	6.3	ND	0.43	ND	ND	ND	ND
Total TICs Volatiles	739	15.8	999	0	17.3	235	0
Acenaphthene	NA	ND	8.5	ND	NA	NA	NA
Anthracene	NA	ND	ND	ND	NA	NA	NA
Benzo(a)Pyrene	NA	ND	ND	ND	NA	NA	NA
Chrysene	NA	ND	ND	ND	NA	NA	NA
Fluoranthene	NA	ND	2.2	ND	NA	NA	NA
Fluorene	NA	ND	14.1	ND	NA	NA	NA
Phenanthrene	NA	ND	25.3	ND	NA	NA	NA
Pyrene	NA	ND	3.2	ND	NA	NA	NA
Total TICs Semi-volatiles	NA	64.5	945	5.6	NA	NA	NA
TPH-DRO (mg/kg)	0.497	0.262	39.2	0.17	0.711	36.4	0.148
Lead (mg/kg)	NA	12.6	2570	49.9	NA	NA	NA

These results are posted on the following figure to illustrate the spatial relationship of findings.

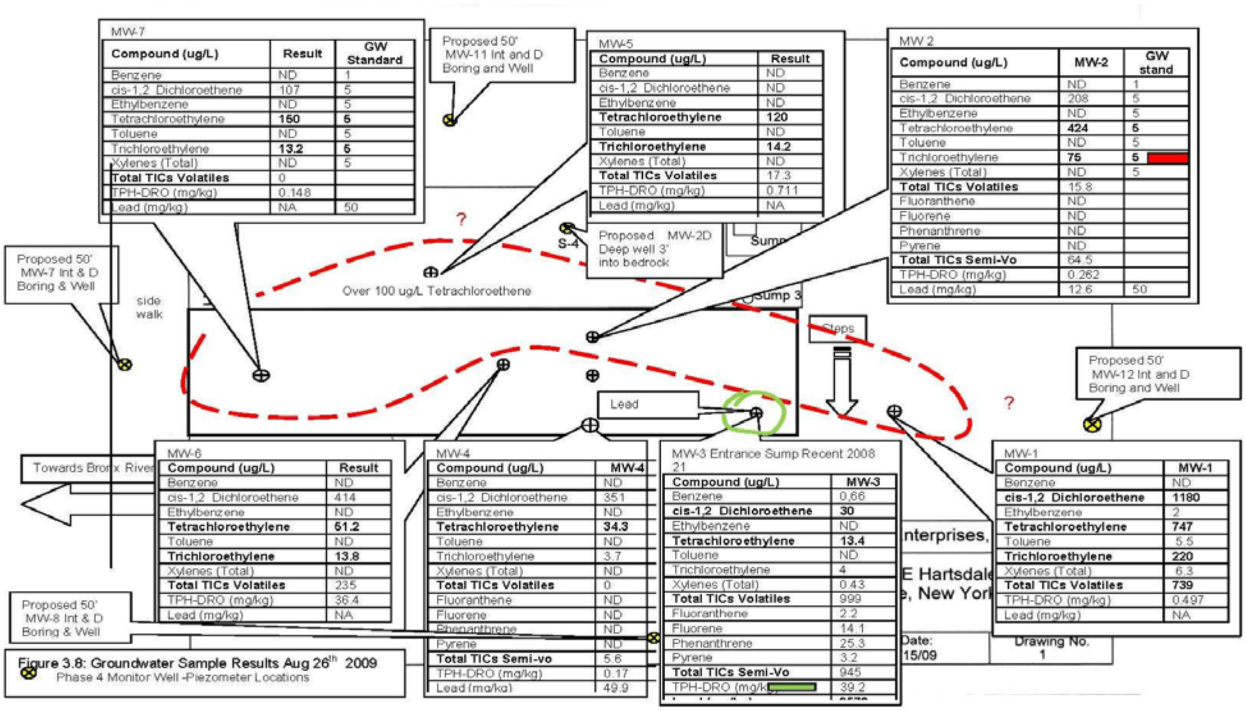


Figure 3-3: Summary of Groundwater Sampling Results – August 26, 2009

3.7 Soil Vapor Assessment

Soil vapor monitoring probes were installed by Tapash on February 9, 2010 in the neighboring basements on a grid trending away from the location of Sump #2/monitoring well MW-2 found in the basement of the dry cleaner. The probes were installed at the following locations.

SSV-8 sub-slab vapor point was installed outside the emergency exit for NY Sports club at the furthest extent of the gym building North of the source area.

SSV-8a sub-slab vapor point was drilled inside the building under the floor slab in the utility closet in the basement to determine the extent of the vapor intrusion under the NY Sports basement, adjacent to the front sidewalk.

SSV-9 sub-slab vapor point was installed through the front sidewalk by the curb outside of King Aristocrat Dry Cleaners to detect any vapor in the area where municipal sewer drains and storm drains are running.

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SSV-10 sub-slab vapor point was drilled through the boiler room floor slab in Hartsdale Liquor, southeast of the source area.

SSV-11 sub-slab vapor point was drilled through the pavement outside Trustco Bank to determine any vapor migration under the pavement to the south of the source area.

SSV-12 sub-slab vapor point was drilled through the pavement in the access road at the rear of Aristocrat Cleaners.

Soil vapor samples were collected by Tapash from the SSV-8, SSV-8a, SSV-9, SSV-10 and SSV-12 locations in 6-liter Summa Canisters on February 15, 2010 and analyzed for the TO-15 list of VOCs by Accutest Laboratories. A ten minute collection period was used for all samples. Results of this testing are summarized in Table 3-9.

Table 3-9: Summary of Soil Vapor Testing Results – February 15, 2010

		Chemical Constituent and Soil Vapor Concentration (ug/m3)			
Sample Designation	Location	Carbon Tetrachloride	Tetrachloroethene	1,1,1-Trichloroethane	Trichloroethene
SSV-8	NY Sports Out	23	142	ND<1.1	13
SSV-8a	NY Sports Inside	ND<1.3	155	ND<1.1	2.3
SSV-9	Front Sidewalk	ND<1.3	78	ND<1.1	0.75
SSV-10	Hartsdale Liquor	ND<1.3	11	ND<1.1	4.1
SSV-12	Access Road	ND<1.3	193	ND<1.1	27

Notes:
Sampling conducted February 15, 2010.
ND - constituent was not detected relative to the indicated reporting limit.

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4.0 AREAS OF CONCERN

The term "Area of concern" or "AOC" means any existing or former location at a site where contaminants are known or suspected to have been discharged which is considered a source area. These include locations where contaminants were generated, manufactured, refined, transported, stored, handled, treated, disposed or where they have or may have migrated. Four AOCs were identified at the Site based on prior testing conducted, as summarized in Section 3.0.

AOC 1: Historic Dry Cleaning Spills

The Site is considered an AOC because the subject property has been used as a dry cleaner for more than 38 years, operated at #212 E. Hartsdale Avenue before the government regulation of the waste disposal of solvent in 1986 and because of degraded soil quality found onsite. There is a sump in the middle of the basement that was found to contain Tetrachloroethylene (PCE).

AOC 2: Basement Entrance Sump Containing Petroleum Hydrocarbons

Petroleum Hydrocarbons were found in the sump at the basement entrance and the central sump in the middle of the basement. It has been noted that the floor sump near the basement entrance has a sump pump that dumps water into the sump in the center of the basement before all accumulated groundwater is pumped into a drain pipe located in the ceiling of the basement. This dewatering system has the potential to cross-contaminate the sumps and both sumps serve to collect groundwater in the basement.

AOC 3: Central Sump in Basement Containing Tetrachoroethylene

The groundwater around the central sump has been found to contain PCE at concentrations above the New York State Groundwater standard. Previous analytical results suggest that PCE has been spilled around the sump.

AOC 4: Vapor Intrusion Potential

There is a potential for vapor intrusion of volatile chemicals found in soil and groundwater into the basement of the Site and adjacent properties.

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5.0 AMENDED RI SCOPE OF WORK

The focused scope of work presented in this Amended RIWP was developed in accordance with discussions held by Hartsdale Village Square, LLC and the NYSDEC, and to address the NYSDEC's comments dated July 8, 2010 pertaining to the March 2010 RIWP submittal.

In order to properly address all of the work requested by the NYSDEC, the investigation will be performed in a phased approach. Testing that will be conducted during the first phase will include an assessment of soil and groundwater quality and groundwater flow patterns. This work will be used to confirm or refute results and conclusions that were offered based on the prior testing conducted at the Site, to develop a current understanding of groundwater/plume migration characteristics, and to better define the source area location. The information developed through the implementation of Phase I tasks will be used to guide additional monitoring well installations and sampling that will be conducted during the second work phase. Finally, soil vapor intrusion testing will be conducted to assess VOC concentrations in soil vapor and ambient air in the vicinity of the dry cleaner.

The activities comprising the scope of work will be conducted as per applicable local, county, state (6 NYCRR Part 375) and federal regulations (40 C.F.R Part 300). Quality assurance and health and safety procedures that will be employed during the project are presented in the Quality Assurance Project Plan (QAPP) and the Health and Safety Plan (HASP) provided in Appendices A and B, respectively.

5.1 Proposed Investigation

Testing will be performed to further the progress of site characterization that was previously initiated in 2008 as discussed in Section 3.0. Environmental media sampling, assessments of soil stratigraphy and ground water flow characteristics will be conducted at the approximate locations presented on the following aerial photograph.

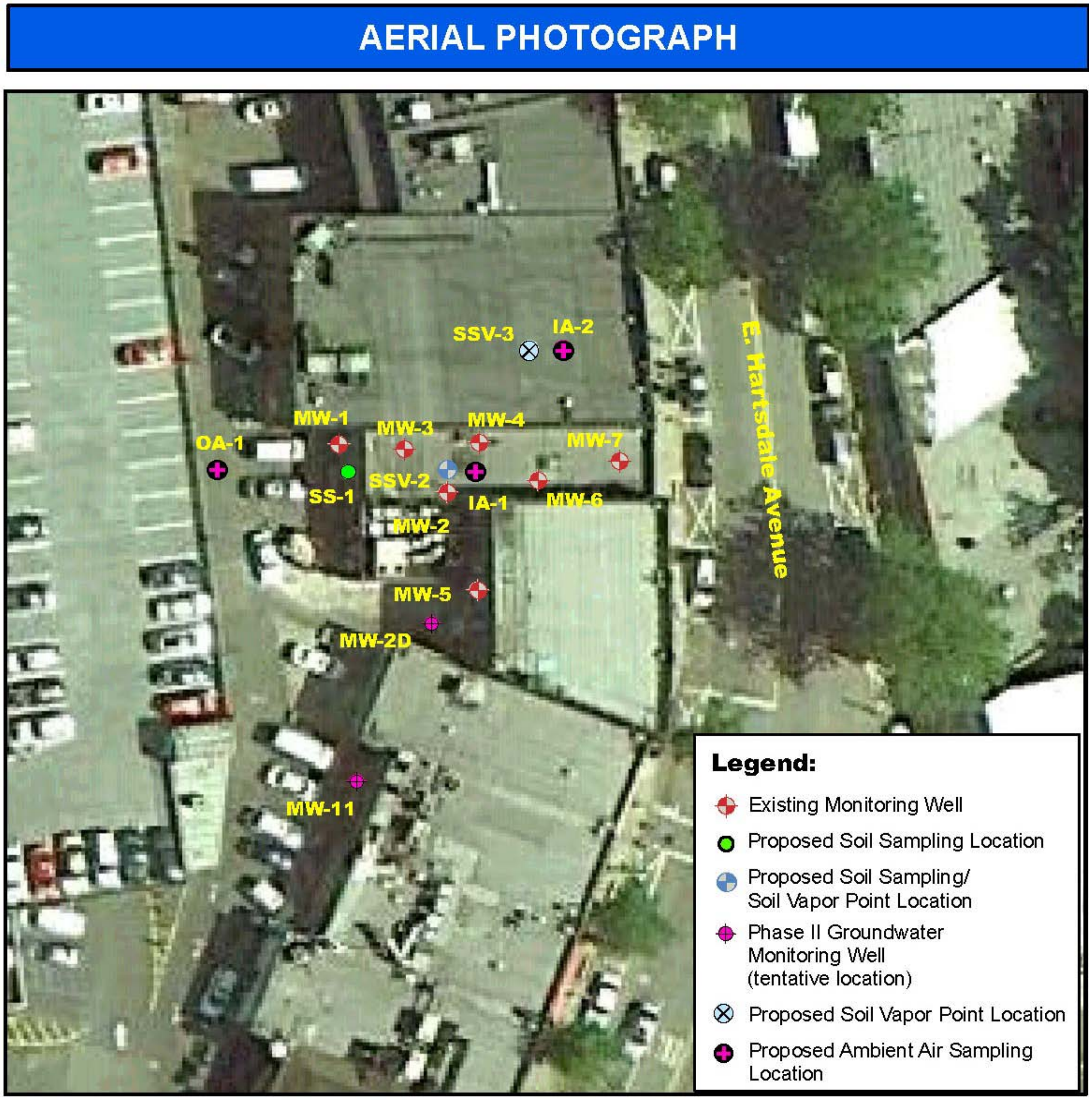

Figure 5-1: Proposed Amended RI Testing Locations

During the proposed activities the actual testing locations will be field verified and surveyed by a professional land surveyor relative to a permanent surface structure to provide for adequate triangulation; and provide the survey data to DER in an acceptable format (e.g., North America Datum 83 [NAD83]); placed on scaled figures that will be submitted as part of the investigation summary report. This work will entail surveying each of the seven existing monitoring wells.

5.1.1 Soil Assessment

Soil sampling will be conducted at three locations shown on Figure 5-1:

1. from an outdoor location behind the building near existing groundwater monitoring well MW-1;
2. in the vicinity of existing groundwater monitoring well MW-2 which is located in the basement of the dry cleaner;; and
3. during the installation of an additional groundwater monitoring well that will be constructed to assess vertical groundwater flow potential and plume migration.

Behind the building

A soil sample will be collected from the 1 to 3 feet below grade surface to assess the location as a potential source.

Vicinity of existing monitoring well MW-2

In Phase I a soil sample will be collected from 0.5 to 2.5 feet below the basement slab during the installation of sub-slab soil vapor monitoring point SSV-2 (see Section 5.1.2) to assess chemical concentrations present in soil directly underlying the basement of the dry cleaner.

Additional well location

Two soil samples will be collected during the installation of a groundwater monitoring well designated MW-2D that will be conducted in the second phase of work described in this Work Plan. The specific intervals for these samples will be selected in the field based on the highest photoionization detector screening results.

Soil sampling procedures are discussed in Section 6.1.

5.1.2 Soil Vapor Assessment

Permanent sub-slab soil vapor probes (SSV-2 and SSV-3) will be installed in the basement of the dry cleaner near existing monitoring well MW-2 and in the basement of the New York Sports Club (pending securing access for testing), respectively (Figure 5-1). Following installation, samples will be collected and analyzed in the laboratory for VOCs to assess to potential for soil vapor intrusion along with ambient indoor air samples (IA-1 and IA-2) that will be collected in close proximity to the sub-slab vapor probes. An outdoor ambient air sample (OA-1) will also be collected to assess contribution of chemical constituents from background sources in accordance with NYSDOH SVI guidance. This testing will be conducted during the heating season (the November 15 through March 31 timeframe) as required by the NYSDOH. Probe installation and air sampling procedures that will be used at the Site are discussed in Section 6.3.

5.1.3 Groundwater Assessment

5.1.3.1 Groundwater Flow

An assessment of flow patterns in the shallow groundwater at the Site will be conducted during Phase I using the seven existing monitoring wells designated MW-1 through MW-7. The locations of these wells are shown on Figure 5-1. Synoptically recorded depth to water measurements and surveyed top of casing elevations will be used to calculate groundwater elevations and the direction of groundwater flow will be assessed through interpolation. The results of this work will be posted on a scaled site map.

5.1.3.2 Groundwater Quality

Groundwater quality will be assessed during Phases I and II of the proposed investigation. During Phase I existing monitoring wells MW-2, MW-3 and MW-7 will be sampled to document current concentrations and, along with defined groundwater flow patterns, to aid in determining plume migration characteristics. Based on these results and other data derived from the Phase I scope of work, two additional wells to be designated MW-2D and MW-11 will be installed and sampled during Phase II. It is envisioned that these combined results will aid in assessing lateral and vertical migration of dissolved chemicals from the source area. Groundwater sampling procedures are discussed in Section 6.2.2.

5.2 Data Reduction and Reporting

Upon the conclusion of the RI activities a report will be prepared to meet the objectives specified in DER-10 Section 3.14.

Data reduction will consist primarily of tabulating analytical results, comparing those results to regulatory criteria provided in 6 NYCRR Part 375 and posting those results on site figures to show the testing location, distribution of constituents identified and the general direction of groundwater flow. Data generated during the project will be placed in the central file maintained by the Project Manager. Following reduction and review of the data, a reported will be prepared documenting the activities conducted at the site, observations, findings and resultant conclusions.

Interim Summary Report

Upon the conclusion of the Phase I testing that will be conducted to initiate the Amended Work Plan scope a summary report will be prepared and submitted to the NYSDEC for review and comment. This report will provide summarized results of the Phase I testing including:

- tabularized soil and groundwater sampling analytical data and maps showing the locations of testing with pertinent data posted;
- a table of calculated groundwater elevations and data posted on a map showing the inferred direction of groundwater flow; and
- a map showing the locations of proposed groundwater monitoring wells MW-2D and MW-11 that will be installed during Phase II.

Additional information that will be provided in the Interim Summary Report will include analytical data summary tables and Data Usability Summary Reports (DUSRs) that will be prepared for the testing previously conducted. This work included reporting of laboratory data at the Category B deliverable level:

- Ambient air testing conducted at the dry cleaner on August 12, 2009. Two ambient indoor air samples were collected at 212 E. Hartsdale Avenue (see Section 3.4).
- Additional soil vapor assessment conducted on February 15, 2010. Five sub-slab soil vapor samples were collected in the vicinity of 212 E. Hartsdale Avenue (see Section 3.8).

It has been determined that none of the remaining previously conducted work as summarized in Section 3.0 included the development of Category B laboratory deliverables.

A proposed updated schedule for the implementation of the Phase II testing will also be included along with an outline of contents for the RI report that will conclude the RI activities.

6.0 TECHNICAL PROCEDURES

The methodologies that will be utilized have been developed achieve goals of the RI and satisfy the requirements of NYSDEC 6 NYCRR Part 375.

6.1 Soil Assessment

Depending on the location and depth of characterization required to address the specific investigative elements presented, soil assessment activities will utilize several potential method and technical approaches to assess stratigraphy and collect soil samples. These may include the use of hand augers, and portable drilling rigs (e.g., direct push, hollow stem auger, air rotary, sonic) depending on the specific investigative requirements.

6.1.1 Organic Vapor Screening - Soil Sample Headspace

Field screening for organic compounds in soil samples will be performed as one of several field screening criteria, and in the breathing zone of all work areas where intrusive activities are to occur as part of the Health and Safety monitoring program, detailed further in the project HASP (Appendix B). This will serve as an immediate indication as to volatile organic hazards at the work location and will determine if personnel health and safety protection is adequate. Screening with a hand-held PID meter will be performed during intrusive work activities (i.e. installation of soil borings and/or groundwater monitoring wells, or collection of groundwater samples) field investigation and all sample collection activities.

1. Calibrate the PID daily in accordance with the particular manufacturer's procedures.
2. For health and safety monitoring during intrusive activities, the PID will be used to continuously monitor for organic vapors in the breathing zone of all work areas in accordance with the HASP.
3. For soil samples, a container separate from any jars that may be used for laboratory analysis will be used to check for total organic vapor concentrations using the PID. Generally, the sample aliquot retained for geologic description and archive is used for headspace total organic vapor screening.
4. Fill the sample container approximately ⅔ full with soil,

5. Place aluminum foil over the sample jar mouth, tightly sealing the opening.
6. Allow the jar to stand for 5 minutes in a location where the sample temperature change will be minimal.
7. After the 5 minutes, shake to jar for 1 minute to aid the desegregation of VOCs from the soil matrix.
8. Allow the jar to stand for an additional 5 minutes in a location where the sample temperature change will be minimal.
9. After the 5 minutes, insert the probe of a PID through the foil seal and observe the instrument for the maximum organic vapor reading.
10. Record the sample number and maximum headspace organic vapor concentration reading.

6.1.2 Soil Logging

The on-site hydrogeologist will examine and use visual and field test criteria to classify the soils. A standard "Geologic Log" will be maintained for each soil boring that will include all of the geological information gathered in the field, including the following:

- The structure of the soils sampled, including layering stratification features, and the dominant soil types;
- The color of soils, using Munsell Soil Color Charts;
- The moisture content of soils;
- Soil grain features, including grain sizes, degree of sorting or grading, angularity, and mineralogy.
- Identification of any rock fragments, organic material or other components; and
- The consistency of clay-dominated soils.

All of the soil information collected will be recorded as a designation under the USCS along with additional observations for each distinctive soil type within each sample. At the discretion of the supervising hydrogeologist samples will be collected and retained for archival purposes and will placed in glass jars or plastic ziplock bags. The on-site hydrogeologist will label the jars or plastic bags with soil boring or well number, sample interval, date, and time.

6.1.3 Soil Sampling

Soil samples chosen from selected intervals based on PID response or other selection criteria specified will be placed into laboratory supplied containers and sent to the laboratory for analysis of indicated chemical parameters.

- Detailed notes will be maintained by supervising hydrogeologist in the field book including:
  - Location and orientation of the samples including distance to identifiable structures, north orientation and spatial orientation of locations.
  - Evidence of soil staining
  - PID screening results
  - Depth of samples.
- Photographs will be taken during and at the completion of the soil sampling. A log of the photographs will be maintained in the field notebook.

6.2 Groundwater Assessment

6.2.1 Monitoring Well Installation

Additional groundwater monitoring wells will be installed at the Site to further assess the possibility of impacts to groundwater resulting from historic operations at the Site. General procedures for installing groundwater monitoring wells are provided in the ASTM guidance document D5092-04, *Standard Practice for Design and Installation of Ground Water Monitoring Wells*.

Soil assessments including stratigraphic documentation and the collection of soil samples for testing will be conducted during well installation in accordance with procedures presented in Section 6.1.2.

Well Installation and Construction

Monitoring wells within the unconsolidated overburden shall be installed using a direct push or hollow stem auger rig, depending on depth and access limitations, and constructed of newly purchased 1 to 2-inch diameter threaded flush joint, schedule 40 PVC casing and 5-10-ft screens with slot openings of 0.020-inches.

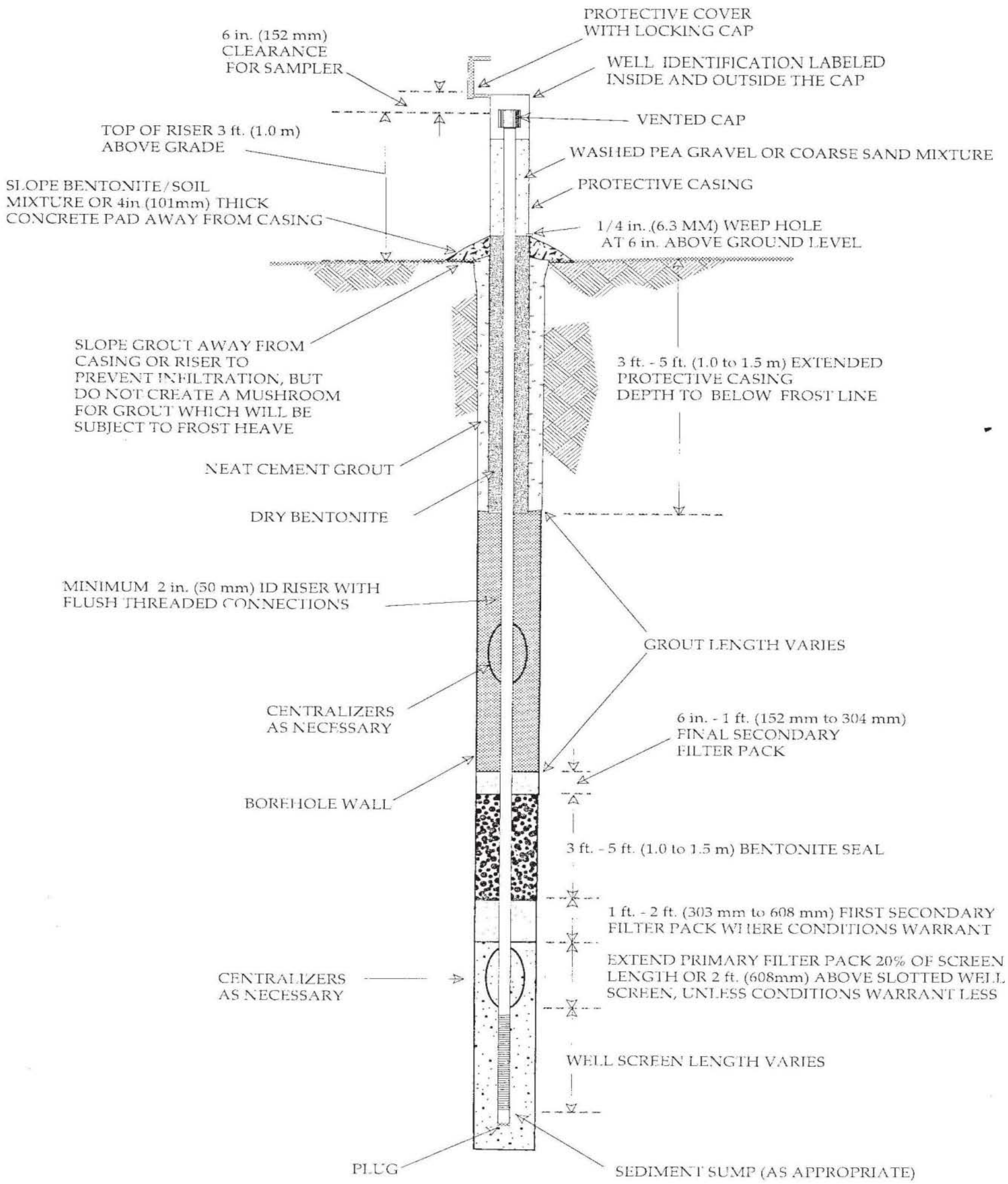

Figure 6-1: General Monitoring Well Construction Details- Unconsolidated Formation

To assess the potential for migration of dissolved chemicals a deeper overburden well to be designated MW-2D will be installed during phase II of this investigation at a location to be determined based on results of proposed groundwater flow mapping, sampling of the existing shallow wells, results of proposed sub-slab vapor testing and in consideration of prior testing results. This data is needed to determine the optimal location of the former source and position of maximum downward migration (if occurring) to the bedrock. Two options for the installation of this well will be employed:

1. if bedrock is not encountered at a depth of 35 feet below grade surface then the well will be installed such that the a 10-foot screen will extend to a total depth of 35 feet; and
2. if bedrock is encountered at a depth of less than 35 feet below grade surface then the well will be constructed with a 5-foot screen extending to the overburden/bedrock contact .

This strategy will initiate a three dimensional delineation of dissolved chemicals migrating from the source and will provide data to assess vertical groundwater flow potential, and its effect on plume migration within the unconsolidated material through comparison of hydraulic head data recorded at the differing depths.

To assess the lateral migration of dissolved chemicals from the Site a shallow well to be designated MW-11 will be installed during Phase II of this investigation at a location to be determined based on results of proposed groundwater flow mapping, sampling of the existing shallow wells, results of proposed sub-slab vapor testing and in consideration of prior testing results. This data is needed to determine to optimal location of a downgradient monitoring point with respect to the former source. The screen zone of this proposed well will be placed to bridge the water table, which based on prior site testing, is located at a depth of approximately 10 feet below land surface. This well will be constructed with a 10-ft screen and installed similarly to the existing well network (i.e., the screen zone will be set to monitor the 8-18 foot depth interval).

Approximate locations of the wells MW-2D and MW-11 that will be installed during Phase II are shown on Figure 5-1. Drill Cuttings developed during well installations will be managed in accordance with procedures provided in Appendix A (QAPP) Section 3.0.

Well Completions at Grade

It is anticipated that the monitoring wells will be installed flush to ground level. For each of the wells, appropriately sized PVC riser will extend from the top of the screen to approximately 4-inches below ground surface. A permanent mark will be made at the top of the well casing to provide a reference point from which to make future water level measurements.

Each well will be fitted with a flush-mounted steel well vault which is a minimum of two (2) inches larger in diameter than the well casings, and secured in a surface seal to adequately protect the casing. A locking cap will be provided for each well with one (1) to two (2) inches clearance between the top of the well cap and the bottom of the locking cap of the protective casing when in the locked position. The on-site hydrogeologist will provide keyed-alike padlocks for the wells.

Each well will have a concrete surface seal that will secure the protective casing in place. The surface seal will extend below the frost depth to prevent potential well damage. The top of the seal will be constructed by pouring concrete into a pre-built form with a minimum of 2-foot long sides. The seal will be finished with a sloping surface to prevent surface runoff from ponding and entering the well vault.

Monitoring Well Development

All newly installed monitoring wells will be developed by submersible pump or air-lift methods to ensure the removal of any drilling fines and to restore the hydraulic properties of the surrounding formation. All wells will be developed no sooner than twenty-four hours after installation, in order to allow the cement/bentonite grout to set properly. At no time will water be introduced into the well during well development procedures.

Purge water generated during this work will be managed in accordance with IDW procedures presented in Appendix A (QAPP) Section 3.0.

6.2.2 Groundwater Sampling

Groundwater samples will be collected from installed monitoring wells to assess groundwater quality. These procedures will include measuring water levels, purging monitoring wells and recording field parameters and through the collection of samples for analysis in the laboratory.

Groundwater samples shall be collected using a low-flow purging and sampling protocol. Further detail can be found in the ASTM guidance document D6771-02, *Standard Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Groundwater Quality Investigations.*

Groundwater Elevation Measurements

Groundwater elevation measurements are to be obtained using the following general procedures whenever depth to groundwater or groundwater elevation data is required. This may include activities such as soil borings, groundwater monitoring well installation/development, groundwater monitoring well sampling, and/or synoptic groundwater level measurements. The measurements will be collected concurrent with the groundwater sampling event and the water levels will be obtained prior to well evacuation and sample collection. The static water level will be measured to the nearest 0.01 foot.

1. Clean all water-level measuring equipment using appropriate decontamination procedures.
2. Remove locking well cap, note weather, time of day, and date, etc. in field notebook, or on an appropriate form.
3. Remove well casing cap.
4. Monitor headspace of well with a PID to determine presence of VOCs, and record in field notebook.
5. Lower water level measuring device into well until the water surface is encountered.
6. Measure distance from water surface to reference measuring point on well casing, and record in field notebook.

NOTE: if water level measurement is from either the top of protective steel casing, top of PVC riser pipe, from ground surface, or some other position on the wellhead.

7. Measure total depth of well and record in field notebook or on log form.
8. Remove all downhole equipment; replace well casing cap and locking steel caps.

9. Calculate elevation of water:

Egw = E – Dgw

Where:

Egw = Elevation of Groundwater;
E = Elevation at point of measurement; and
Dgw = Depth to Groundwater.

Field Measurement Procedures

The characterization of groundwater quality will include the measurement of indicator parameters in the field during groundwater sampling events using portable testing instruments. These parameters will include turbidity, specific conductance, pH, Eh, temperature and dissolved oxygen. It is anticipated that a flow-through cell equipped with probes and a meter for measuring these parameters will be used and the specific manufacturer's calibration and operation procedures should be followed.

Groundwater Sample Collection

The low-flow groundwater purging/sampling technique employs the use of a flow-through cell equipped with probes and a meter for measuring groundwater quality parameters such as pH, temperature, specific conductivity, and dissolved oxygen. One example of this equipment is the Horiba U-22 Flow-Through Cell and the specific manufacturer's calibration and operation instructions should be followed.

General Procedures

The following procedure will be used for all monitoring well groundwater sampling.

- Clean all water-level measuring equipment using appropriate decontamination procedures.

- Wear appropriate health and safety equipment as outlined in the HASP. In addition, samplers will don new sampling gloves at each individual well prior to sampling.
- Visually examine the exterior of the monitoring well for signs of damage or tampering and record in the field logbook.
- Unlock well cap.
- Take and record in field logbook PID readings.
- Measure the static water level in the well with a decontaminated steel tape or electronic water level indicator. The tape or water level indicator will be rinsed with deionized water in between individual wells to prevent cross-contamination. Synoptic round of water level measurements will all be completed on the same day.
- All wells will also be checked for the presence and thickness of Light or Dense Non Aqueous Phase Liquids (LNAPL/DNAPL).
- If LNAPL or DNAPL is not detected in the well, continue with the low-flow sampling procedures described below.

<u>Low-Flow Sampling</u>

The low-flow sampling procedure is intended to facilitate the collection of minimum-turbidity groundwater monitoring well samples.

Typical Sampling Equipment List

- Adjustable-rate, low flow pumping system (e.g., bladder pump, peristaltic pump). The selected pump must be specifically designed for low flow rates (i.e., use of a high volume pump that is adjusted down to a low flow setting is not permitted).
- Tubing: Tubing used in purging and sampling each well must be dedicated to that well. Once properly located, moving the pump in the well should be avoided. Consequently, the same tubing should be used for purging and sampling. Teflon® and Teflon®-lined polyethylene tubing must be used to collect samples for organic analysis. For samples collected for inorganic analysis, Teflon® or Teflon®-lined polyethylene, PVC, Tygon, or polyethylene or silicon tubing may be used.
- Electronic water level measuring device, 0.01-foot accuracy.
- Flow measurement supplies (e.g., graduated cylinder and stop watch).

- Interface probe.
- Power or air source (generator, compressed air tank, etc.).
- In-line purge criteria parameter monitoring instruments - pH, turbidity, specific conductance, temperature, and dissolved oxygen.
- Decontamination supplies.
- Field book.
- Sample bottles.
- Sample preservation supplies (as specified by the analytical methods).
- Sample tags or labels, chain of custody forms.
- Well construction data, location map, field data from last sampling event.

Sample Collection Procedure

1. Lower the pump and any associated equipment (e.g., safety cable, tubing, and e!ectric lines) very slowly into the well to a depth corresponding to the center of the saturated screen section of the well. If possible, the pump intake should be kept at least two feet above the bottom of the well to prevent mobilization of any sediment. Lowering the pump quickly, or even at a moderate rate, will result in disturbing sediment in the well. This is one of the most important steps in low flow sampling at the Site.

2. Measure the water level again with the pump in well before starting the pump. Start pumping the well at 100 to 500 milliliters per minute. Ideally, the pump rate should cause little or no water level drawdown in the well (less than 0.3 foot and the water level should stabilize).

    a. Measure and record the depth to water and pumping rate every 3 to 5 minutes (or as appropriate) during pumping. If purging continues for more than 30 minutes, readings will be recorded at approximately 10-minute intervals. However, once stabilization is indicated, a minimum of 3 consecutive readings at 3 to 5 minute intervals will be recorded prior to sample collection.
    b. Care should be taken not to cause pump suction to be broken or entrainment of air in the sample. Do not allow the groundwater level to go below the pump intake.
    c. Pumping rates should, if needed, be reduced to the minimum capabilities of the

pump to minimize drawdown and/or to ensure stabilization of indicator parameters.

3. During purging, measure and record the field indicator parameters using the in-line meter (turbidity, temperature, specific conductance, pH and dissolved oxygen) every 3 to 5 minutes (or as appropriate). If purging continues for more than 30 minutes, readings will be recorded at approximately 10-minute intervals. However, once stabilization is indicated, a minimum of 3 consecutive readings at 3 to 5 minute intervals will be recorded prior to sample collection.

    a. The well is considered stabilized and ready for sample collection once all the field indicator parameter values remain within 10 percent for 3 consecutive readings.
    b. If drawdown in the well is measured at 1 foot or more, continue to low flow purge until a minimum of the equivalent volume of 1 well casing volume is removed. Using the flow equation to calculate the volume of purge water. Then collect the groundwater sample.

    Purge water generated during well sampling will be managed in accordance with procedures provided in Appendix A (QAPP) Section 3.0.

4. Before sampling, either disconnect the in-line cell or use a bypass assembly to collect groundwater samples before the in-line cell. All sample containers should be filled by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.
5. Samples requiring pH adjustments will have their pH checked to ensure that the proper pH has been obtained. For VOC samples, this will necessitate the collection of a test sample to determine the amount of preservative that needs to be added to the sample container prior to sampling.
6. Samples for analysis of inorganic constituents will be collected directly into the laboratory supplied containers, in some instances the remainder of samples required (e.g., VOCs, SVOCs) may be collected following removal of the pumping apparatus from the well using a dedicated or properly decontaminated bailer;
7. Label the samples using waterproof labels, or apply clear tape over the paper labels. Place all samples in a cooler as described in the QAPP with bagged ice or frozen cold

packs and maintain at 4°C for delivery to the laboratory.

8. Do not use ice for packing material; melting will cause bottle contact and possible breakage.
9. Measure and record well depth. Take final water quality reading using low flow cell.
10. Secure the well.

6.3 Soil Vapor Assessment

The presence of volatile compounds in soil vapor will be assessed using procedures specified in the New York State Department of Health's Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006). All air samples will be collected during the heating season (November 15 through March 31 period) using laboratory supplied and evacuated 6L Summa Canisters over an 8-hour collection period.

6.3.1 Sub-slab Soil Vapor Sampling

Prior to installation of the sub-slab vapor probes SSV-2 and SSV-3, the building floor will be inspected and any penetrations (cracks, floor drains, utility perforations, sumps, etc.) will be noted and recorded. Probes will be installed at locations where the potential for ambient air infiltration via floor penetrations is minimal to the extent practicable.

Sub-slab vapor probes installed may be permanent, semi-permanent or temporary. Sub-slab implants or probes will be constructed in the same manner at all sampling locations to minimize possible discrepancies. The following general procedures will be included in any construction protocol:

a. permanent recessed probes should be constructed with brass or stainless steel tubing and fittings;
b. temporary probes should be constructed with inert tubing (e.g., polyethylene, stainless steel, nylon, Teflon®, etc.) of the appropriate size (typically 1/8 inch to ¼ inch diameter), and of laboratory or food grade quality;
c. tubing should not extend further than 2 inches into the sub-slab material;
d. porous, inert backfill material (e.g., glass beads, washed #1 crushed stone, etc.) should be

added to cover about 1 inch of the probe tip for permanent installations; and

e. the implant should be sealed to the surface with non-VOC-containing and non-shrinking products for temporary installations (e.g., permagum grout, melted beeswax, putty, etc.) or cement for permanent installations.

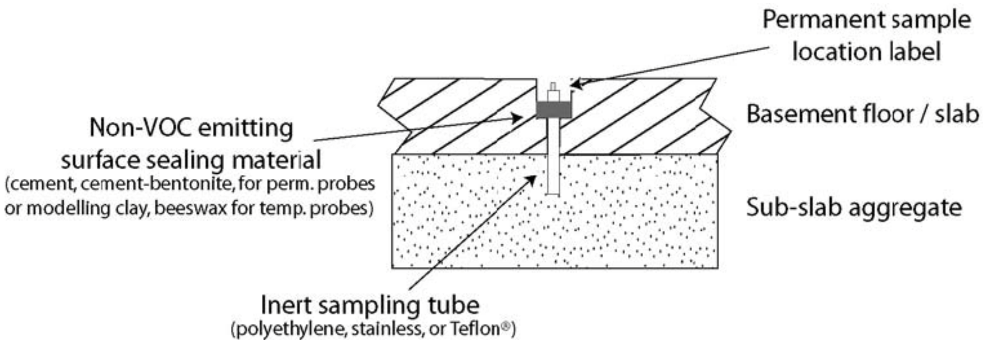

Figure 6-2: Sub-slab Vapor Probe Construction

Sub-slab Vapor Sampling:

To obtain representative samples that meet the data quality objectives, sub-slab vapor samples will be collected in the following manner:

a. after installation of the probes, one to three volumes (i.e., the volume of the sample probe and tube) must be purged prior to collecting the samples to ensure samples collected are representative;

b. flow rates for both purging and collecting must not exceed 0.2 liters per minute to minimize ambient air infiltration during sampling; and

c. samples should be collected, using conventional sampling methods, in an appropriate container — one which;

i. meets the objectives of the sampling (e.g., investigation of areas where low or high concentrations of volatile chemicals are expected; to minimize losses of volatile chemicals that are susceptible to photodegradation),

ii. is consistent with the sampling and analytical methods (i.e., low flow rate; Summa® canisters analyzing by using EPA Method TO-15), and

iii. is certified clean by the laboratory;

d. sample size depends upon the volume of that will achieve minimum reporting limits, the flow rate, and the sampling duration; and

e. ideally, samples should be collected over the same period of time as concurrent indoor and outdoor air samples.

When sub-slab vapor samples are collected, the following actions will be taken to document conditions during sampling and ultimately to aid in the interpretation of the sampling results:

a. current storage and uses of volatile chemicals should be identified;

b. the use of heating or air conditioning systems during sampling will be noted;

c. floor plan sketches will be drawn that include the floor layout with sampling locations, chemical storage areas, doorways, stairways, location of basement sumps or subsurface drains and utility perforations through building foundations, HVAC system air supply and return registers, compass orientation (north), footings that create separate foundation sections, and any other pertinent information should be completed;

d. outdoor plot sketches will be drawn that include the building site, area streets, outdoor air sampling locations (if applicable), compass orientation (north), and paved areas;

e. weather conditions (e.g., precipitation and indoor and outdoor temperature) and ventilation conditions (e.g., heating system active and windows closed) will be reported; and

f. any pertinent observations, such as spills, floor stains, smoke tube results, odors and readings from field instrumentation (e.g., vapors via PID, ppbRAE, Jerome Mercury Vapor Analyzer, etc.), will be recorded.

The field sampling team will maintain a sample log sheet summarizing the following:

- Sample identification;
- Date and time of sample collection;
- Sampling depth;
- Identity of samplers;
- Sampling methods and devices;
- Purge volumes;
- Volume of soil vapor extracted;
- Canister vacuum before and after samples were collected;
- Apparent moisture content (dry, moist, saturated, etc.) of the sampling zone; and

- Chain of custody protocols and records used to track samples from sampling point to analysis.

Tracer gas:

When collecting sub-slab soil vapor samples (e.g., SSV-2 and SSV-3), a tracer gas will be used as a quality assurance/quality control measure to verify the integrity of the soil vapor probe seal. Without the use of a tracer, there is no way to verify that a soil vapor sample has not been diluted by outdoor air. Helium will be used as the tracer as it is readily available, has low toxicity, can be monitored with portable measurement devices and can be detected in the laboratory.

The protocol for using a tracer gas is straightforward: simply enrich the atmosphere in the immediate vicinity of the area where the probe intersects the ground surface with the tracer gas, and measure a vapor sample from the probe for the presence of high concentrations (> 10%) of the tracer. A plastic pail will serve to keep the tracer gas in contact with the probe during the testing.

Figure 6-3 depicts the method that will be employed for tracer gas testing. The selected tracer gas (helium) will be released in the enclosure prior to initially purging the sample point, taking care to avoid excessive purging prior to sample collection. Care will also be taken to prevent pressure build-up in the enclosure during introduction of the tracer gas. Inspection of the installed sample probe, specifically noting the integrity of the surface seal and the porosity of the soil in which the probe is installed, will help to determine the tracer gas setup.

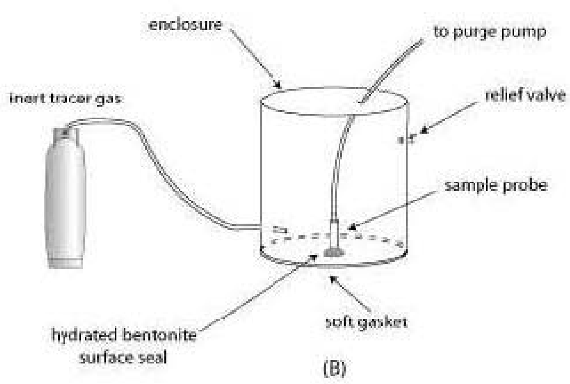

Figure 6-3: Helium Tracer Testing Schematic

The tracer gas (helium) will be included in the list of target analytes reported by the laboratory for the sub-slab samples.

6.3.2 Indoor Air Sampling

The proposed testing will be conducted during the heating season that spans the time period November 15 through March 30. In these colder months, heating systems should be operating to maintain normal indoor air temperatures (i.e., 65 – 75 °F) for at least 24 hours prior to and during the scheduled sampling time. Prior to collecting indoor samples IA-1 and IA-2, a pre-sampling inspection will be performed to evaluate the physical layout and conditions of the building being investigated, to identify conditions that may affect or interfere with the proposed sampling, and to prepare the building for sampling.

The indoor air samples will be collected in the following manner:

a. sampling duration will reflect the exposure scenario being evaluated without compromising the detection limit or sample collection flow rate (i.e., an 8 hour sampling duration will be used);
b. personnel will avoid lingering in the immediate area of the sampling device while samples are being collected;
c. sample flow rates will conform to the specifications in the sample collection method and will be consistent with the flow rates for concurrent outdoor air and sub-slab samples; and
d. samples will be collected, using conventional sampling methods, in laboratory prepared and supplied 6L Summa canisters:

The following actions will be taken to document conditions during indoor air sampling and ultimately to aid in the interpretation of the sampling results:

a. historic and current uses and storage of volatile chemicals will be identified, as feasible, (e.g., use of volatile chemicals in commercial or industrial processes and/or during building maintenance);

b. a product inventory survey documenting sources of volatile chemicals present in the building during the indoor air sampling that could potentially influence the sample results will be completed;
c. the use of heating or air conditioning systems during sampling will be noted;
d. floor plan sketches should be drawn that include the floor layout with sampling locations, chemical storage areas, doorways, stairways, location of basement sumps or subsurface drains and utility perforations through building foundations, HVAC system supply and return registers, compass orientation (north), footings that create separate foundation sections, and any other pertinent information will be completed;
e. outdoor plot sketches will be drawn that include the building site, area streets, outdoor air sampling locations, compass orientation (north), and paved areas;
f. weather conditions (e.g., precipitation and indoor and outdoor temperature) and ventilation conditions (e.g., heating system active and windows closed) will be reported; and
g. any pertinent observations, such as spills, floor stains, odors and readings from field instrumentation (e.g., via ppbRAE), will be recorded.

Additional documentation including photographs to accompany floor plan sketches.

The field sampling team will maintain a sample log sheet summarizing the following:

a. sample identification,
b. date and time of sample collection,
c. sampling height,
d. identity of samplers,
e. sampling methods and devices,
f. vacuum of canisters before and after samples collected, and
g. chain of custody protocols and records used to track samples from sampling point to analysis.

6.3.3 Outdoor Air Sampling

An outdoor air sample (OA-1) will be collected simultaneously with the soil vapor and indoor air samples to identify potential outdoor air interferences associated with infiltration of outdoor air into the sampling apparatus while the soil vapor was collected. To obtain representative samples that meet the data quality objectives, the outdoor air sample will be collected in a manner consistent with that for the soil vapor samples. The outdoor air sample will be situated at an upgradient on-site location with respect to wind direction on the day of sample collection. If no wind is detected or a direction cannot be reliably confirmed, the outdoor sample will be located on the western side of the Site.

The following actions will be taken to document conditions during outdoor air sampling and ultimately to aid in the interpretation of the sampling results:

1. An outdoor plot sketch will be drawn that include the testing site, area streets, outdoor air sampling locations, the location of potential interferences (e.g., gasoline stations, factories, lawn movers, etc.), compass orientation (north), and paved areas;
2. Weather conditions (e.g., precipitation and outdoor temperature) will be reported; and
3. Pertinent observations, such as odors, readings from field instrumentation, and significant activities in the vicinity (e.g., operation of heavy equipment or dry cleaners) will be recorded.

7.0 COMMUNITY-ORIENTED ACTIVITIES

7.1 Community Air Monitoring Plan (CAMP)

The following procedures will be employed to address potential community health and safety issues associated with residual materials that may be encountered during outdoor investigative activities that will be conducted at the Site. As a result of prior testing conducted it was found that soil, soil vapor and groundwater present at the Site contain chemicals including tetrachloroethylene. It is possible that certain intrusive activities, such as soil testing and monitoring well installations, may have the potential to expose members of the nearby community to airborne materials on a short-term basis.

The CAMP will be implemented at the by environmental professionals during intrusive activities that involve materials that have the potential to affect the surrounding community. Due to the nature of the activities, there is the potential for organic vapor and/or dust emissions to occur as these activities are conducted. In addition, there is the potential for generation of organic vapors and/or dust associated mechanical equipment that may be utilized to implement these invasive activities. To address these concerns, organic vapor and dust monitoring will be performed.

7.1.1 Organic Vapor Monitoring

Under the CAMP, organic vapor concentrations will be monitored by an environmental professional at the downwind perimeter of the work area while intrusive activities are occurring. In general, the work area will be a 30-foot radius around the work zone, or the Site boundary, whichever is smaller. To monitor organic vapors, a photoionization detector (PID) will be used and maintained in good operating condition. Calibration of the PID will be performed according to manufacturer's instructions. Background levels of organic vapors will be measured at the Site prior to beginning work and upwind of the work area periodically using a PID. Organic vapors will be monitored at the downwind perimeter of the work area while intrusive activities are occurring and will be averaged on a 15-minute basis. PID readings will be recorded in the field logbook and will include the time, location, and PID readings observed. The action levels and required responses are as follows:

Organic Vapor Readings	
Action Level	*Response Actions*
Less than 5 ppm above background	*Continue Work*
More than 5 ppm but less than 25 ppm above background	*Implement Vapor Emission Response Plan*
More than 25 ppm above background	*Stop Work. Perform downwind monitoring in accordance with Vapor Emission Response Plan (see below)*

The *Vapor Emission Response Plan* includes the following trigger levels and responses:

- In the event the level of organic vapors exceeds 5 ppm above the background at the downwind perimeter of the work area on a 15-minute average basis, activities will be halted and monitoring continued. Work may resume if the organic vapor level then decreases to below 5 ppm above background, or concentrations measured 200 feet downwind or at half of the distance to the nearest residential or commercial building, whichever is less, are below 5 ppm over background;

- If the level of organic vapors measured 200 feet downwind or at half of the distance to the nearest residential or commercial structure, whichever is less, is greater than 5 ppm above background then all work will be halted, the vapor source will be identified, and corrective actions taken. If the level at the downwind location persists above 5 ppm over background after work stops and corrective actions are taken, then monitoring will be performed within 20 feet of the nearest downward residential or commercial structure (20-foot zone); and
- If efforts to abate the emission source are unsuccessful and the vapor levels are greater than 25 ppm above background in the 20-foot zone, then work will be halted.

7.1.2 Particulate Monitoring

Particulate (dust) monitoring will be performed with a MINIRAM personal monitor (or equivalent) calibrated according to the manufacturer's instructions. Monitoring will be performed within, upwind and downwind of the work area by an environmental professional during activities involving residual soil movement. The readings will be recorded in the environmental professional's field logbook.

If the downwind particulate level integrated over 15 minutes exceeds the upwind level by more than 100 micrograms per cubic meter *(ug/m^3)* or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Dust suppression techniques are anticipated to include reducing moving equipment rates and/or application of water to dry surfaces. Work may continue with dust suppression techniques providing that the downwind particulate level does not exceed the upwind particulate level by more than 150 ug/m^3.

If, after implementation of dust suppression techniques, downwind particulate levels are greater than 150 ug/m^3 above upwind levels, then work will stop and activities will be reevaluated. Work may resume providing that dust suppression techniques and other controls are successful in reducing the downwind particulate level to within 150 ug/m^3 of the upwind level and in preventing visible dust migration.

7.2 Citizen Participation

To facilitate the remedial process and enable citizens to participate in decisions that affect their health, environment, and social well being, opportunities for citizen involvement will be provided and two-way communication with citizens will be encouraged before decision makers form or adopt final positions.

DER defines citizen participation (CP) in relation to its remedial programs as:

A program of activities that provides opportunities for citizens to participate early and in an ongoing way in the decision-making process for the remediation of contaminated sites. The CP program promotes communication among people affected by or interested in contaminated sites, DEC, and parties responsible for their investigation and remediation.

DER's CP program includes the following goals:

- Promote the development of timely, effective site remedial programs that protect public health and the environment;
- Enhance the public's access to, and understanding of, issues and information related to a site and that site's remedial process;
- Provide citizens with early and continuing opportunities to participate in DER's site remedial process and timely notice of such opportunities; and
- Ensure that DER staff make site remedial decisions after considering the input and concerns of the affected and interested community.

To accomplish these goals CP activities are conducted to achieve the following objectives:

- Provide a process for the affected and interested public to become well informed about site issues and information and to effectively participate in the decision making process for site remedial actions;
- Foster meaningful public participation that reflects the diversity of interests and perspectives found within the community;
- Solicit public comments at formal milestones, and encourage public input at any time during the site remedial process;
- Encourage dialogue to promote the exchange of information among the affected and interested public, governmental agencies, and other interested parties that strengthens

trust among the parties, increases understanding of site and community issues and concerns, and improves decision making;

- Provide timely and courteous responses to citizen requests and concerns; and
- Inform the public, gather informed public input, and minimize needless delays caused by uncertainty or lack of information.

The Citizen Participation Plan (CPP) developed in accordance with DER-23 Section 3 "Brownfield Cleanup Program Citizen Participation Requirements" for the implementation of RI activities at the Site is provided in Appendix C.

7.2.1 CP Activities Associated with Implementation of the Amended RIWP

A copy of the Amended RIWP will be placed into the established document repositories for public review.

8.0 PROJECT SCHEDULE

The activities described herein will only be initiated after receiving NYSDEC approval to proceed with the tasks described in this Amended Remedial Investigation Work Plan. Implementation of the work will be conducted in accordance with the schedule presented in Figure 8-1.

	(Weeks From NYSDEC Approval on Amended RIWP)											
Amended RIWP Phase I Implementation Activity	1	2	3	4	5	6	7	8	9	10	11	12
Project Initiation												
Soil Sampling												
Groundwater Sampling												
Laboratory Analysis												
Monitoring Well Surveying												
DUSR Preparation			(Tapash Reporting)					(Phase I Reporting)				
Provide Interim Summary Report to NYSDEC												(1)

	(Weeks From NYSDEC Approval of Phase II Scope)											
Amended RIWP Phase II Implementation Activity	1	2	3	4	5	6	7	8	9	10	11	12
Phase II Mobilization												
Monitoring Well Installation												
Monitoring Well Surveying												
Groundwater Sampling												
Laboratory Analysis												

	(Weeks - Beginning November 15)											
RIWP Completion	1	2	3	4	5	6	7	8	9	10	11	--------
SVI Sampling (2,3,4)												
Laboratory Analysis												
DUSR Preparation						Phase II and SVI Reporting						

Provide RI Report to NYSDEC												(5)

Notes:
1 - Includes presentation of updated Phase II Scope of Work.
2 - Testing to be conducted during heating season In accordance with NYSDOH requirements.
3 - Includes sub-slab soil vapor, indoor air and outdoor air sampling.
4 - Completion of work scope is contingent upon securing an access agreement with NY Sports Club for testing.
5 - One month after completion of RI scope implementation including receipt of all final lab and DUSR reports.

Figure 8-1: Amended RI Implementation Schedule

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APPENDICES