SUB-SLAB VAPOR and INDOOR AIR MONITORING

A LOT IN DELMAR, INC.
154 & 156 DELAWARE AVENUE PROPERTIES
DELMAR, ALBANY COUNTY, NEW YORK 12054

SPILL NO. 0602941

Prepared for:

A LOT IN DELMAR, INC.
Ms. Betty Smith
3409 Bedford Court
Naples, Florida 34112

Prepared by:

H2H Associates, LLC
179 River Street
Troy, New York 12180

February 27, 2009
Revised March 12, 2009

TABLE OF CONTENTS

LIST OF FIGURES

ATTACHMENT

1.0 GENERAL

This section addresses background, purpose and scope, work organization, work schedule and duration, and an outline of decontamination procedures.

1.1 BACKGROUND

This background section summarizes project and site description, site ownership history, and overall environmental conditions.

1.1.1 Project and Site Description

The site is located on the northernmost portion of the 1.1-acre parcel (Town of Bethlehem tax parcel 86.10-2-1) and 1.0-acre parcel (Town of Bethlehem tax parcel 86.10-2-2) in the northeastern section of the hamlet of Delmar in the Town of Bethlehem, New York (Figure 1). The area of previous investigation was located south of Delaware Avenue (Albany County Route 443), west of the Hess Station, north of an inactive rail easement owned by Canadian Pacific Railway, and east of an improved easement owned by the City of Albany Water Board (Figure 2).

1.1.2 Site Ownership/History

A summary of site ownership for the two subject parcels is provided in Attachment 1. A Lot in Delmar, Inc. acquired the Site from Kathryn Smith who repurchased the parcels from Fleet Trust Company, which served as the executor for the estate of Leonard C. Smith. Leonard C. Smith and Kathryn Smith had previously owned the Site and other nearby properties since 1960 (Spectrum Phase I ESA, October 13, 2006).

The 156 Delaware Avenue portion of the site is currently leased to an operating dry cleaning business (Best Cleaners NY). Best Cleaners NY acquired the business from ROXY United Cleaners, Inc. (ROXY) on March 5, 2005. ROXY had previously operated a dry cleaning operation at this location for several decades. The Site had also operated as a bus depot, although the northwestern portion of the Site was not believed to be part of the bus depot.

1.1.3 Overview of Environmental Conditions

Previous site investigation results revealed the following:

- *Surface Topography:* The Site was relatively flat with no vegetative ground cover. The western and northern segments of the Site are paved. No free product, sheen, or staining was observed at ground surface, in the subsurface soil, or groundwater. Based on Site history, chlorinated solvents and its degradation byproducts (PCE, TCE, cis 1,2-DCE, and vinyl chloride) are considered the target VOCs at the Site.

- *Geologic Conditions:* Soils encountered at the Site were low permeability varved, glaciolacustrine clayey silt.

- *Hydrogeologic Conditions:* The groundwater at the Site can be characterized as a shallow, perched system. The inferred depth to water table was variable, ranging from 3.25 feet below ground surface (BGS) to 4.30 feet BGS. Although there were no surveyed elevations to reference, it was inferred that the groundwater flow direction was to the south and east with a low hydraulic gradient.

- *Subsurface Soil Quality:* Elevated concentrations of target VOCs were observed in the soil immediately south of the subject building. In addition, the presence of VOC-impacted soils appeared to decrease with distance away from the southern portion of the building.

  Analytical results for three soil samples (GB-3-07 [depth: 10-12'], GB-6-07 [10-12'], and GB-12-07 [10-12']) indicated tetrachloroethane (PCE) at concentrations ranging from 2,100 µg/kg to 23,000 µg/kg. These concentrations exceeded the NYSDEC Recommended Soil Cleanup Objective (RSCO) for PCE, which is 1,400 µg/kg. The NYSDEC RSCO for Total VOCs (10,000 µg/kg) was also exceeded in one area immediately south of the subject building, possibly indicating that this area is close or near to the potential source area(s).

  VOC contamination was not observed in the subsurface soil northwest and north of the subject building at the Site.

  No other VOCs (i.e., petroleum-related hydrocarbons and aliphatic hydrocarbon solvents) or SVOCs were detected in the subsurface soil samples selected for laboratory analysis.

  Based upon the data collected to date, the impacts to Site soils are localized beneath the southern exterior of the subject building as a result of historical waste management practices by ROXY.

- *Groundwater Quality:* Elevated concentrations of target VOCs were observed in the groundwater beneath and south of the southern portion of the building in the vicinity of several potential source areas. NYSDEC groundwater standards were exceeded for each of the target VOCs, except for TCE (GB-1-07).

  No other VOCs (i.e., petroleum-related hydrocarbons and aliphatic hydrocarbon solvents) or SVOCs were detected in the groundwater samples selected for laboratory analysis.

- *Sub-Slab Vapor Quality / Subsurface Soil Vapor Quality:* Sub-slab vapor and subsurface soil vapor levels at the Site are elevated beneath or within potential source areas (Figure 3). Results indicate that there is a potential hazard to indoor air based on NYSDOH's FINAL Guidance for Evaluating Soil Vapor Intrusion (NYSDOH, October 2006). The most recent set of indoor air samples collected at the 154 Delaware Avenue (2A) and 156 Delaware Avenue (1A) buildings revealed the need for additional monitoring.

1.2 PURPOSE AND SCOPE

Ms. Betty Smith (Owner of A Lot in Delmar, Inc.) has retained H2H Associates, LLC (H2H) to prepare this vapor monitoring program for the Site. This Work Plan outlines the activities (including methods and procedures) to be performed to satisfy monitoring requirements as specified by the New York State Department of Health (NYS DOH) and their FINAL Guidance for Evaluating Soil Vapor Intrusion.

The Work Plan is provided to outline the scope of work necessary to assess whether there is a potential for an exposure to workers or customers at LC Smith Pet Center (154 Delaware Avenue) or Best Dry

Cleaners (156 Delaware Avenue). Following evaluation of the data, a vapor mitigation system will be installed in each affected area, if warranted. Remediation will include the design and installation of the vapor mitigation system for affected buildings.

Remaining portions of Section 1.0 of this Work Plan provide additional general information. Section 2.0 presents a brief outline of the monitoring and construction procedures that will be followed. Section 3.0 provides a Contingency Plan that will be followed in the event that potentially hazardous wastes are encountered during the vapor/indoor air sampling activities and/or remediation system installation. All personnel directly involved with the excavation activities, including NYSDEC/NYSDOH personnel and the contractor, will be required to review and abide by the Work Plan.

A Field Health and Safety Plan (FHSP) has been developed for use with this Work Plan. The FHSP has been prepared to ensure the health and safety of workers and the immediate community during performance of this IRM.

1.3 WORK ORGANIZATION

The sub-slab vapor and indoor air monitoring will be implemented in accordance with the project drawings and specifications. In particular, the Proposed Sub-Slab Vapor / Indoor Air Sampling Points Map (Figure 4) outlines the proposed sampling locations for sub-slab vapor and indoor air for this monitoring phase of the project.

H2H will provide continuous on-site oversight and inspection services for the sub-slab vapor and indoor air. A qualified outside contractor (O'Rourke, Inc. of Owego, New York) will install the vapor mitigation system(s), if applicable. All contractors and consultants providing on-site work services will be responsible for preparing and implementing an acceptable Health and Safety Plan pursuant to the requirements contained in 29 CFR Part 1910, relative to their work assignments and responsibilities.

1.4 WORK SCHEDULE AND DURATION

The vapor and indoor air monitoring is presently scheduled to commence in the first week of March 2009. Proposed work hours will be during the weeknights from 5:00 P.M. to 7:00 A.M., to minimize potential disturbances to active commercial businesses and their customers. Additionally, the work is scheduled to occur during periods of reduced temperatures and seasonally lower water table conditions, which will assist in minimizing the potential for odors, nuisance dust, and vectors.

1.5 DECONTAMINATION PROCEDURES

A temporary decontamination (decon) pad will be built on-site south of the 156 Delaware Avenue building in an area between the impacted and clean zones. The decon pad will consist of a polyethylene lined pad, which will be sloped to drain to a sump area. The decon water will be impounded and recovered for disposal.

All project equipment and vehicles will be appropriately decontaminated prior to being removed from the Site. All equipment that contacted impacted materials will be thoroughly washed to remove all waste residues. Mud will be washed from the tires of any over-the-road vehicles as necessary to prevent mud tracking from the Site onto Delaware Avenue.

2.0 SAMPLING, SCREENING AND ANALYSIS

Two sub-slab vapor screening samples (1-SSV-09 and 3-SSV-09) and four indoor air sampling points (1-09, 2-09, 3-09, and 4-09) will be collected, at the locations noted in Figure 4 and will be submitted to a laboratory for analysis (EPA TO-15 parameters).

2.1 SUB-SLAB VAPOR

Sub-slab vapor samples will be collected in 1.0 liter certified clean summa canisters.

The following procedures will be included in the probe construction protocol:

- boring will be installed using hand augers or direct push technology;
- Samples will be collected from directly beneath the slab and the tubing will not extend further than 2 inches into the sub-slab material;
- porous backfill material (e.g., coarse grade Unimin® sand) will be used to create a sampling zone 1 to 2 feet in length;
- boring will be fitted with inert tubing with mesh screen at the end of the tubing (e.g., ¼-inch inside diameter (I.D.) Schedule 40 PVC); and
- soil vapor probe will be sealed above the sampling zone with bentonite to prevent outdoor air infiltration, and the remainder of the borehole will be backfilled with clean material.

The following will be included in the sampling procedures:

- soil vapor screening sample will be collected 24 hours after the implant assembly has been installed;
- one to three implant volumes (i.e., the volume of the sample probe and tube) will be purged prior to collecting the sample to make sure the sample collected is representative;
- flow rates for both purging and collecting will not exceed 0.2 liters per minute to minimize outdoor air infiltration during sampling;
- sample will be collected, using conventional sampling methods, in 1.0 liter certified-clean summa canisters;
- sample will be analyzed for EPA TO-15 parameters by an ELAP-certified laboratory; and
- a tracer gas (e.g., 1,1-difluoroethane, tetrafluoroethane, helium, etc.) will be used when collecting the soil vapor screening sample to provide a means of quality control (QC) to make sure that adequate sampling techniques are being implemented (i.e., to verify infiltration of outdoor air is not occurring).

The following action will be undertaken to document local conditions during sampling that may influence interpretation of the results:

- plot sketches will be drawn that include the site, area streets, neighboring commercial or industrial facilities (with estimated distance to the site);
- weather conditions (e.g., precipitation, outdoor temperature, barometric pressure, wind speed and direction) will be recorded for the 24 to 48 hours before sampling; and
- pertinent observations will be recorded, such as odors and readings from field equipment.

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;
- vacuum before and after samples collected;
- apparent moisture content (i.e., dry, moist, saturated, etc.) of the sampling zone; and
- chain of custody protocols to track samples from sampling point to analysis.

The detection limits achieved by the sample analysis will be equal to or less than 1 microgram per cubic meter ($\mu g/m^3$) for each compound.

2.2 INDOOR AIR

In general, indoor air samples (Samples 1-09, 2-09, 3-09, and 4-09) will be collected in a similar manner as the sub-slab samples. Each indoor air sample will be collected in a 1.0 liter certified clean summa canister and will be analyzed for EPA TO-15 for VOCs by an ELAP-certified laboratory. The detection limit for trichloroethylene (TCE) will be 0.25 $\mu g/m^3$.

Sampling duration will reflect the exposure scenario being evaluated without compromising the detection limit or sample collection flow rate (e.g., an 8-hour sample from a workplace with a single shift). Personnel will avoid lingering in the immediate area of the sampling device while samples are being collected. Sample flow rates will conform to the specifications in the sample collection method and, if possible, will be consistent with the flow rates for concurrent sub-slab samples.

The detection limits achieved by the indoor air and sub-slab samples will be equal to 1 microgram per cubic meter ($\mu g/m^3$) for each compound. Once the data is collected, submitted for laboratory analysis, and analyzed, the results of the indoor air, sub-slab vapor, and soil vapor probes will help determine whether on-site soil vapors contain Site-related compounds and whether there is a potential for on-site and off-site soil vapor impacts.

3.0 SOIL VAPOR INTRUSION (SVI) MITIGATION SYSTEM(S)

The most effective mitigation methods involve sealing infiltration points and actively manipulating the pressure differential between the building(s) interior and exterior (on a continuous basis). In fact, SVI mitigation systems use similar guidance and protocols established by the EPA to reduce exposures to radon in their "Consumer's Guide to Radon Reduction" (EPA 402-K-03-002; revised February 2003). The appropriate mitigation method to use will largely depend upon the building(s) foundation design. Furthermore, buildings having more than one foundation design feature (e.g., a basement under one portion of the house and a crawl space beneath the remainder) may require a combination of mitigation methods. Occasionally, there are site-specific or building-specific conditions under which alternative methods (such as HVAC modification, sealing, room pressurization, passive ventilation systems, or vapor barriers) may be more appropriate. Such mitigation proposals may be considered on a case-by-case basis.

This section describes methods of mitigation that are expected to be the most reliable given site conditions.

154 & 156 Delaware Avenue Buildings

For buildings with a basement slab (152 Delaware Avenue Building) or slab-on-grade foundation (156 Delaware Avenue Building), in conjunction with sealing potential subsurface vapor entry points, an active sub-slab depressurization system (SSD system) is the preferred mitigation method for buildings with a basement slab or slab-on-grade foundation. A SSD system will use a fan-powered vent and piping to draw vapors from the soil beneath the building(s) slab (i.e., essentially creating a vacuum beneath the slab) and discharge them to the atmosphere. This results in lower sub-slab air pressure relative to indoor air pressure, which prevents the infiltration of sub-slab vapors into the building(s). The most common approach to achieving depressurization beneath the slab is to insert the piping through the floor slab into the soil underneath. If a mitigation is installed, up to four extraction points will be installed per affected building. To facilitate soil vapor extraction, the Contractor will:

- Install extraction points by saw cutting the floor;
- Excavate soil under the slab;
- Install angular #2 stone and Schedule 40 PVC pipe;
- Patch and repair the concrete slab;
- Install PVC risers, couplers, elbows and horizontal runs, as necessary, to exhaust soil vapor along exterior side wall of affected building;
- Repair and fire caulk wall penetrations;
- Install fan(s) and pressure gages in SSD system. Need to determine if separate systems will be used or if all PVC will be plumbed together with 1 large extraction fan; and
- Complete all electrical connections, including installation of a dedicated electrical panel for the SSD system.

The following approaches are provided as ways to reduce vapor intrusion levels in a building(s), either in place of the more common sub-slab suction point method or in conjunction with that method:

- *Drain tile suction* - Some buildings have drain tiles or perforated pipe to direct water away from the foundation of the building. Suction on these tiles or pipes is often effective;

- *Sump hole suction* - If the building(s) has a sump pump to remove unwanted water, the sump can be capped so that it can continue to drain water and serve as the location for piping. If the sump is not used as the suction or extraction point, the associated wiring and piping should be sealed and an air-tight cover should be installed to enhance the performance of the SSD system; and
- *Block wall suction* - If the building has hollow block foundation walls, the void network within the wall may be depressurized by drawing air from inside the wall and venting it to the outside. This method is often used in combination with sub-slab depressurization.

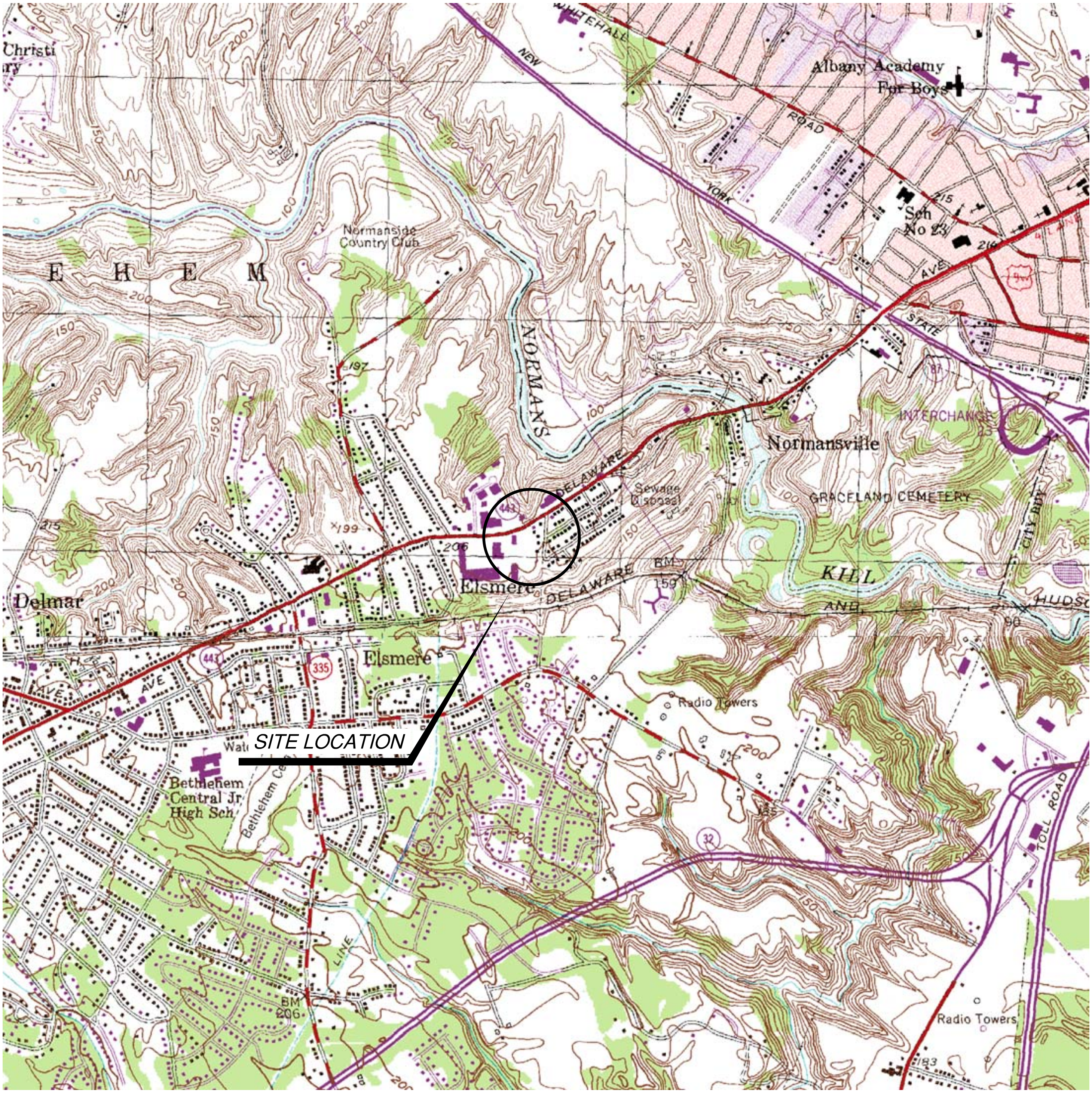
The depressurization approach, or combination of approaches, selected for a building will be determined on a building-specific basis due to building-specific features that may be conducive to a specific depressurization approach. For example, if the contaminants are entering the building through a block wall, block wall suction in conjunction with traditional sub-slab depressurization may be more effective at minimizing exposures related to soil vapor intrusion rather than sub-slab depressurization alone.

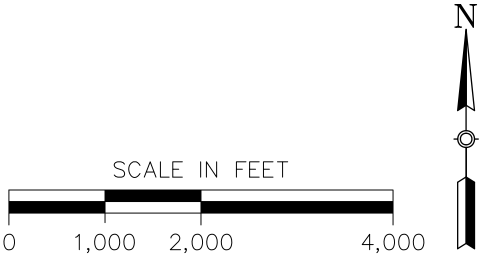
Although sealing is not a reliable mitigation technique on its own, it can significantly improve the effectiveness of a SSD system since it limits the flow of subsurface vapors into the building. If a mitigation system is installed, the Contractor will seal all floor cracks with low solvent content caulk. All joints, cracks and other penetrations of slabs, floor assemblies and foundation walls below or in contact with the ground surface should be sealed with materials that prevent air leakage.

If the State concurs that a SSD system is not a practicable alternative or that exposures will be mitigated concurrently by a method selected to remediate subsurface contamination, alternative mitigation methods may be considered, such as the following:

- *HVAC modification* - a technique where the building's HVAC system is modified to avoid depressurization of the building relative to underlying and surrounding soil (i.e., to maintain a positive pressure within the building); and
- S*oil vapor extraction (SVE) system* - a technique used to remediate contaminated subsurface soil vapor. SVE systems use high flow rates, induced vacuum or both to collect and remove contamination, while SSD systems use a minimal flow rate to affect the minimum pressure gradient needed to reverse air flow across a building's foundation. Depending upon the SVE system's design, the system may also serve to mitigate exposures. For example, the SVE system's radius of influence includes the subsurface beneath affected buildings or horizontal legs of the system will be installed beneath affected buildings. However, complications can arise if the SVE system is no longer effective at remediating contaminated vapors, exposures should still be mitigated due to residual vapor contamination.

FILENAME: P:\2009\A Lot in Delmar\156 Delaware Avenue\Drawing Files\CADD Drawings\02-23-09 - Figure 1.dwg DATE: FEB 23, 2009 TIME: 3:58 PM





SOURCE: USGS 7.5 min. QUADRANGLES ALBANY AND DELMAR, NY

THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES

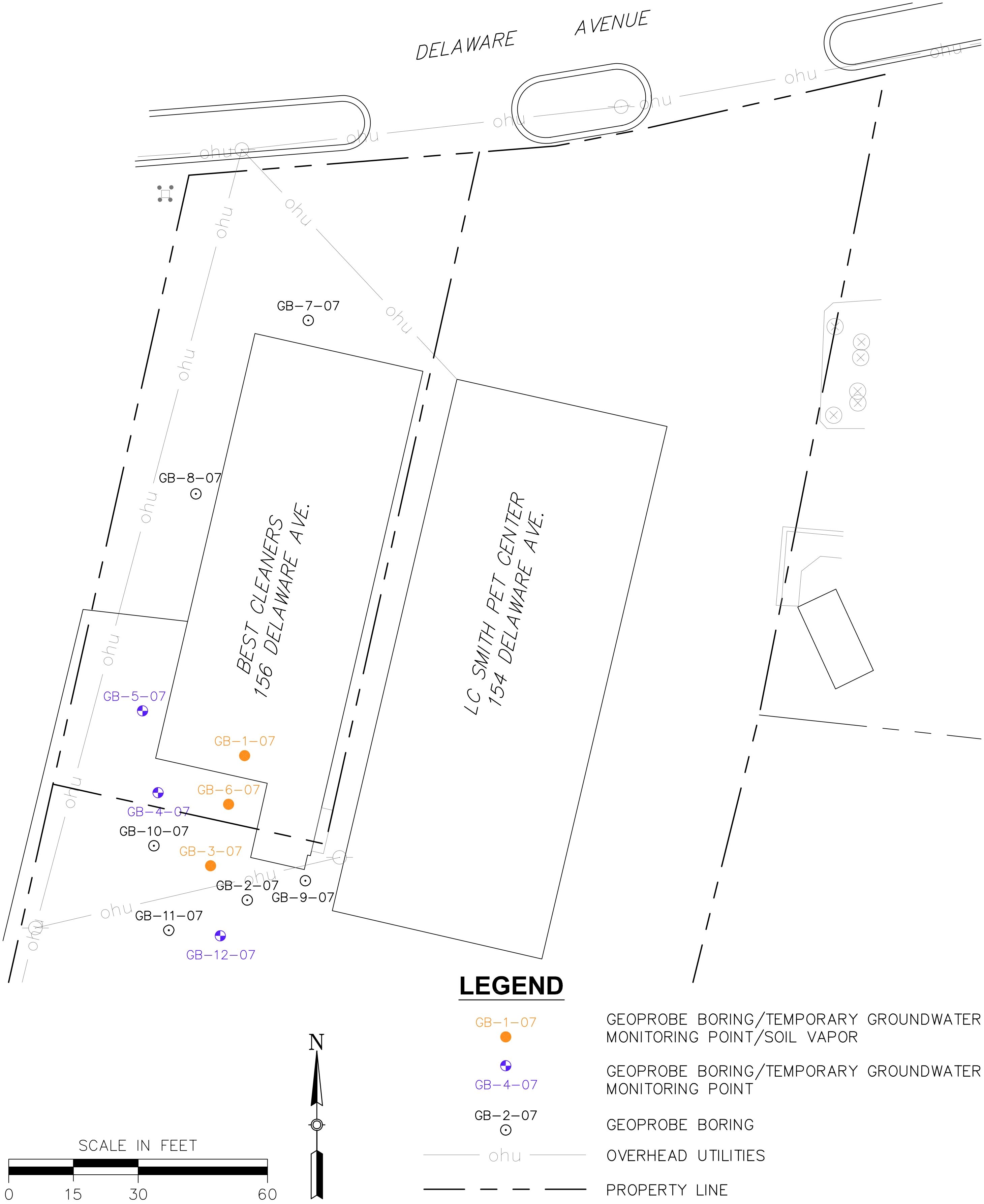
DRAWN BY: ASM
DESIGN BY: MAW
CHECK BY: MAW
PROJ. NO: PROJ. NO
SCALE: AS SHOWN
DATE: 2/27/09

SITE LOCATION MAP

A LOT IN DELMAR, INC.
TOWN OF BETHLEHEM **156 DELAWARE AVENUE PROPERTY** ALBANY COUNTY, NY

H2H ASSOCIATES, LLC
179 RIVER STREET, TROY, NY 12180 518.270.1620

FIGURE 1



FILENAME: P:\2009\A Lot in Delmar\156 Delaware Avenue\Drawing Files\CADD Drawings\02-23-09 - Figure 2.dwg DATE: FEB 23, 2009 TIME: 3:56 PM

THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES

DRAWN BY:	ASM
DESIGN BY:	MAW
CHECK BY:	MAW
PROJ. NO :	PROJ. NO
SCALE :	AS SHOWN
DATE :	2/27/09

SITE SKETCH

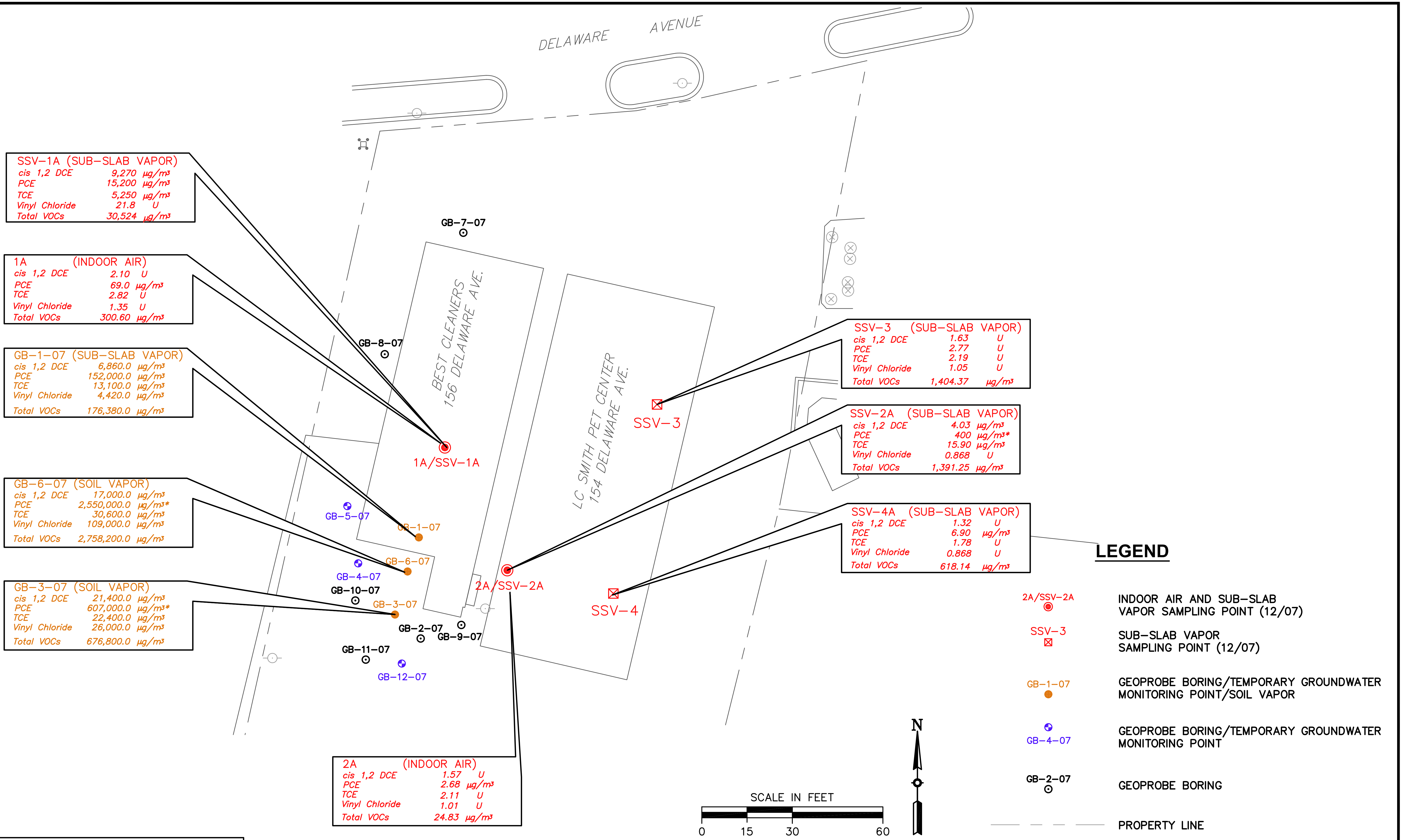
A LOT IN DELMAR, INC.

TOWN OF BETHLEHEM **156 DELAWARE AVENUE PROPERTY** ALBANY COUNTY, NY

H2H ASSOCIATES, LLC
179 RIVER STREET, TROY, NY 12180 518.270.1620

FIGURE 2

FILENAME: P: \2009\A Lot in Delmar\156 Delaware Avenue\Drawing Files\CADD Drawings\02-23-09 – Figure 3.dwg DATE: FEB 23, 2009 TIME: 4:09 PM



SSV–1A (SUB–SLAB VAPOR)

cis 1,2 DCE	9,270	µg/m³
PCE	15,200	µg/m³
TCE	5,250	µg/m³
Vinyl Chloride	21.8	U
Total VOCs	30,524	µg/m³

1A (INDOOR AIR)

cis 1,2 DCE	2.10	U
PCE	69.0	µg/m³
TCE	2.82	U
Vinyl Chloride	1.35	U
Total VOCs	300.60	µg/m³

GB–1–07 (SUB–SLAB VAPOR)

cis 1,2 DCE	6,860.0	µg/m³
PCE	152,000.0	µg/m³
TCE	13,100.0	µg/m³
Vinyl Chloride	4,420.0	µg/m³
Total VOCs	176,380.0	µg/m³

GB–6–07 (SOIL VAPOR)

cis 1,2 DCE	17,000.0	µg/m³
PCE	2,550,000.0	µg/m³*
TCE	30,600.0	µg/m³
Vinyl Chloride	109,000.0	µg/m³
Total VOCs	2,758,200.0	µg/m³

GB–3–07 (SOIL VAPOR)

cis 1,2 DCE	21,400.0	µg/m³
PCE	607,000.0	µg/m³*
TCE	22,400.0	µg/m³
Vinyl Chloride	26,000.0	µg/m³
Total VOCs	676,800.0	µg/m³

2A (INDOOR AIR)

cis 1,2 DCE	1.57	U
PCE	2.68	µg/m³
TCE	2.11	U
Vinyl Chloride	1.01	U
Total VOCs	24.83	µg/m³

SSV–3 (SUB–SLAB VAPOR)

cis 1,2 DCE	1.63	U
PCE	2.77	U
TCE	2.19	U
Vinyl Chloride	1.05	U
Total VOCs	1,404.37	µg/m³

SSV–2A (SUB–SLAB VAPOR)

cis 1,2 DCE	4.03	µg/m³
PCE	400	µg/m³*
TCE	15.90	µg/m³
Vinyl Chloride	0.868	U
Total VOCs	1,391.25	µg/m³

SSV–4A (SUB–SLAB VAPOR)

cis 1,2 DCE	1.32	U
PCE	6.90	µg/m³
TCE	1.78	U
Vinyl Chloride	0.868	U
Total VOCs	618.14	µg/m³

µg/m³ = ALL CONCENTRATIONS ARE REPORTED IN µg/m³ MICROGRAMS PER CUBIC METER

VOCs = VOLATILE ORGANIC COMPOUNDS

* = ESTIMATED

DATE	REVISIONS RECORD/DESCRIPTION
	1
	2
	3
	4
	5
	6

THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES

DRAWN BY:	ASM
DESIGN BY:	MAW
CHECK BY:	MAW
PROJ. NO:	464.00
SCALE:	AS SHOWN
DATE:	2/27/09

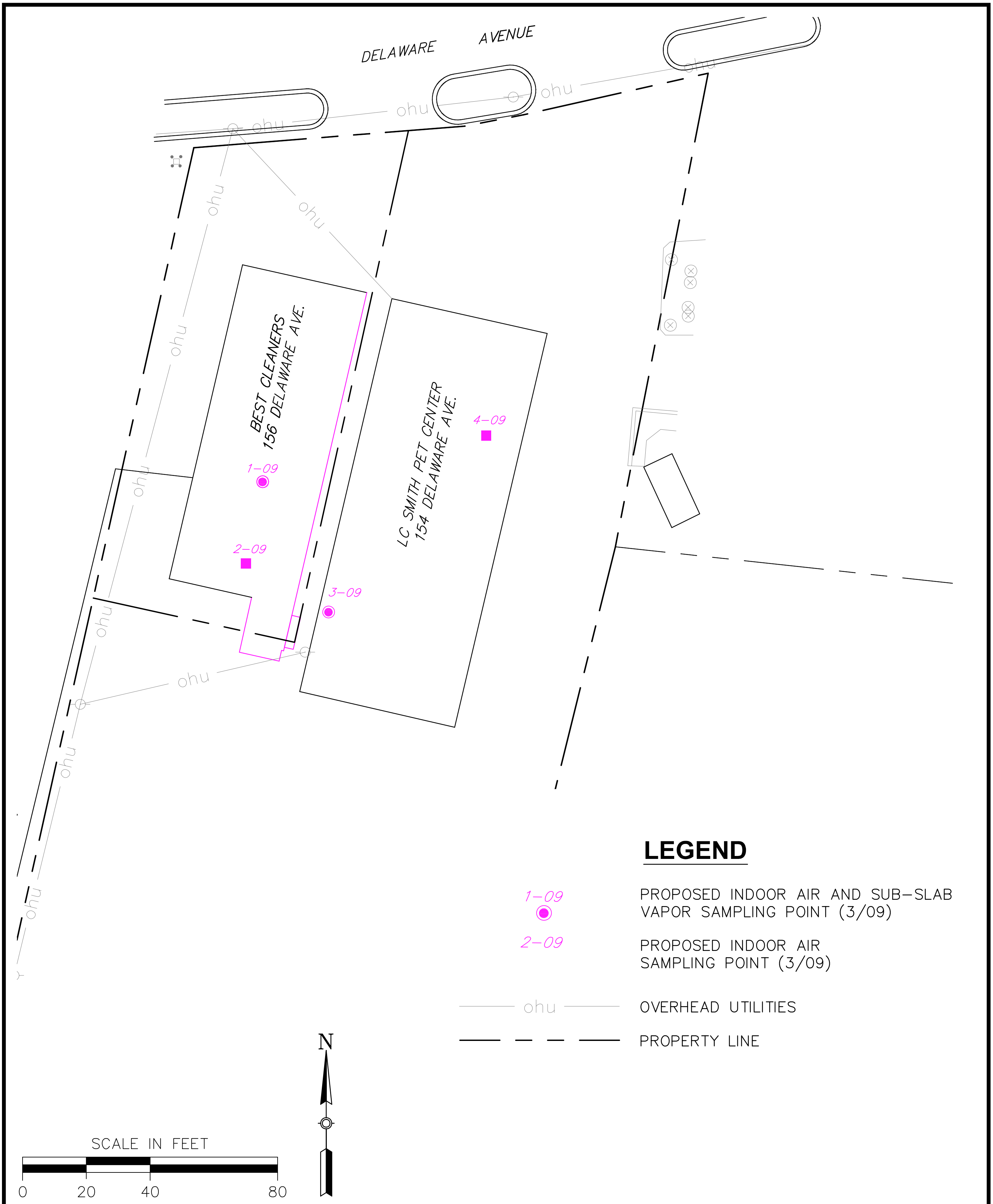
SUMMARY OF SOIL VAPOR / SUB-SLAB / INDOOR AIR QUALITY RESULTS
(FEBRUARY 2009)

TOWN OF BETHLEHEM
A LOT IN DELMAR, INC.
156 DELAWARE AVENUE PROPERTY
ALBANY COUNTY, NY

H2H ASSOCIATES, LLC
179 RIVER STREET, TROY, NY 12180 518.270.1620

FIGURE 3

FILENAME: P:\2009\A Lot in Delmar\156 Delaware Avenue\Drawing Files\CADD Drawings\02-23-09 - Figure 4.dwg DATE: FEB 23, 2009 TIME: 4:04 PM



THIS DRAWING IS NOT TO BE USED FOR ENGINEERING PURPOSES

DRAWN BY: ASM
DESIGN BY: MAW
CHECK BY: MAW
PROJ. NO : PROJ. NO
SCALE : AS SHOWN
DATE : 2/27/09

PROPOSED SUB-SLAB VAPOR / INDOOR AIR MONITORING POINTS
MARCH 2009

A LOT IN DELMAR, INC.

TOWN OF BETHLEHEM **156 DELAWARE AVENUE PROPERTY** ALBANY COUNTY, NY

H2H ASSOCIATES, LLC
179 RIVER STREET, TROY, NY 12180 518.270.1620

FIGURE 4

ATTACHMENTS

ATTACHMENT 1

Chain of Title

156 Delaware Avenue (Tax Map Number 86.10-2-1)
Town of Bethlehem, Albany County, New York

OWNER	FROM	TO
Frederick H. Clark, a/k/a Fred Clark, and Jane Clark, Emma Clark, George U. Clark, and	March 11, 1908	January 1, 1953
Estelle B. Clark	December 25, 1946	January 1, 1953
Leonard C. Smith	December 29, 1952	September 3, 1977
State Bank of Albany, a/k/a Norstar Bank of Upstate New York, a/k/a Fleet Trust Company	July 9, 1972	December 30, 1994
Kathryn Smith	February 9, 1952	December 30, 1994
A Lot in Delmar, Inc.	December 28, 1994	PRESENT

Chain of Title

152-160 Delaware Avenue (Tax Map Number 86.10-2-2)
Town of Bethlehem, Albany County, New York

OWNER	FROM	TO
Frederick H. Clark, a/k/a Fred Clark, Jane Clark, Emma Clark, and George U. Clark	March 11, 1908	December 18, 1946
Leonard C. Smith	December 15, 1946	September 3, 1977
State Bank of Albany, a/k/a Norstar Bank of Upstate New York, a/k/a Fleet Trust Company	July 9, 1972	December 30, 1994
Kathryn Smith	December 15, 1946	December 30, 1994
A Lot in Delmar, Inc.	December 28, 1994	PRESENT