SUB SLAB DEPRESSURIZATION SYSTEM
CLOSURE WORK PLAN
Order On Consent
Site #V00582

S&S X Ray
1101 Linwood Street
Brooklyn, NY 11208

May 9, 2011

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1.0 INTRODUCTION

Previous remedial activities at the site during the period between 2002 and 2005 included mineral spirits tank removal, soil removal, groundwater removal, and installation of a sub-slab depressurization system. Based on data obtained from previous investigations and the remediation done at the site, a Final Remedial Report for the site dated February 28, 2006 was developed by Shapiro Engineering, P.C. Soil sample results showed elevated levels of BTEX compounds in gthree soil sampling locations at approximately 12-foot depth below grade. The groundwater sample analysis at down gradient monitoring well indicated no presence of BTEX compounds. The constituents of concern (COPC) for soil and groundwater were primarily ethylbenzene and xylenes.

The current area of non-compliance (groundwater standards exceeded) is proximate to the former tank area and current location of MW-3 (Figure 1). A remedial plan was submitted to Michael MacCabe of NYS DEC on June 4, 2009 to address this area using in-situ oxidation. The in-situ oxidation process described in the plan was implemented on two occasions (April and September, 2010). Groundwater sampling was performed one month after each in-situ oxidation event. Additional rounds of groundwater sampling shall be collected on a quarterly basis as part of this plan.

1.2 Purpose of Work Plan

The purpose of this work plan is as follows:

- Determine the presence of VOCs in the indoor air and sub slab soil vapor.
- Provide a DUSR for all indoor and sub slab air samples
- Evaluate the possible closure of the SSDS system and provide recommendations, as required, for the study site.

2.0 SITE DESCRIPTION

The site is located at 1101 Linwood Avenue in Brooklyn, NY (Figure 1). It is currently operating as a multi-compartment personal storage rental business. The surrounding area is non-residential industrial composed mainly of warehouses.

The area of contamination originated from the current location of MW-3 and extended to the southwest beneath the current building footprint.
Previous remedial activities included:

- 2002 – Two tanks were removed. Approximately 40 cy of contaminated soil around them was also removed. A total of 2,150 gallons of contaminated groundwater was collected for disposal.

- 2004-2005 – Approximately 250 cy was excavated for disposal to a depth of 12 feet below grade.

- 2005 – A sub-slab depressurization system was installed beneath the building downgradient of MW-3.

- 2006 – Downgradient monitoring well MW-1 was installed. 252 gallons of Regenox chemical oxidizer was injected into borings within the contaminant plume.

- 2010 – In-situ Oxidation was performed on two occasions utilizing monitoring well MW-3 as an injection well.

The fine sand/silt and clay content of the soil indicated that contaminant migration in groundwater would be relatively slow. In addition, contaminant adsorption potential would be relatively high. Based on this information, the risk to off-site receptors was considered to be very low. Note that the downgradient monitoring well (MW-2) is clean.

The current remedy for the site is natural attenuation and monitoring of groundwater and soil vapor control via a sub-slab ventilation system located beneath the building slab. Additional remedial efforts were performed and including 2 separate in-situ oxidation injection events at MW-3 using Hydrogen Peroxide and VTX catalyst according to the Pressly Remedial Action Plan dated June 4, 2009. Site closure criteria shall include compliance with groundwater standards and comparison of results to Background VOCs in indoor air found in Appendix C of the Final NYS DOH CEH BEEI Soil Vapor Intrusion Guidance.

Levels of VOCs (see Table 1) remain in groundwater at MW-3.

TABLE 1

Post Remediation Sampling Results
Former S&S Xray
1101 Linwood Ave, Brooklyn NY
In-Situ Oxidation Events March 25, 2010, October 2, 2010
In-Situ Oxidation Injection Description: Injection of 1000 gallons of 3.5 % H202 and VTX Catalyst to MW-3

Location	Compound Dectected	Post In-Situ Oxidation Nov. 4, 2010 Concentration (ug/l)	Post In-Situ Oxidation May, 2010 Concentration (ug/l)	Pre Remediation January, 2009 Concentration (ug/l)	Pre Remediation February, 2008 Concentration (ug/l)	NYS DEC Standard
MW-1	ND	NS	ND	ND	ND	
MW-2	ND	NS	ND	ND	ND	
MW-3	1,2,4Trimethylbenzene	550	750	2,700	3,500	5
	1,3,5Trimethylbenzene	120	210	640	400	5
	Ethylbenzene	380	600	4,200	5100	5
	Naphthalene	880	690	4,200	5,600	10
	n-Butylbenzene	54	160	330	400	5
	Total Xylenes	2100	2481	18,000	22,200	5
	Isopropylbenzene	14	31	ND	ND	5
	p-isopropyltoluene	ND	32	ND	ND	NA
	sec-Butylbenzene	ND	9.4	ND	ND	5
	n-Propylbenzene	19	ND	ND	ND	5

3.0 AIR SAMPLING

3.1 Sampling Background Conditions

The indoor air of the site building is climate controlled, meaning that the HVAC system is operational in both summer and winter for heating and air conditioning. Sampling under this plan will likely occur in the spring of 2011.

In order to account for “rebound effect”, the SSDS system will be shut down for a period of 1 month prior to indoor air and sub slab air sampling. Based on the results of the air sampling, the system will be either turned back on (if rebound occurs) or not turned back on depending upon regulatory approval.

A single representative background air sample shall be collected from the outdoor air on the building roof at an upwind location.

A product inventory will be conducted during the sampling event using the NYS DOH Product Inventory/Questionnaire forms located in the NYS DOH Soil Vapor Intrusion Guidance document.

3.2 Sub Slab Vapor

In order to evaluate the presence of volatile organic compounds (VOCs) in the sub slab, a total of two (2) indoor sub-slab vapor probes shall be installed. VP-1 will be installed in the front office area. VP-2 will be installed in the warehouse area. The VPs shall be installed according to the NYS DOH Guidance For Evaluating Soil Vapor Intrusion in the State of New York, October 2006. The proposed VP locations were depicted on Figure 1.

A portable hammer drill will be used to excavate a small diameter hole within the floor slab to access the sub-slab material for VP installation.

The probes shall be constructed to a depth 2-inches into the sub-slab bedding material using a ¼-inch polyethylene food grade riser tubing. One inch of the probe tip shall be surrounded with coarse silica sand. A bentonite seal shall be placed above the sub-slab aggregate to prevent air infiltration into the sampling zone. The remaining hole shall be backfilled with mortar.

A Summa® canister shall be attached to the riser tubing and opened to begin filling at a rate not to exceed 0.2 liters per minute. The samples will be collected over an 8-hour period to reflect the duration of potential exposure. The beginning and end vacuum of the Summa ® canister shall be recorded along with the sample log sheet.

3.3 Indoor Air

Three additional indoor air samples (IA-1, IA-2, and IA-3) shall be collected from within the building (Figure 1). IA-1 will be collected from within the office area. IA-2 will be collected from the warehouse area. IA-3 will be collected adjacent to and downgradient (south/southeast) of the source area.

A Summa ® canister shall be used to collect the indoor air samples at a rate not to exceed 0.2 liters per minute. In general, the samples will be collected over an 8-hour period to reflect the duration of potential exposure. Following collection, the canisters shall be shipped with a chain of custody form to York Environmental Laboratories in Stratford, CT for analysis according to EPA Method TO-15. The detection limit for all air samples will be 0.25ug/m^3 for PCE.

3.4 Sub Slab Vapor Extraction Well

A single instantaneous grab vapor sample will be collected from the sub-slab exhaust system stack (Figure 2). A Summa® canister shall be attached to the exhaust manifold pipe. The beginning and end vacuum of the Summa ® canister

shall be recorded along with the sample log sheet. Following collection, the canister shall be shipped with a chain of custody form to York Environmental Laboratories in Stratford, CT for analysis according to EPA Method TO-15. The detection limit of the analysis shall be at least 1ug/m^3.

4.0 DATA VALIDATION

Data validation shall be performed according to the guidelines described in the NYSDEC, Division of Environmental Remediation, Guidance for the Development of Data Usability Summary Reports (DUSR). In addition, the data shall be reviewed using the protocol specified in the NYS Analytical Services Protocol (2005).

5.0 REPORT

Following completion, Pressly shall prepare a report summarizing the results of this investigation for submittal to the NYS DEC and NYS DOH. The report shall include field sampling logs, DUSR, maps, data tabulation, and recommendations for closure of the SSDS or additional sampling as required.

6.0 HEALTH AND SAFETY

The Health and Safety Plan included in the Site Monitoring Plan prepared by Shapiro Engineering, PC and dated May, 2006 will be followed during this investigation.

FIGURE 1

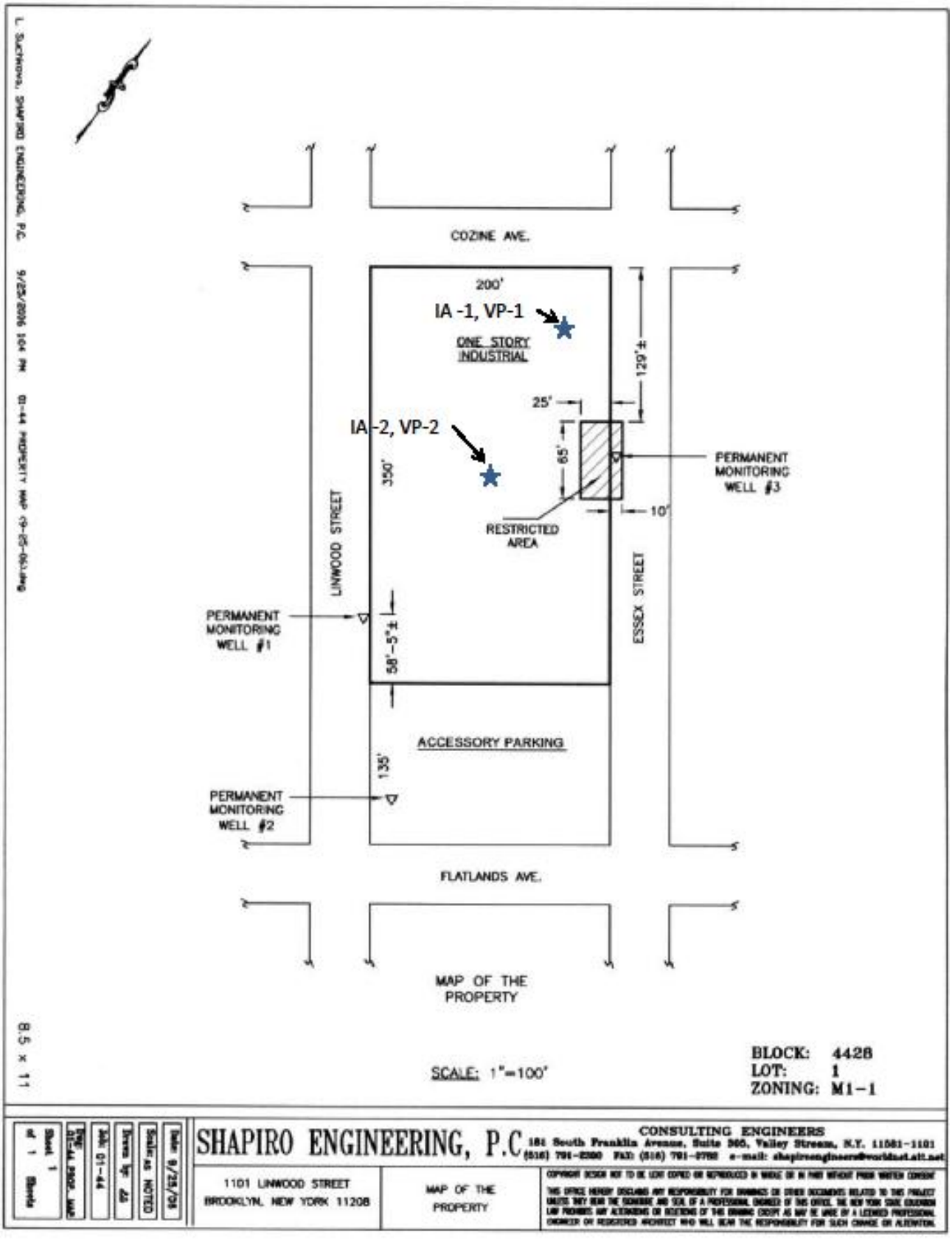
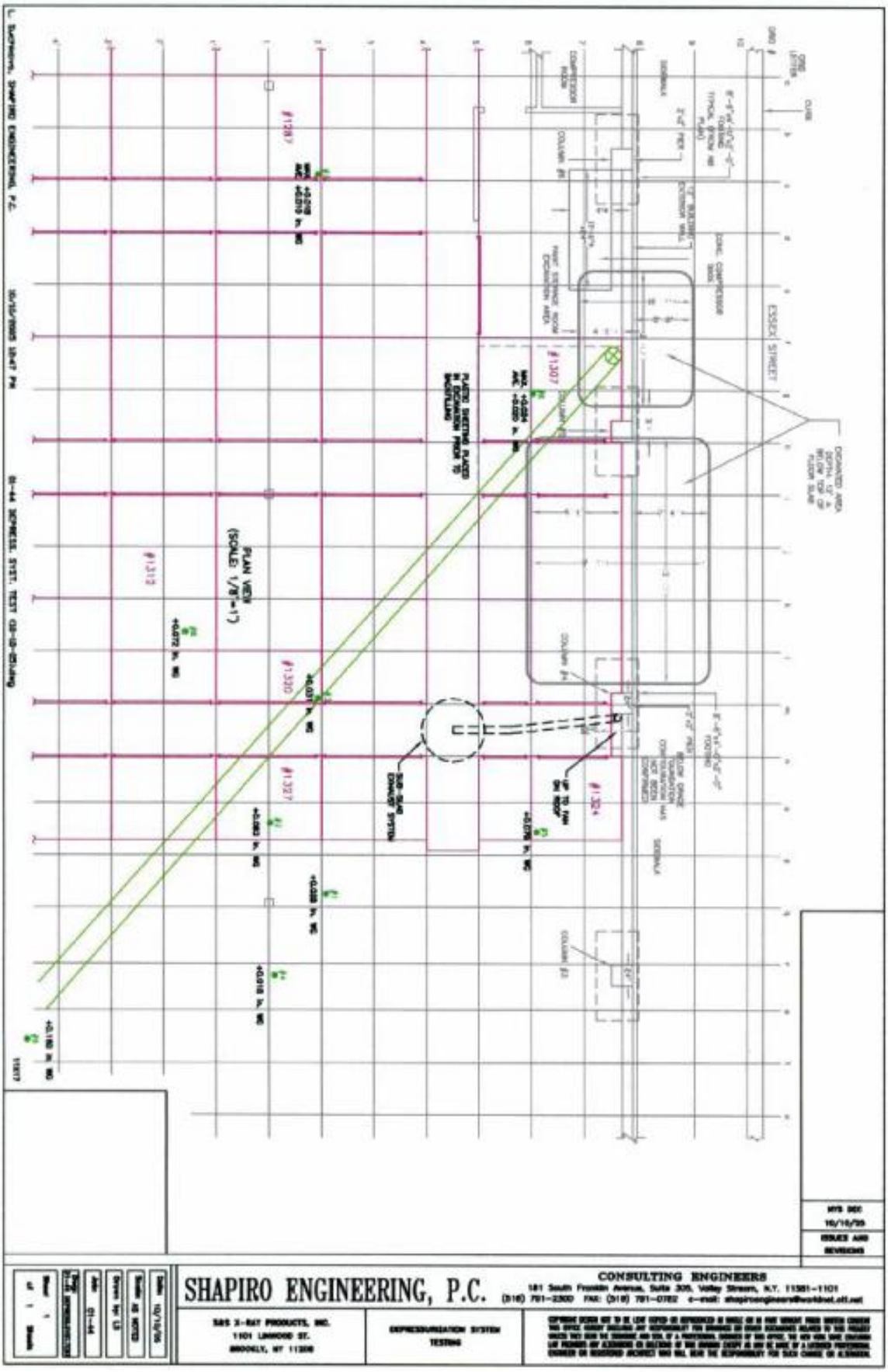

COZINE AVE.
200'
IA -1, VP-1
ONE STORY INDUSTRIAL
129'±
25'
IA-2, VP-2
65'
350'
PERMANENT MONITORING WELL #3
10'
RESTRICTED AREA
LINWOOD STREET
ESSEX STREET
PERMANENT MONITORING WELL #1
58'-5"±
ACCESSORY PARKING
135'
PERMANENT MONITORING WELL #2
FLATLANDS AVE.
MAP OF THE PROPERTY
SCALE: 1"=100'
BLOCK: 4428
LOT: 1
ZONING: M1-1
L. SHAPIRO, SHAPIRO ENGINEERING, P.C. 9/25/2006 1:04 PM 01-44 PROPERTY MAP (9-25-06).dwg
8.5 x 11
SHAPIRO ENGINEERING, P.C.
CONSULTING ENGINEERS
181 South Franklin Avenue, Suite 305, Valley Stream, N.Y. 11581-1101
(516) 791-2200 FAX: (516) 791-2788 e-mail: shapiroengineers@worldnet.att.net
1101 LINWOOD STREET
BROOKLYN, NEW YORK 11208
MAP OF THE PROPERTY
Date 9/25/06
Scale as NOTED
Drawn by AS
Job 01-44
File 01-44 PROP. MAP
Sheet 1 of 1 Sheets

FIGURE 2


PLAN VIEW
(SCALE: 1/8"=1')
SHAPIRO ENGINEERING, P.C.
CONSULTING ENGINEERS
SAS X-RAY PRODUCTS, INC.
1101 LINWOOD ST.
BROOKLYN, NY 11208
EXPRESSURIZATION SYSTEM
TESTING