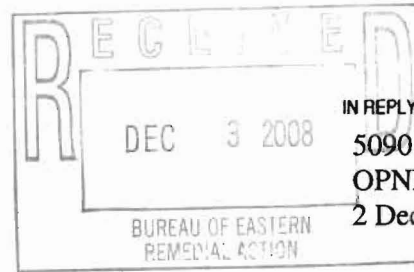




**DEPARTMENT OF THE NAVY**  
NAVAL FACILITIES ENGINEERING COMMAND, MID-ATLANTIC  
9742 MARYLAND AVENUE  
NORFOLK, VIRGINIA 23511-3095



Mr. Stephen M. Scharf  
New York State Department of Environmental Conservation  
Division of Environmental Remediation  
Remedial Action Bureau A, 11<sup>th</sup> Floor  
625 Broadway  
Albany, New York 12233-7258

Subj: INDOOR AIR SAMPLING WORK PLAN; NAVAL WEAPON INDUSTRIAL RESERVE PLANT (NWIRP) BETHPAGE, NEW YORK; EPA ID # NYD002047967

Dear Mr. Scharf:

The Navy is forwarding two copies of the enclosed "Indoor Air Sampling Work Plan, NWIRP Bethpage, New York". The Work Plan describes the indoor air sampling that will be conducted in the residential homes adjacent to Site 1 to determine if vapors have migrated offsite and affected indoor air quality. This Work Plan is being conducted in accordance with the New York State Department of Health Guidance for Evaluating Soil Vapor Intrusion in the State of New York.

Currently, two homeowners have submitted signed access agreements to allow the Navy to conduct the environmental sampling. Homeowners were requested to sign and return the access agreement by December 8, 2008 if they wanted their homes sampled.

Should you have any questions, please contact me at (757) 444-0781.

Sincerely,

LORA B. FLY  
Remedial Project Manager  
By Direction of the  
Commanding Officer

Encl: (1) Site1 - Phase II Soil Vapor Testing Work Plan, NWIRP Bethpage, New York

Subj: SITE 1 - PHASE II SOIL VAPOR TESTING WORK PLAN; NAVAL WEAPON  
INDUSTRIAL RESERVE PLANT (NWIRP) BETHPAGE, NEW YORK; EPA ID #  
NYD002047967

Distribution:

NAVAIR, Richard Smith  
NYSDEC, Henry Wilkie  
NYSDOH, Jacquelyn Nealon  
USEPA Region II, Carol Stein  
ECOR Solutions, Al Taormina  
TTNUS, David Brayack  
Public Repository

**INDOOR AIR SAMPLING  
WORK PLAN**

**NWIRP BETHPAGE**  
Bethpage, New York



**Naval Facilities Engineering Command  
Mid-Atlantic**

**Contract No. N62472-03-D-0057  
Contract Task Order 147**

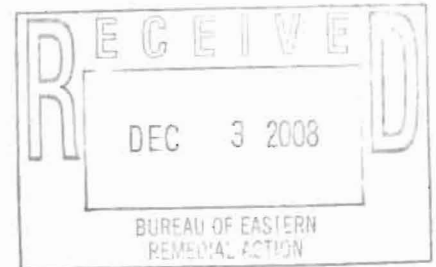
DECEMBER 2008

**INDOOR AIR SAMPLING  
WORK PLAN  
NWIRP Bethpage, New York**

**NAVAL FACILITIES ENGINEERING COMMAND  
MID-ATLANTIC**

**COMPREHENSIVE LONG-TERM  
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT**

**Submitted to:  
Naval Facilities Engineering Command  
Mid-Atlantic  
9742 Maryland Avenue  
Norfolk, Virginia 23511-3095**



**Prepared and Submitted by:  
Tetra Tech NUS, Inc.  
234 Mall Boulevard, Suite 260  
King of Prussia, Pennsylvania 19406-1433**

**Contract No. N62472-03-D-0057  
Contract Task Order 147**

**December 2008**

**PREPARED UNDER THE DIRECTION OF:**

A handwritten signature in black ink, appearing to read "Robert Sok", written over a horizontal line.

**ROBERT SOK  
PROJECT MANAGER  
TETRA TECH NUS, INC.  
NORFOLK, VIRGINIA**

**APPROVED FOR SUBMISSION BY:**

A handwritten signature in black ink, appearing to read "John J. Trepanowski", written over a horizontal line.

**JOHN J. TREPANOWSKI, P.E.  
PROGRAM MANAGER  
TETRA TECH NUS, INC.  
KING OF PRUSSIA, PENNSYLVANIA**

**LETTER WORK PLAN**  
**INDOOR AIR SAMPLING**  
**NAVAL WEAPONS INDUSTRIAL RESERVE PLANT**  
**BETHPAGE, NEW YORK**

**1.0 INTRODUCTION**

This Work Plan has been prepared for the indoor air sampling activities at properties adjacent to the Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage, Long Island, New York (Figures 1 and 2). Site 1 was identified as having been impacted by historic releases of chlorinated solvents and was remediated via an air sparging/soil vapor extraction (AS/SVE) system between 1998 and 2002. The treatment and remedial goals were based on protection of groundwater. Soil vapor testing conducted in January 2008 indicated elevated concentrations of VOCs existing along the eastern boundary of Site 1 that may affect the nearby residential neighborhood. Additional off-site soil vapor testing was conducted in October 2008 to evaluate the potential migration of contaminated soil vapor. Evaluation of this data is in progress.

The indoor air sampling activities will include indoor, sub-slab, and outdoor air sampling at residential homes located adjacent to Site 1. Initially, six homes along Eleventh Street and one home on Ninth Street (reference location) will be targeted for indoor air sampling. Testing in these homes is dependent on approval of the homeowners. Air samples will be analyzed for volatile organic compounds (VOCs) via EPA TO-15 method. The fieldwork outlined in this Work Plan is being conducted in accordance with New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH 2006).

**1.1 SITE HISTORY**

The NWIRP-Bethpage was established in 1933. Since its inception, the plant's primary mission has been the research prototyping, testing, design engineering, fabrication, and primary assembly of military aircraft. The facilities at NWIRP-Bethpage included four plants used for assembly and prototype testing; a group of quality control laboratories, two warehouses complexes (north and south), a salvage storage area, water recharge basins, the Industrial Wastewater Treatment Plant, and several smaller support buildings. In 1998, operations ended at the facilities.

Site 1 is located in the middle third of the NWIRP Bethpage facility and is east of Plant No. 3, see Figure 2. The Site occupies approximately four acres, and contains a concrete storage pad and an abandoned cesspool leach field. Historically, this site was also used as a storage area for various types of equipment and heavy materials, including transformers. Site 1 is enclosed by a

six-foot high, chain-link fence. The site is relatively flat, with the eastern portion covered with sandy soils, gravel, grass, and one concrete pad. The western portion of the site is predominantly covered with concrete. A vegetated wind row (pine) and wood fence are present along the eastern edge of the site to reduce community visibility.

## **1.2 BACKGROUND**

In 1985, an Initial Assessment Study (IAS) conducted at the NWIRP Bethpage, NY, identified materials stored at Site 1 the Former Drum Marshaling Area. This storage first took place on a gravel surface over the cesspool field, east of Plant No. 3. Hazardous waste management practices for Northrop Grumman facilities included the staging of drummed wastes include waste halogenated and non-halogenated solvents (Rogers, Golden & Halpern, 1986). Cadmium and cyanide were also stored in Area 2 within Site 1 from the early 1950s through 1974. Reportedly, 200 to 300 drums were stored at each area at any one time within Site 1. In 1978, the collection and marshaling point was moved a few yards south of the original site, to an area on a concrete pad. In 1982, drummed waste storage was relocated to another Drum Marshaling facility located in the Salvage Storage Area, which is not at Site 1. Reportedly, there was no direct evidence of hazardous waste spills at Site 1. An abandoned septic drainage system almost completely underlies the entire area of Site 1.

An AS/SVE system was constructed in 1998 to address VOCs in site soils. The primary volatile compounds of concern, based on distribution and maximum detected concentrations, included trichloroethene (TCE), tetrachlorethene (PCE), 1,1,1- trichloroethane (1,1,1-TCA), 1,2-dichloroethane (1,2-DCA), 1,2-dichloroethene (1,2- DCE), and 1,1-dichloroethene (1,1-DCE). The preliminary remediation goals (PRGs) were established in the Record of Decision (ROD) prepared in May 1995 (NDNFEC/NYSDEC, 1995). The goals were established to control continuing releases of VOCs to groundwater.

In 2001, VOC concentrations in the extracted vapor were measured to estimate the efficiency of the extraction process. Post treatment groundwater sampling was also conducted in 2002. The analytical results above practical quantity limits (PQL) included chloroform in one location at 1.2 micrograms per liter ( $\mu\text{g/L}$ ); 1,1,1- TCA in two locations at 5.2 and 48  $\mu\text{g/L}$  and PCE at two locations at 18 and 21  $\mu\text{g/L}$ .

The AS/SVE system operated until March 2002, at which time it was shutdown. Approximately 4,500 pounds of VOCs were removed from the soil and groundwater during the operation of the system. Post Operational sampling was performed in 2002 in order to close-out the AS/SVE system at Site 1.

To further determine the effectiveness of the AS/SVE treatment system on VOCs in the subsurface, a post operational soil boring program was conducted in 2002. Forty-one soil borings were advanced to the top of the water table, approximately 65 feet bgs. Soil sample results indicated that VOCs were not detected in the majority of soil boring locations. VOCs exceeding the PRGs were observed in six of the soil boring locations. These VOCs were present at depths ranging from 10 to 64 feet. The presence of VOCs at shallow depths indicated the difficulty of vapor extraction wells to efficiently remove more surficial VOCs. Clay layers observed in the subsurface soil resulted in the potential for inefficiencies at the near surface intervals. Four soil boring locations showed VOCs above the PRGs at depths that were not influenced by the AS/SVE.

Final regulatory guidance for evaluating soil vapor intrusion was issued in October of 2006 by the NYSDOH and identified soil vapor migration and intrusion into buildings as a potential concern. In January 2008, a soil gas investigation determined that continuous soil vapors from Site 1 may be migrating past the Navy fence line (Tetra Tech, 2008). Soil gas samples collected along the eastern border had a maximum TCE and PCE concentration of 180,000  $\mu\text{g}/\text{m}^3$  at 20 feet bgs and 5,300  $\mu\text{g}/\text{m}^3$  at 24 feet bgs in the soils. NYSDEC did not develop any standards, criteria or guidance values for VOC concentrations in subsurface vapors; however, NYSDOH indoor air criteria for TCE and PCE is 5  $\mu\text{g}/\text{m}^3$  and 100  $\mu\text{g}/\text{m}^3$ , respectively. It should be noted that concentrations of PCE and TCE observed in soil gas does not correlate to the indoor air concentrations in residential homes. They are many factors that influence the vapor concentrations as they migrate through soil.

Chemical concentrations in soil gas samples collected along the southern edge of Site 2 and the northeast corner of Site 1 (BPS1-SG1004, BPS1-SG1005, and BPS1-SG1006) were much lower than concentrations detected along the central and southeast corner of Site 1. Maximum TCE and PCE concentrations in this area were 820  $\mu\text{g}/\text{m}^3$  and 78  $\mu\text{g}/\text{m}^3$ , respectively. Additionally, these concentrations were detected at a depth of 46 feet below ground surface (bgs). Shallower samples contained lower concentrations of these chemicals. The highest concentrations of TCE and PCE were generally detected at depths of 20 and 50 feet. However, shallow samples BPS1-SG1001-07 (7 feet bgs) and BPS1-SG1002-08 (8 feet) contained TCE (19,000  $\mu\text{g}/\text{m}^3$  and 3,300  $\mu\text{g}/\text{m}^3$ ) and PCE (170  $\mu\text{g}/\text{m}^3$  and 1,700  $\mu\text{g}/\text{m}^3$ ) at concentrations greater than NYSDOH criteria of 5  $\mu\text{g}/\text{m}^3$  and 100  $\mu\text{g}/\text{m}^3$  for indoor air, respectively.

A Phase II soil vapor investigation was conducted off site in the residential neighborhood in October 2008. The results of this investigation are currently being evaluated. A pilot study is

scheduled to be conducted in January 2009 to design an SVE system along the Navy fence line to address any residual soil vapors that may have migrated east into the residential area.

### **1.3 OBJECTIVE**

The objective of this indoor air sampling is to determine whether potentially contaminated soil vapors migrated offsite and impacted indoor air quality at adjacent residential properties.

### **1.4 CONCEPTUAL SITE MODEL (CSM)**

In January 2008, the Navy collected soil gas samples at the facility fence line, approximately 70 feet from residential housing. Samples were collected at depths of approximately 8, 20, and 45 feet below ground surface (bgs). Data is presented in the draft Site 1 Soil Vapor Investigation (TtNUS, April 2008) and documents findings of TCE at concentrations up to 19,000 micrograms per cubic meter of air ( $\mu\text{g}/\text{m}^3$ ) at 7 feet bgs, 180,000  $\mu\text{g}/\text{m}^3$  at 20 feet bgs, and 150,000  $\mu\text{g}/\text{m}^3$  at 50 feet bgs. For comparison, NYSDOH Indoor Air Quality Criteria for TCE is 5  $\mu\text{g}/\text{m}^3$  and sub slab guidance for action is 250  $\mu\text{g}/\text{m}^3$ . Based on the distance from the site to the residential housing, lower concentrations of TCE would be expected under the housing area. Other VOCs, including PCE and 1,1,1-TCA, were also detected at concentrations up to 90,000  $\mu\text{g}/\text{m}^3$  in the soil gas samples.

Given the historic AS/SVE remediation of VOCs in the soil and groundwater at Site 1 and the results of the January 2008 soil vapor testing at the site, residual VOCs might be present in fine grained material that would limit soil vapor diffusion in the unsaturated zone. The recent soil vapor testing also suggests that soil vapor migration from Site 1 could potentially be impacting the adjacent residential area. Further evaluation and delineation of VOC contaminated soil vapor was conducted in October 2008. Validated laboratory results from this investigation are anticipated in January 2009.

### **1.5 SAMPLING APPROACH**

Six residential homes along Eleventh Street, nearest to Site 1, and one home on Ninth Street (reference location) are initially being targeted for indoor air sampling. Homeowners will be contacted and only those homeowners that grant permission and sign access agreements with the Navy will be sampled. Indoor, sub-slab, and outdoor air sampling will be conducted in accordance with NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH 2006).

The homes targeted for the indoor air sampling are depicted on Figure 3. Prior to sampling, an indoor air quality questionnaire and building inventory form will be completed for each home. The



NYSDOH questionnaire will be used and is presented in Attachment A. The basement floors will be inspected and any penetrations including cracks, drains, utilities, sumps, etc., will be documented in field log books and/or on the questionnaire form.

Each indoor/sub-slab air sample will be collected over a 24 hour time period and analyzed according to United States Environmental Protection Agency (USEPA) Method TO-15 VOCs by an Environmental Laboratory Approval Program (ELAP) certified laboratory (USEPA, 1999). Table 1 presents each of the indoor/sub-slab air sample locations, corresponding sample nomenclature, and analytical method. Outdoor air samples will be collected simultaneously during the indoor and sub-slab air sampling to evaluate the potential influence of outdoor air on indoor air quality. Outdoor air samples will be collected, as necessary, to provide representative air samples from an upwind location. It is anticipated that one outdoor air sample may be collected for every two homes targeted for indoor air sampling. Site specific conditions will be evaluated at the time of sampling and the outdoor air samples will be collected accordingly. Outdoor air samples will also be analyzed via USEPA Method TO-15. A list of anticipated detection limits are presented in Attachment B.

## **2.0 FIELD ACTIVITIES**

The scope of work consists of indoor air and sub-slab air sampling at residential homes along Eleventh Street. Outdoor air sampling will also be conducted simultaneously with the indoor air and sub-slab air samples. The specific activities for this fieldwork and sampling are summarized as follows:

1. Complete questionnaire and home inventory
2. Establish sampling locations
3. Drill and install temporary sub-slab sampling points
4. Collect indoor air, sub-slab, and outdoor air samples
5. Fill and seal sub-slab holes
6. Ship and analyze air samples for TO-15 VOCs

The homes targeted for sampling are presented on Figure 3. Sample nomenclature and analysis are presented in Table 1. Sampling forms to be used during field activities are presented in Attachment A.

After signed access agreements are in place with the homeowners, a field schedule will be developed and homeowners will be contacted to coordinate field sampling activities. Once in the field and prior to sampling, an indoor air quality questionnaire and building inventory form will be completed for each home (see Attachment A). The basement floors will be inspected and any

penetrations including cracks, drains, utilities, sumps, etc., will be documented in field log books and/or on the questionnaire form. Field readings with a photoionization detector (PID) will be used to screen observed areas of concern and suspect odors.

A small diameter hole (0.25 inch) will be drilled into the basement slab and over drilled with a 1.0 inch diameter drill bit to provide annular space for the installation of temporary sampling probes. The temporary probes will be constructed of inert tubing for each of the sub-slab air samples. The tubing will not extend further than 2 inches into the sub-slab material and the probes will be sealed to the surface with clay and/or beeswax. After installation of the probes, one to three volumes of air will be purged prior to collecting samples to ensure a representative sample. Purged air will be contained, screened and released outside the home. Each temporary probe will be removed after the sub-slab air sampling is completed. The probe hole will be abandoned by removing the tubing and surface seal followed by filling and/or patching the resulting hole with a clay seal and bentonite/cement mixture.

Indoor and outdoor air samples will be collected simultaneously with the sub-slab air sampling. Actual sampling locations will be determined in the field based on site specific conditions. Information collected on the indoor air quality questionnaire, building inventory, wind direction, etc. will be used to determine actual placement of indoor air and outdoor air sampling locations. For outdoor air samples, the SUMMA<sup>®</sup> canister will be positioned at an upwind location (approximately 100 feet) near the associated indoor air sampling locations at a height of approximately 4 ft above grade. The outdoor air sample will be obtained over a twenty-four hour period to be consistent with the indoor/sub-slab air samples. The sampling procedures for indoor, outdoor, and sub-slab air sampling will be conducted in accordance with NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH 2006).

SUMMA<sup>®</sup> canisters will be utilized for collecting all air samples. The SUMMA<sup>®</sup> canisters do not require preservation with ice or refrigeration during shipment. SUMMA<sup>®</sup> canisters will be shipped to the laboratory via overnight carrier (e.g., Federal Express) for analysis.

The field sampling team will maintain an air sampling log sheet and field logbook that summarizes the following information:

- a. sample identification
- b. date and time of sample collection
- c. sampling depth
- d. identity of samplers
- e. sampling methods and devices (including canister and regulator ID numbers)

- f. purge volumes
- g. volume of soil vapor or air extracted
- h. vacuum before and after samples are collected
- i. wind speed and direction (for outdoor air sampling)
- j. ambient temperature
- k. chain of custody (COC) protocols and records used to track samples from sampling point to analysis

(Air Sample Log Sheet is presented in Attachment B)

Sample labeling information for this sampling event is provided in Table 1 of this Work Plan. All sample containers will be labeled with a unique sample identifier. The sample identification code will consist of up to 15 characters, as described below.

- The first four characters indicate the site from which the sample is to be collected:  
BPS1 (Bethpage Site 1)
- The next two characters indicate the matrix:  
BPS1-AR (Air Sample)
- The next four characters indicate the sampling location:  
BPS1-AR001 (Location 1)
- The next two/three characters indicate the type of the sample:  
BPS1-AR001-SSB (Sub-Slab), IND (Indoor Air), and ODA (Outdoor Air)

Any other pertinent information regarding sample identification will be recorded in the field logbooks or on sample log sheets.

### **3.0 Reporting**

A data summary report will be submitted to include; field procedures, field activities, and sampling results for the soil gas investigation and the indoor air sampling. All samples that will be used to make decisions on appropriate actions to address exposures and environmental contamination will be analyzed by an ELAP certified laboratory. After sample validation, sampling results will be compared to criteria presented in the NYSDOH guidelines (NYSDOH 2006) and screening values presented in the Phase II Soil Vapor Testing Work Plan (September 2008).

### **4.0 Schedule**

Pending approval of this work plan and receipt of Navy approved property access agreements with the individual property owners, the fieldwork will start within approximately 4 to 6 weeks. The proposed indoor/sub-slab air sampling should be completed in approximately one week. After receipt and validation of the analytical data from the indoor air sampling, and with agreement on

the next investigative steps, additional indoor air sampling will be conducted as necessary. Additional indoor air sampling will be based on the results of this indoor air sampling event and the results from the soil gas sampling in the neighborhood. Homeowner permission and signed access agreements with each of the homeowners will be required prior to any additional sampling on private property.

## ACRONYMS

1, 1, 1-TCA	1, 1, 1-trichloroethene
1, 1-DCE	1, 1-dichloroethene
1, 2-DCA	1, 2-dichloroethane
1, 2-DCE	1, 2-dichloroethene
AS/SVE	air sparging/soil vapor extraction
bgs	below ground surface
COC	chain of custody
ELAP	Environmental Laboratory Approval Program
IAS	Initial Assessment Study
ml/min	milliliters per minute
NWIRP	Naval Weapons Industrial Reserve Plant
NYSDOH	New York State Department of Health
PCE	tetrachloroethene
PQL	practical quantity limits
PRG	preliminary remediation goals
ROD	Record of Decision
TAL	Target analyte list
TCE	trichloroethene
TCL	Target compound list
VOC	Volatile organic compound
USEPA	United States Environmental Protection Agency
µg/L	micrograms per liter

## REFERENCES

Foster Wheeler Environmental Corp., 2003. Final Close-Out Report, Construction of a Soil Vapor Extraction/Air Sparging System at the Naval Weapons Industrial Reserve Plant Bethpage, NY. December.

New York State Department of Health (NYSDOH), 2006. FINAL Guidance for Evaluating Soil Vapor Intrusion in the State of New York. October.

Northern Division Naval Facilities Engineering Command and New York State Department of Environmental Conservation (NDNFEC/NYSDEC), 1995. Record of Decision, Naval Weapons Industrial Reserve Plant, Bethpage, New York Sites 1, 2, 3 NYS Registry: 1-30-003B. May.

Rogers, Golden & Halpern, 1986. Initial Assessment Study of NWIRP Bethpage, NY and NWIRP Calverton, NY. December.

Tetra Tech NUS, Inc., 2008. Site 1 Soil Vapor Investigation. Naval Weapons Industrial Reserve Plant Bethpage. April.

United States Environmental Protection Agency (USEPA), 1999. Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air Second Edition Compendium Method TO-15 Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/ Mass Spectrometry (GC/MS). January.

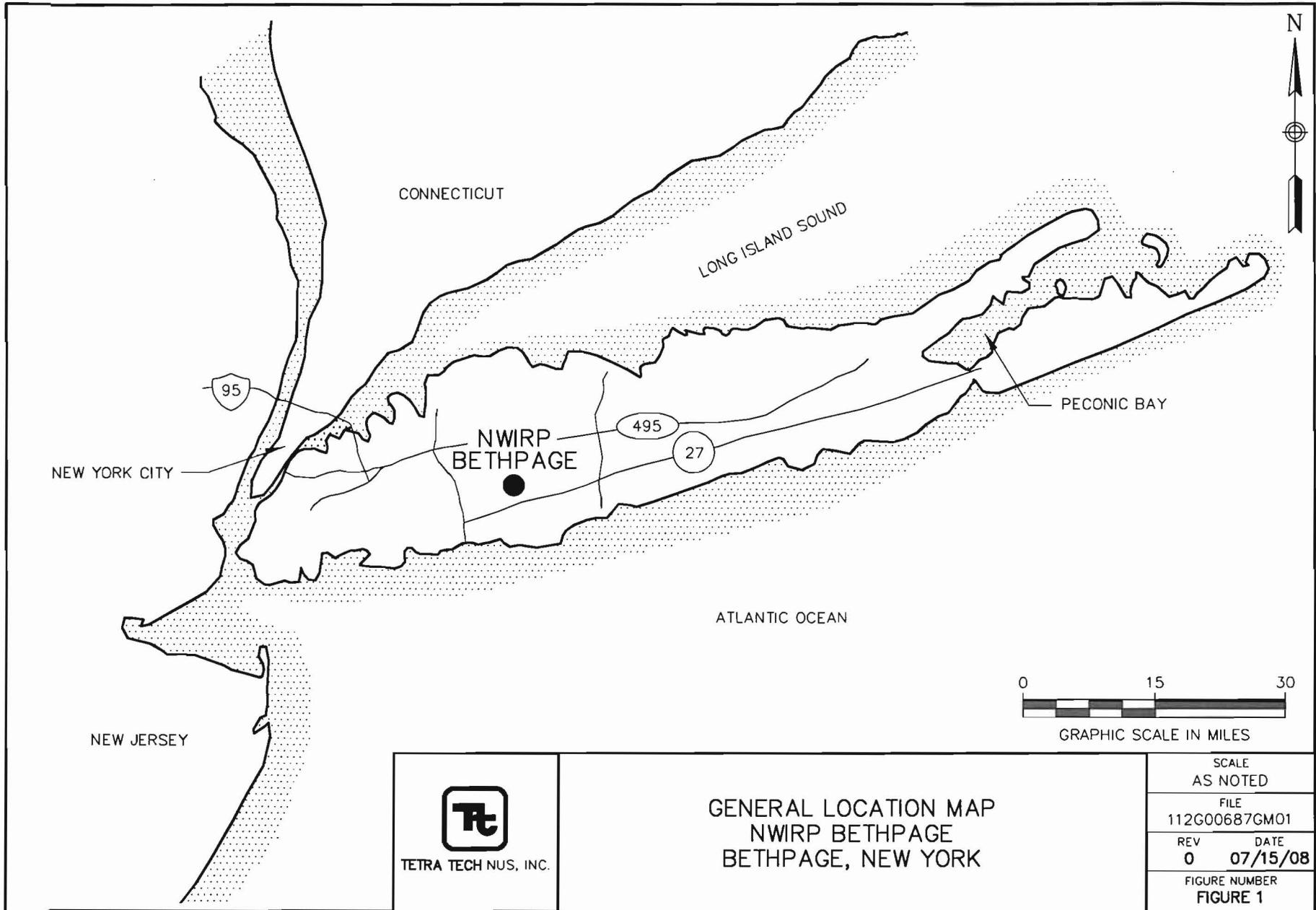
United States Environmental Protection Agency (USEPA), 2002. OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance). November.

**TABLE 1  
INDOOR AIR SAMPLING  
SITE 1 - FORMER DRUM MARSHALING AREA  
NWIRP BETHPAGE, NEW YORK**

Sample ID	Residential Home #	Sample Type	Air Sample <sup>2</sup>	Analytical Method <sup>3</sup>
BPS1-AR001-IND	1	Indoor Air	YES	TO-15
BPS1-AR001-SSB		Sub-Slab	YES	TO-15
BPS1-AR001-ODA		Outdoor Air <sup>1</sup>	YES	TO-15
BPS1-AR002-IND	2	Indoor Air	YES	TO-15
BPS1-AR002-SSB		Sub-Slab	YES	TO-15
BPS1-AR002-ODA		Outdoor Air <sup>1</sup>	YES	TO-15
BPS1-AR003-IND	3	Indoor Air	YES	TO-15
BPS1-AR003-SSB		Sub-Slab	YES	TO-15
BPS1-AR003-ODA		Outdoor Air <sup>1</sup>	YES	TO-15
BPS1-AR004-IND	4	Indoor Air	YES	TO-15
BPS1-AR004-SSB		Sub-Slab	YES	TO-15
BPS1-AR004-ODA		Outdoor Air <sup>1</sup>	YES	TO-15
BPS1-AR005-IND	5	Indoor Air	YES	TO-15
BPS1-AR005-SSB		Sub-Slab	YES	TO-15
BPS1-AR005-ODA		Outdoor Air <sup>1</sup>	YES	TO-15
BPS1-AR006-IND	6	Indoor Air	YES	TO-15
BPS1-AR006-SSB		Sub-Slab	YES	TO-15
BPS1-AR006-ODA		Outdoor Air <sup>1</sup>	YES	TO-15
BPS1-AR007-IND	7	Indoor Air	YES	TO-15
BPS1-AR007-SSB		Sub-Slab	YES	TO-15
BPS1-AR007-ODA		Outdoor Air <sup>1</sup>	YES	TO-15

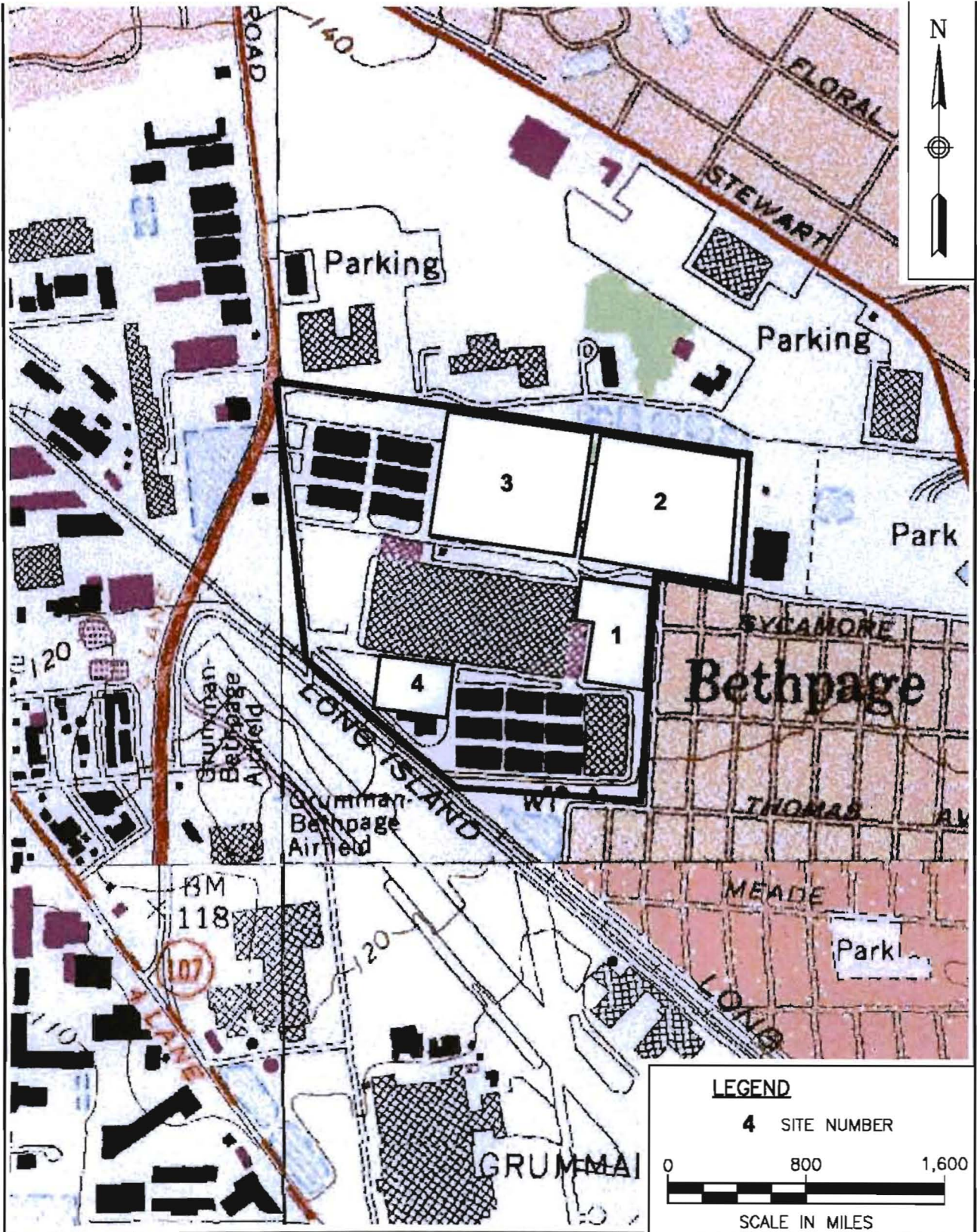
**NOTES:**

- 1) Outdoor air samples will be collected as needed to provide representative upwind air samples for each home. (One outdoor air sample may be used for multiple homes and will be dependent on field conditions)
- 2) Air samples will be collected with 6L Summa canisters.
- 3) United States Environmental Protection Agency (USEPA) Method TO-15  
(conducted by an Environmental Laboratory Approval Program (ELAP) certified laboratory)





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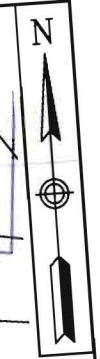


TETRA TECHNUS, INC.

SITE LOCATION MAP  
 SITE 1  
 NWIRP BETHPAGE  
 BETHPAGE, NEW YORK

SCALE AS NOTED	
FILE 112G00687BM01	
REV 0	DATE 07/15/08
FIGURE NUMBER FIGURE 2	

112GN9845/2810/112GN9845GM07.DWG 11/17/08 MKB



**LEGEND**

- SOIL GAS SAMPLE LOCATION (OCTOBER, 2008)
- SOIL GAS SAMPLE LOCATION (JANUARY, 2008)
- SOIL VAPOR PRESSURE MONITORING POINT (SVPM)
- PROPERTY LINE
- FENCE LINE
- SITE BOUNDARY
- AOC BOUNDARY
- PROPOSED INDOOR AIR SAMPLING LOCATION

0 100 200  
SCALE IN FEET



**INDOOR AIR  
PROPOSED SAMPLING LOCATIONS  
SITE 1  
NWRP BETHPAGE  
BETHPAGE, NEW YORK**

FILE 112GN9845GM07	SCALE AS NOTED
FIGURE NUMBER FIGURE 3	REV 0 DATE 11/17/08

**ATTACHMENT A**

**INDOOR AIR SAMPLING FORMS AND QUESTIONNAIRE**

**NEW YORK STATE DEPARTMENT OF HEALTH  
INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY  
CENTER FOR ENVIRONMENTAL HEALTH**

This form must be completed for each residence involved in indoor air testing.

Preparer's Name \_\_\_\_\_ Date/Time Prepared \_\_\_\_\_

Preparer's Affiliation \_\_\_\_\_ Phone No. \_\_\_\_\_

Purpose of Investigation \_\_\_\_\_

**1. OCCUPANT:**

**Interviewed: Y / N**

Last Name: \_\_\_\_\_ First Name: \_\_\_\_\_

Address: \_\_\_\_\_

County: \_\_\_\_\_

Home Phone: \_\_\_\_\_ Office Phone: \_\_\_\_\_

Number of Occupants/persons at this location \_\_\_\_\_ Age of Occupants \_\_\_\_\_

**2. OWNER OR LANDLORD: (Check if same as occupant \_\_\_)**

**Interviewed: Y / N**

Last Name: \_\_\_\_\_ First Name: \_\_\_\_\_

Address: \_\_\_\_\_

County: \_\_\_\_\_

Home Phone: \_\_\_\_\_ Office Phone: \_\_\_\_\_

**3. BUILDING CHARACTERISTICS**

**Type of Building:** (Circle appropriate response)

Residential  
Industrial

School  
Church

Commercial/Multi-use  
Other: \_\_\_\_\_

If the property is residential, type? (Circle appropriate response)

- |              |                 |                   |
|--------------|-----------------|-------------------|
| Ranch        | 2-Family        | 3-Family          |
| Raised Ranch | Split Level     | Colonial          |
| Cape Cod     | Contemporary    | Mobile Home       |
| Duplex       | Apartment House | Townhouses/Condos |
| Modular      | Log Home        | Other: _____      |

If multiple units, how many? \_\_\_\_\_

If the property is commercial, type?

Business Type(s) \_\_\_\_\_

Does it include residences (i.e., multi-use)? Y / N      If yes, how many? \_\_\_\_\_

Other characteristics:

Number of floors \_\_\_\_\_

Building age \_\_\_\_\_

Is the building insulated? Y / N

How air tight? Tight / Average / Not Tight

**4. AIRFLOW**

Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

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Airflow near source

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Outdoor air infiltration

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Infiltration into air ducts

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**5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply)**

- a. Above grade construction: wood frame concrete stone brick
- b. Basement type: full crawlspace slab other \_\_\_\_\_
- c. Basement floor: concrete dirt stone other \_\_\_\_\_
- d. Basement floor: uncovered covered covered with \_\_\_\_\_
- e. Concrete floor: unsealed sealed sealed with \_\_\_\_\_
- f. Foundation walls: poured block stone other \_\_\_\_\_
- g. Foundation walls: unsealed sealed sealed with \_\_\_\_\_
- h. The basement is: wet damp dry moldy
- i. The basement is: finished unfinished partially finished
- j. Sump present? Y / N
- k. Water in sump? Y / N / not applicable

Basement/Lowest level depth below grade: \_\_\_\_\_ (feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

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**6. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)**

Type of heating system(s) used in this building: (circle all that apply – note primary)

Hot air circulation	Heat pump	Hot water baseboard
Space Heaters	Stream radiation	Radiant floor
Electric baseboard	Wood stove	Outdoor wood boiler
		Other _____

The primary type of fuel used is:

Natural Gas	Fuel Oil	Kerosene
Electric	Propane	Solar
Wood	Coal	

Domestic hot water tank fueled by: \_\_\_\_\_

Boiler/furnace located in: Basement Outdoors Main Floor Other \_\_\_\_\_

Air conditioning: Central Air Window units Open Windows None

Are there air distribution ducts present? Y / N

Describe the supply and cold air return ductwork, and its condition where visible, including whether there is a cold air return and the tightness of duct joints. Indicate the locations on the floor plan diagram.

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## 7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom Almost Never

Level                      General Use of Each Floor (e.g., familyroom, bedroom, laundry, workshop, storage)

Basement \_\_\_\_\_

1<sup>st</sup> Floor \_\_\_\_\_

2<sup>nd</sup> Floor \_\_\_\_\_

3<sup>rd</sup> Floor \_\_\_\_\_

4<sup>th</sup> Floor \_\_\_\_\_

## 8. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

- a. Is there an attached garage? Y / N
- b. Does the garage have a separate heating unit? Y / N / NA
- c. Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, atv, car) Y / N / NA  
Please specify \_\_\_\_\_
- d. Has the building ever had a fire? Y / N When? \_\_\_\_\_
- e. Is a kerosene or unvented gas space heater present? Y / N Where? \_\_\_\_\_
- f. Is there a workshop or hobby/craft area? Y / N Where & Type? \_\_\_\_\_
- g. Is there smoking in the building? Y / N How frequently? \_\_\_\_\_
- h. Have cleaning products been used recently? Y / N When & Type? \_\_\_\_\_
- i. Have cosmetic products been used recently? Y / N When & Type? \_\_\_\_\_

- j. Has painting/staining been done in the last 6 months? Y / N Where & When? \_\_\_\_\_
- k. Is there new carpet, drapes or other textiles? Y / N Where & When? \_\_\_\_\_
- l. Have air fresheners been used recently? Y / N When & Type? \_\_\_\_\_
- m. Is there a kitchen exhaust fan? Y / N If yes, where vented? \_\_\_\_\_
- n. Is there a bathroom exhaust fan? Y / N If yes, where vented? \_\_\_\_\_
- o. Is there a clothes dryer? Y / N If yes, is it vented outside? Y / N
- p. Has there been a pesticide application? Y / N When & Type? \_\_\_\_\_

Are there odors in the building? Y / N  
If yes, please describe: \_\_\_\_\_

Do any of the building occupants use solvents at work? Y / N  
(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist)

If yes, what types of solvents are used? \_\_\_\_\_

If yes, are their clothes washed at work? Y / N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry-cleaning regularly (weekly)	No
Yes, use dry-cleaning infrequently (monthly or less)	Unknown
Yes, work at a dry-cleaning service	

Is there a radon mitigation system for the building/structure? Y / N Date of Installation: \_\_\_\_\_  
Is the system active or passive? Active/Passive

## 9. WATER AND SEWAGE

Water Supply: Public Water Drilled Well Driven Well Dug Well Other: \_\_\_\_\_

Sewage Disposal: Public Sewer Septic Tank Leach Field Dry Well Other: \_\_\_\_\_

## 10. RELOCATION INFORMATION (for oil spill residential emergency)

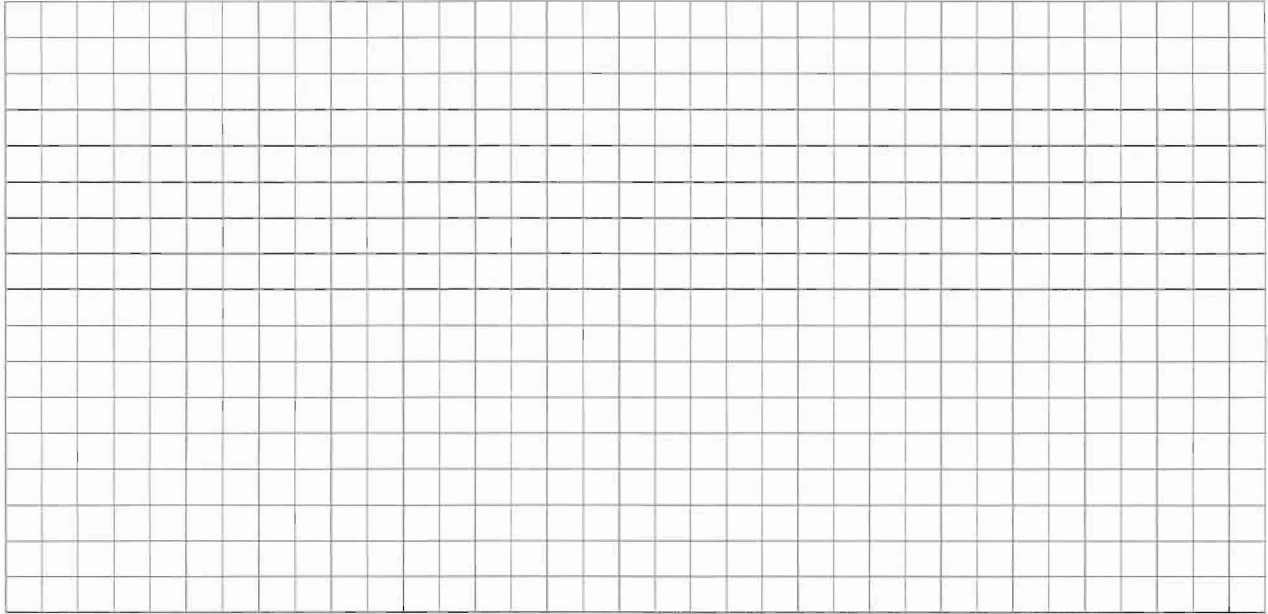
- a. Provide reasons why relocation is recommended: \_\_\_\_\_
- b. Residents choose to: remain in home      relocate to friends/family      relocate to hotel/motel
- c. Responsibility for costs associated with reimbursement explained? Y / N
- d. Relocation package provided and explained to residents? Y / N



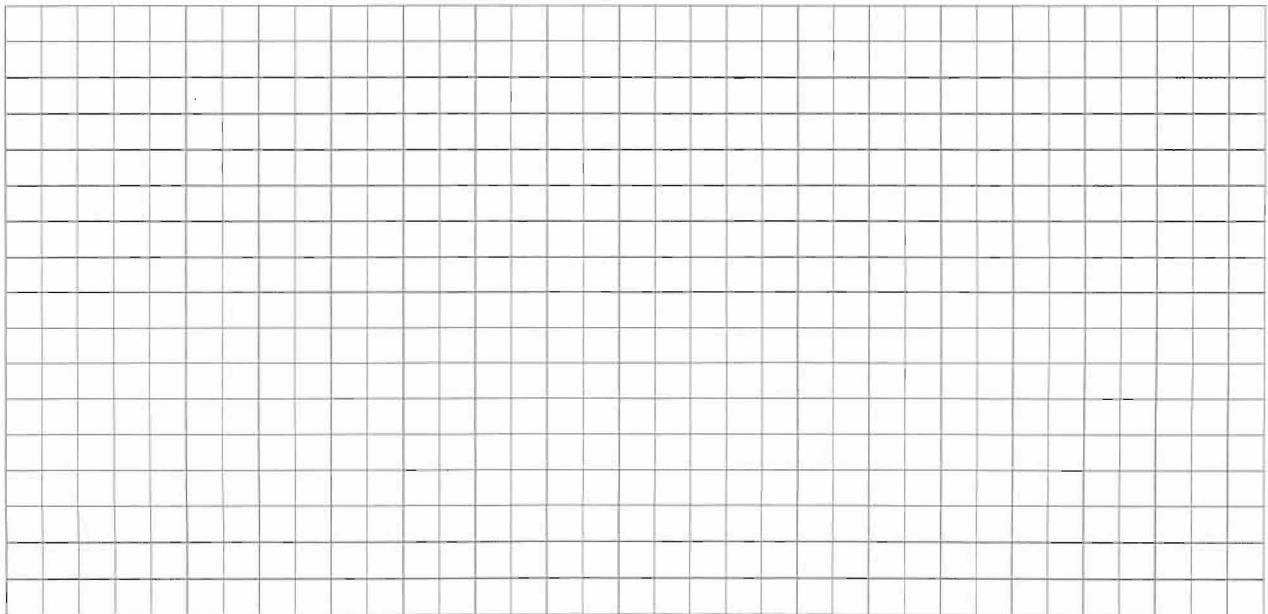
**11. FLOOR PLANS**

**Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.**

**Basement:**

A large grid of graph paper, approximately 30 units wide by 25 units high, intended for drawing a plan view sketch of the basement.

**First Floor:**

A large grid of graph paper, approximately 30 units wide by 25 units high, intended for drawing a plan view sketch of the first floor.

**12. OUTDOOR PLOT**

**Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling location(s) and PID meter readings.**

**Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.**

A large grid of graph paper, consisting of 20 columns and 30 rows of small squares, intended for drawing a sketch of the area surrounding the building being sampled. The grid is empty and occupies the lower two-thirds of the page.





Tetra Tech NUS, Inc. AIR SAMPLING LOG SHEET

Project Site Name: NWIRP Bethpage Sample ID No.: \_\_\_\_\_  
 Project No.: 112G01687 Sample Location: \_\_\_\_\_  
 C.O.C. No.: \_\_\_\_\_ Sampled By: \_\_\_\_\_

SAMPLING DATA:						
Date:	Wind speed	Wind Direction	Ambient temperature	Barometric Pressure	Relative Humidity	Other
Time:	(Visual)	(S.U.)	(°C)	(°C)	(%)	
Method:						

Summa Canister #	
Filter Type	

Start Time Vacuum		in Hg
End Time Vacuum		in Hg

He check	Start	Stop	Reading
Purge Data	Start	Stop	

Readings:  
 Liters/minute  
 \_\_\_\_\_ @ \_\_\_\_\_  
 \_\_\_\_\_ @ \_\_\_\_\_  
 \_\_\_\_\_ @ \_\_\_\_\_

Notes:  
 PID:  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**ATTACHMENT B**  
**TO-15 ANALYTE LIST**



180 Blue Ravine Road, Suite B Folsom, CA 95630

Method: Modified TO-15-LL (Sp)/SpRLs-NYSDOH (2007)

Compound	Rpt.Limit(ppbv)
1,1,1-Trichloroethane	0.050
Carbon Tetrachloride	0.050
Trichloroethene	0.050
Bromodichloromethane	0.050
1,1,2-Trichloroethane	0.050
Tetrachloroethene	0.050
Dibromochloromethane	0.050
1,2-Dibromoethane (EDB)	0.050
1,1,2,2-Tetrachloroethane	0.050
1,3-Dichlorobenzene	0.050
1,4-Dichlorobenzene	0.050
1,2-Dichlorobenzene	0.050
Freon 12	0.050
Freon 114	0.050
Freon 11	0.050
Freon 113	0.050
Bromoform	0.050
Vinyl Chloride	0.10
1,1-Dichloroethene	0.10
1,1-Dichloroethane	0.10
cis-1,2-Dichloroethene	0.10
Benzene	0.10
1,2-Dichloroethane	0.10
Toluene	0.10
Ethyl Benzene	0.10
m,p-Xylene	0.10
o-Xylene	0.10
trans-1,2-Dichloroethene	0.10
Methyl tert-butyl ether	0.10
Chloromethane	0.10
Bromomethane	0.10
Chloroethane	0.10
Hexane	0.10
2-Butanone (Methyl Ethyl Ketone)	0.10
Chloroform	0.10
Cyclohexane	0.10
1,2-Dichloropropane	0.10
1,4-Dioxane	0.10
cis-1,3-Dichloropropene	0.10
4-Methyl-2-pentanone	0.10
trans-1,3-Dichloropropene	0.10

Reporting limits cited do not take into account sample dilution due to canister pressurization.

Toll Free: 1-800-985-5955 Phone: 1-916-985-1000 Fax: 1-916-985-1020 email: [atl@airtoxics.com](mailto:atl@airtoxics.com) [www.airtoxics.com](http://www.airtoxics.com)



180 Blue Ravine Road, Suite B Folsom, CA 95630

**Method: Modified TO-15-LL (Sp)/SpRLs-NYSDOH (2007)**

Chlorobenzene	0.10
Styrene	0.10
1,3,5-Trimethylbenzene	0.10
1,2,4-Trimethylbenzene	0.10
alpha-Chlorotoluene	0.10
2,2,4-Trimethylpentane	0.10
tert-Butyl alcohol	0.50
Methylene Chloride	0.50
Hexachlorobutadiene	0.50
Ethanol	0.50
1,2,4-Trichlorobenzene	0.50

<u>Surrogate</u>	<u>Method Limits</u>
4-Bromofluorobenzene	70-130
1,2-Dichloroethane-d4	70-130
Toluene-d8	70-130

Reporting limits cited do not take into account sample dilution due to canister pressurization.