

**Via Email**

April 12, 2016

NC Department of Environmental Quality  
- Brownfields Program  
1646 Mail Service Center  
Raleigh, NC 27699

Attention: Ms. Sharon Eckard, PG

Re: Vapor Mitigation System Installation – Nottingham Apartments  
Market Street Storage Brownfields Project  
Greensboro, North Carolina  
Brownfields ID 17057-13-041  
H&H Job No. MSS-003

Dear Sharon:

Please find the attached report in PDF format for the above-referenced site. If you have any questions or comments, please feel free to contact me.

Sincerely,

*Hart & Hickman, PC*



Matt Bramblett, PE  
Principal

Enclosure

cc: Ms. Lori Hinnant (via email)  
Mr. John Turner, Jr (via email)  
Mr. Frank Hinman (via email)

# Vapor Mitigation System Installation Nottingham Apartments

## Market Street Storage Brownfields Project Greensboro, North Carolina

DENR BF Project #17057-13-041  
H&H Job No. MSS-002  
April 8, 2016



**Vapor Mitigation System Installation  
Nottingham Apartments  
Market Street Storage Brownfields Site  
Greensboro, North Carolina  
H&H Job No. MSS-003**

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**Vapor Mitigation System Installation  
Nottingham Apartments  
Market Street Storage Brownfields Site  
Greensboro, North Carolina  
H&H Job No. MSS-003**

**1.0 Introduction and Background**

Hart & Hickman, PC (H&H) has prepared this Vapor Mitigation System Installation Report to document vapor mitigation activities and subsequent indoor air sampling conducted at building 4250 in the Nottingham Apartments complex located at 4254 United Street in Greensboro, North Carolina. A site location map is included as Figure 1. The purpose of the vapor mitigation activities was to mitigate elevated levels of trichloroethylene (TCE) and other volatile organic compounds (VOCs) detected in indoor air samples collected inside apartment building 4250. A brief summary of the vapor intrusion assessment activities conducted at the site is included below.

On February 18 and 19, 2015, H&H conducted soil vapor and sub-slab vapor assessment activities at and downgradient of the Market Street Storage facility. Based on the results of the subsurface soil vapor sampling activities, DEQ requested that indoor air sampling be completed in the two buildings located adjacent to subsurface soil vapor samples with concentrations above residential screening levels.

On May 6 through 13, 2015, H&H conducted indoor air sampling activities in eight tenant spaces located in the Nottingham Apartment complex. H&H collected the indoor air samples by deploying Radiello® samplers for a seven-day period in the four first floor units in buildings 4250 and 4252. In an effort to identify and eliminate potential background sources, H&H personnel reviewed household products that could contribute to indoor air concentrations. In addition, H&H collected an outdoor ambient air background sample concurrently with the indoor air samples.

Analytical results indicated the presence of TCE in the indoor air samples collected from apartments 4250A (2.6 µg/m<sup>3</sup>) and 4250B (4.4 µg/m<sup>3</sup>) above the default Division of Waste Management (DWM) Residential Indoor Air Screening Level (IASL) of 0.417 µg/m<sup>3</sup>. The US EPA confirmed the TCE levels in indoor air via indoor air sampling. Then, EPA installed temporary portable carbon air filtration units in the two ground level apartments where TCE levels exceeded the NC Department of Health and Human Services (DHHS) action level of 2.0 µg/m<sup>3</sup> during the summer of 2015. After DEQ's review of the indoor air sampling data, DEQ requested that a vapor mitigation work plan be prepared for building 4250 of the Nottingham Apartment complex.

On December 23, 2015, H&H submitted a Vapor Mitigation Work Plan (work plan) to DEQ. Following work plan approval by DEQ, H&H conducted vapor mitigation activities at the site. The vapor mitigation activities included the installation of a sub-slab depressurization (SSD) system inside apartment building 4250 in the Nottingham Apartments complex. Following system installation, the indoor air filters were turned off and indoor air samples were collected. The SSD system installation and indoor air sampling were conducted in accordance with the approved work plan. A description of the sub-slab depressurization system installation along and subsequent indoor air sampling is included below.

## 2.0 Vapor Intrusion Mitigation Activities

### 2.1 Sub-Slab Depressurization System Installation

On February 25, 2016, H&H installed a SSD system inside apartment building 4250. The system was installed in accordance with the approved work plan and a layout of the system is included as Figure 2. The SSD system consisted of two fans which drew sub-slab vapor from four sub-slab vapor extraction points located inside the apartment building. The fans used are known as AMG Legend, and fan specifications are provided in Appendix A. As shown in Figure 2 a sub-slab vapor extraction point was installed in each of the four first floor units (4250A, 4250B, 4250C, and 4250D). The sub-slab vapor was discharged to the atmosphere through an exterior exhaust stack.

The system was constructed by first drilling through the building's slab with a rotary hammer drill to install 4-inch diameter sub-slab penetrations (SSPs) extending approximately 2 inches beneath the slab. Following installation of the SSP, the contractor removed approximately 1 cubic ft of subsurface material from beneath the floor to create a void space around the end of the pipe for collection of air/vapor. H&H field personnel observed that the subsurface material removed from below the slab primarily consisted of gravel. This indicated that the gravel layer in the vicinity of the SSP was up to 1 ft in thickness. A 4-inch diameter PVC pipe connected to a 3-inch reducer was then installed and sealed at each penetration using Loctite Proline S10 Masonry Sealant. Each penetration was then connected via 3-inch PVC pipe to a fan that mounted to the exterior of the site building. Exhaust lines from the fans were bracketed to the exterior wall of the site building to height equal to or greater than 3 ft above the roof edge. The exhaust piping was finished with 90 degree turnout fittings equipped with vermin screens. Photographs of the SSD system installation are included in Appendix B.

To allow for future monitoring without disturbing the tenants, a vacuum gauging line was also installed (Figure 1). The vacuum gauging line was connected to the vacuum observation point installed through the slab at a location in the same closets as the SSPs. The observation point is 0.5-inch diameter schedule 80 PVC pipe which expanded to 0.75-inch schedule 80 PVC pipe.

This vacuum observation line pipe runs parallel with the SSP discharge pipe to exit the side of the building.

Labels were placed on both the SSD piping and vacuum gauging lines that say “Do Not Disturb.” A similar label was placed on the fan on-off switch box.

Following initial start-up of the SSD system on February 25, 2016, a vacuum of approximately 0.30-inches of water was observed at each vacuum gauging line. A Dwyer Magnehelic® differential pressure gauge #2001 (range of 0-1.0" water) was used to measure the vacuum at the test ports. Following approximately three days of SSD system operation, the portable carbon air filtration units were shut off and unplugged for confirmation sampling.

## **2.2 Post-Mitigation Confirmation Sampling**

Beginning on March 1, 2016 (approximately two days after shutting off the portable carbon air filtration units), H&H collected post-mitigation indoor air confirmation samples to assess the effectiveness of the sub-slab depressurization system. H&H deployed passive Radiello® samplers in each of the four first floor units in building 4250. In conjunction with the indoor air samples, H&H also collected an outdoor background sample located in an upgradient location based on the seasonal prevailing wind direction. The locations of the indoor and background air samples are shown on Figure 3. Because chlorinated VOCs were not observed in household chemicals previously inventoried and because household chemicals were reportedly not removed during the US EPA indoor air sampling event, H&H did not remove household chemicals prior to sampling.

Following a seven day sampling time, H&H retrieved the Radiello® samplers from units 4250A, 4250B, and 4250D and retrieved the background outdoor sample. H&H was unable to retrieve the Radiello® sampler in unit 4250C because the tenant had apparently removed it from its sample location. Consistent with the previous sampling event, the indoor air samples were analyzed for select chlorinated VOCs by method RAD624-SIM-RAD130B.M. Chlorinated

VOCs included in the analysis included PCE, TCE, cis-1,2-dichloroethylene, trans-1-2-dichloroethylene, and vinyl chloride.

### 3.0 Results

The results of the indoor and background air samples did not indicate the presence of compounds above laboratory detection limits or Division of Waste Management (DWM) Residential Indoor Air Screening Levels (IASL) except for a concentration of TCE detected in indoor air sample 4250D ( $4.2 \mu\text{g}/\text{m}^3$ ) which was above the DWM Residential IASL of  $2.0 \mu\text{g}/\text{m}^3$ . A summary of the analytical results for the post-mitigation sampling along with pre-mitigation sampling are included in Table 1. The laboratory analytical report for the post-mitigation sampling is included in Appendix C.

As shown in Table 1, concentrations of PCE and TCE detected in the indoor air samples collected from units 4250A and 4250B were removed to below laboratory detection limits following the installation of the SSD system; however, the TCE concentration detected in the sample collected from unit 4250D was detected above the DWM Residential IASL following the installation of the SSD system. In contrast, prior to system installation, TCE concentrations were below laboratory detection limits in sample 4250D. Please note that although TCE concentrations increased in sample 4250D following the installation of the SSD system, PCE concentrations in sample 4250D decreased after SSD system installation.

Based on the effective reduction of PCE and TCE in samples 4250A and 4250B, as well as the absence of a detectable concentration of TCE in sample 4250D prior to system installation, H&H believes that the TCE concentration detected in sample 4250D may be erroneous and may not represent a vapor intrusion issue.

#### 4.0 Summary and Recommendations

On February 25, 2016, H&H conducted vapor mitigation activities at the Nottingham Apartments complex located at 4254 United Street in Greensboro, North Carolina. The purpose of the vapor mitigation activities was to mitigate elevated levels of TCE and other volatile VOCs detected in indoor air samples collected inside apartment building 4250. The vapor mitigation activities included the installation of a SSD system within the apartment building.

Beginning on March 1, 2015 (approximately five days after SSD system operation) H&H attempted to collect an indoor air sample from each of the four first floor apartments and a background air sample for a seven-day period utilizing Radiello® samplers. Following the seven day sampling period, H&H retrieved the Radiello® samplers from units 4250A, 4250B, and 4250D and retrieved the background outdoor sample. H&H was unable to retrieve the Radiello® sampler in unit 4250C because the tenant had apparently removed it from its sample location.

The results of the indoor and background air samples did not indicate the presence of compounds above laboratory detection limits or DWM Residential IASLs except for a concentration of TCE which was detected in the indoor air sample collected from unit 4250D ( $4.2 \mu\text{g}/\text{m}^3$ ) above the DWM Residential IASL of  $2.0 \mu\text{g}/\text{m}^3$ .

A comparison of the pre and post system installation data indicate that concentrations of PCE and TCE detected in samples 4250A and 4250B dropped below laboratory detection limits following the installation of the SSD system; however, the TCE concentration detected in the sample collected from unit 4250D was above the DWM Residential IASL following the installation of the SSD system. In contrast, prior to system installation, TCE concentrations were below laboratory detection limits in sample 4250D. Please note that although TCE concentrations increased in sample 4250D following the installation of the SSD system, PCE concentrations in sample 4250D decreased after SSD system installation.

Based on the effective reduction of PCE and TCE in samples 4250A and 4250B, as well as the absence of a detectable concentration of TCE in sample 4250D prior to system installation, H&H

believes that the TCE concentration detected in sample 4250D may be erroneous and may not represent a vapor intrusion issue; therefore, H&H recommends that a confirmation indoor air sample be collected in unit 4250D, after a household chemical inventory and temporary chemical removal. In addition, H&H recommends that an indoor air sample be collected from unit 4250C because no data is available from that apartment due to apparent tenant interference. After confirmation of system performance, Market Street has fulfilled its obligations under the Brownfields Agreement.

On-going operation and maintenance for the SSD is the responsibility of others. H&H recommends continuous operation of the SSD fans until subsurface vapor data are collected that indicate that there is no further potential for vapor intrusion. The fans should be checked for operation once per month. At the time the fans are checked for operation, the vacuum test line should be measured at each of the four test ports. In addition, H&H recommends that the piping and floor seals be inspected once per year in each apartment to look for any piping damage or seal deterioration. The monthly checks and measurements and annual visual inspections should be documented on a log sheet. If a fan is discovered not to be operating, H&H recommends that the fan be repaired within a 2-day period.

**Table 1**  
**Summary of Indoor Air Analytical Data**  
**Nottingham Apartments**  
**Market Street Storage Brownfields Project**  
**Greensboro, North Carolina**  
**H&H Job No. MSS-002**

Sample Location	Sampling Dates	Phase	Tetrachloroethene (PCE)	Trichloroethene (TCE)	Vinyl Chloride	trans-1,2-Dichloroethene (trans-1,2-DCE)	cis-1,2-Dichloroethene (cis-1,2-DCE)
			$\mu\text{g}/\text{m}^3$				
4250A	5/6-5/13/2015	Pre-Mitigation	0.33	<b>2.6</b>	<0.016	<0.017	<0.019
	3/1-3/8/2016	Post-Mitigation	<0.34	<0.29	<0.15	<1.2	<0.24
4250B	5/6-5/13/2015	Pre-Mitigation	2.1	<b>4.4</b>	<0.016	<0.017	<0.019
	3/1-3/8/2016	Post-Mitigation	<0.34	<0.29	<0.15	<1.2	<0.24
4250C	5/6-5/13/2015	Pre-Mitigation	1.9	0.071 J	<0.016	<0.017	<0.019
4250D	5/6-5/13/2015	Pre-Mitigation	0.070 J	<0.023	<0.016	<0.017	<0.019
	3/1-3/8/2016	Post-Mitigation	<0.34	<b>4.2</b>	<0.15	<1.2	<0.24
4252A	5/6-5/13/2015	Pre-Mitigation	1.7	0.031 J	<0.016	<0.017	1.1
4252B	5/6-5/13/2015	Pre-Mitigation	<b>9.8</b>	<0.023	<0.016	<0.017	<0.019
4252C	5/6-5/13/2015	Pre-Mitigation	0.15	0.071	<0.016	<0.017	<0.019
4252D	5/6-5/13/2015	Pre-Mitigation	0.22	0.053	<0.016	<0.017	<0.019
BG	5/6-5/13/2015	Pre-Mitigation	0.20	<0.023	<0.016	<0.017	<0.019
	3/1-3/8/2016	Post-Mitigation	<0.34	<0.29	<0.15	<1.2	<0.24
DWM Residential Indoor Air Screening Level			8.34	2.0	0.168	NS	NS

Notes

Samples collected using Radiello 130 cartridges

**Bold** highlight indicates concentration exceeds Division of Waste Management

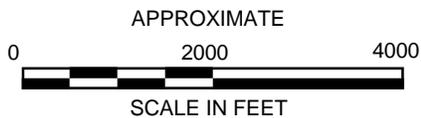
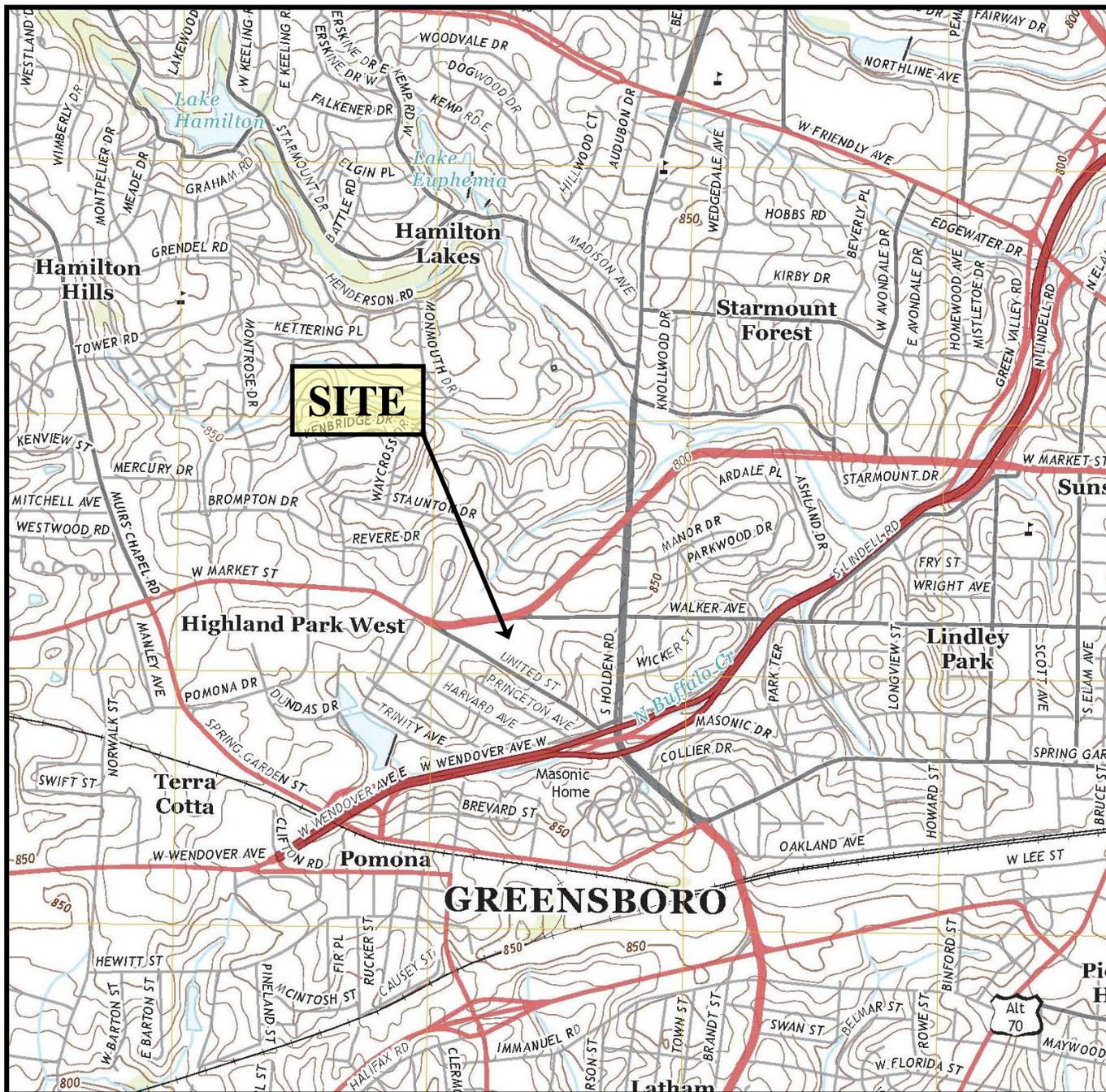
\*NC DWM Residential Vapor Intrusion Screening Concentrations (Sept 2015) except TCE level provided by NC DEQ

DMW = Division of Waste Management

NS = Not Specified

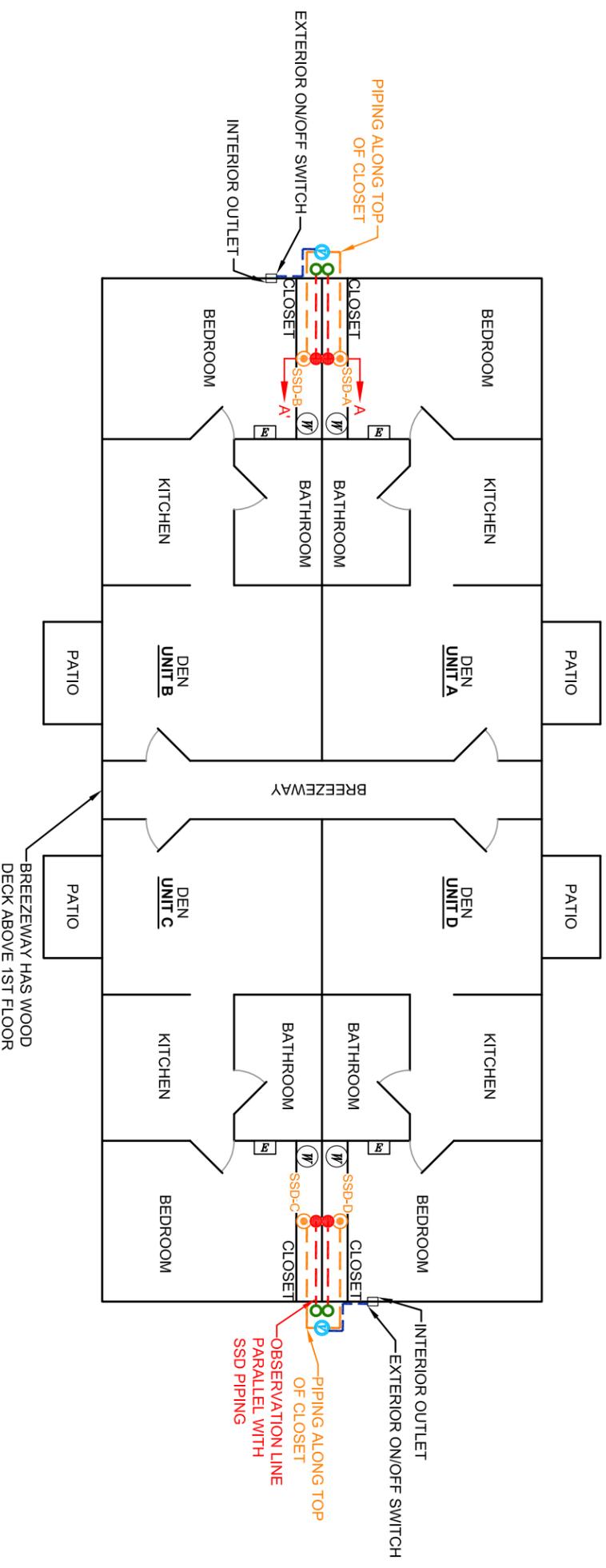
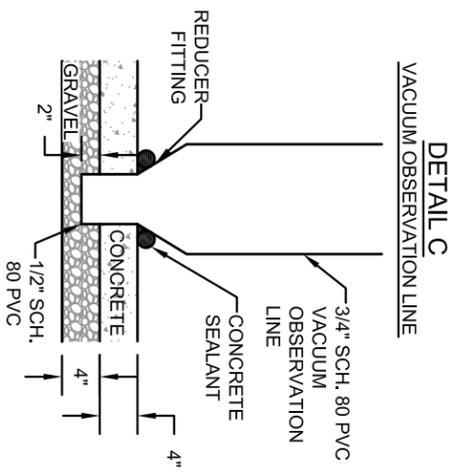
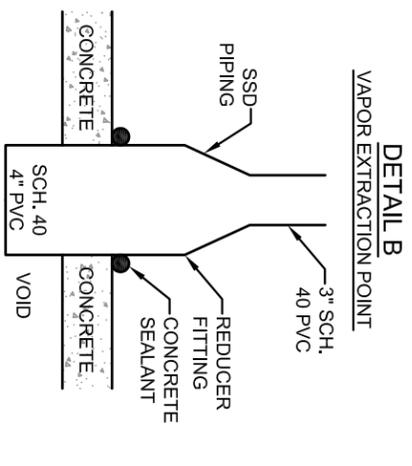
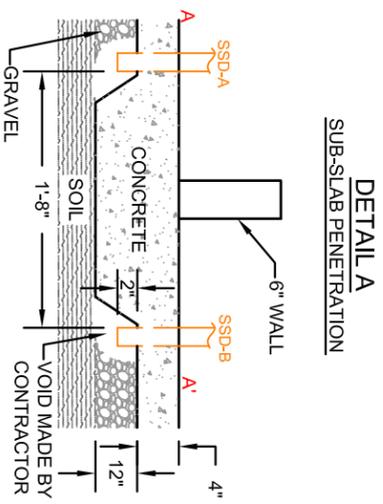
BG = Background

$\mu\text{g}/\text{m}^3$  = micrograms per cubic meter

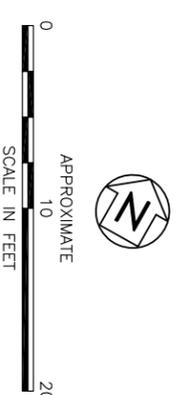


NORTH CAROLINA, GREENSBORO 2013

TITLE	<b>SITE LOCATION MAP</b>	
PROJECT	3939 WEST MARKET STREET GREENSBORO, NC	
		2923 S. Tryon Street, Suite 100 Charlotte, NC 28203 704.586.0007(p) 704.586.0373(f)
DATE:	04/07/2016	REVISION NO: 0
JOB NO:	MSS-003	FIGURE: 1



- LEGEND**
- ELECTRICAL PANEL
  - SSD SYSTEM VAPOR EXTRACTION POINT
  - VACUUM POINT
  - VACUUM TEST PORT
  - SSD SYSTEM VACUUM MOTOR
  - HOT WATER HEATER
  - SSD SYSTEM PIPING RUN
  - 3/4" VACUUM OBSERVATION LINE
  - ELECTRICAL LINE



NOTE:

APARTMENT BUILDING 4250 IS TWO STORIES.

TITLE  
**SUB-SLAB DEPRESSURIZATION SYSTEM LAYOUT**

PROJECT  
**NOTTINGHAM APARTMENTS  
4250 UNITED STREET  
GREENSBORO, NORTH CAROLINA**

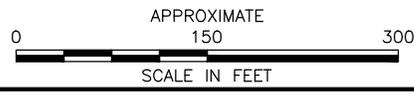
**hart hickman**  
SMARTER ENVIRONMENTAL SOLUTIONS  
2923 South Tryon Street, Suite 100  
Charlotte, North Carolina 28203  
704-586-0007 (p) 704-586-0373 (f)  
License # C-1269 / #C-245 Geology

DATE: 4-12-16  
JOB NO. MSS-003  
REVISION NO. 0  
FIGURE NO. 2



**LEGEND**

- - - SUBJECT PROPERTY BOUNDARY
- INDOOR AIR SAMPLE LOCATION
- ⊕ BACKGROUND AIR SAMPLE LOCATION
- 4250A APARTMENT NUMBER



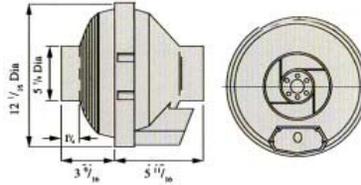
TITLE <b>INDOOR AIR SAMPLE LOCATION MAP</b>	
PROJECT <b>NOTTINGHAM APARTMENTS MARKET STREET BROWNFIELDS PROJECT GREENSBORO, NORTH CAROLINA</b>	
 2923 South Tryon Street-Suite 100 Charlotte, North Carolina 28203 704-586-0007(p) 704-586-0373(f) License # C-1269 / #C-245 Geology	
DATE: 04-07-16	REVISION NO. 0
JOB NO. MSS-003	FIGURE NO. 3

**Appendix A**  
**Fan Specification**



home products order radon info mitigation NCRA compare about contact

**AMG Legend**



**AMG Legend, Radon Extract Fan Performance Figures**

Model	Volts	Watts	Max. Amps	CFM at STATIC PRESSURE in. w.g.										
				0"	0.5"	0.75"	1.0"	1.25"	1.5"	1.75"	2.0"	2.2"	2.4"	2.6"
AMG Legend	115V 60Hz	125	1.32	353	280	245	210	180	149	110	70	43	19	0

Weight: 8 lbs. 3 oz. Fan Speed: 3100 rpm

Performance shown is for installation type D - Ducted inlet, Ducted outlet. Speed (rpm) shown is nominal. Performance is based on actual speed of test. Performance ratings do not include the effects of appurtenances in the air stream. The performance figures shown have been corrected to standard air density.

\*We have brackets, too!

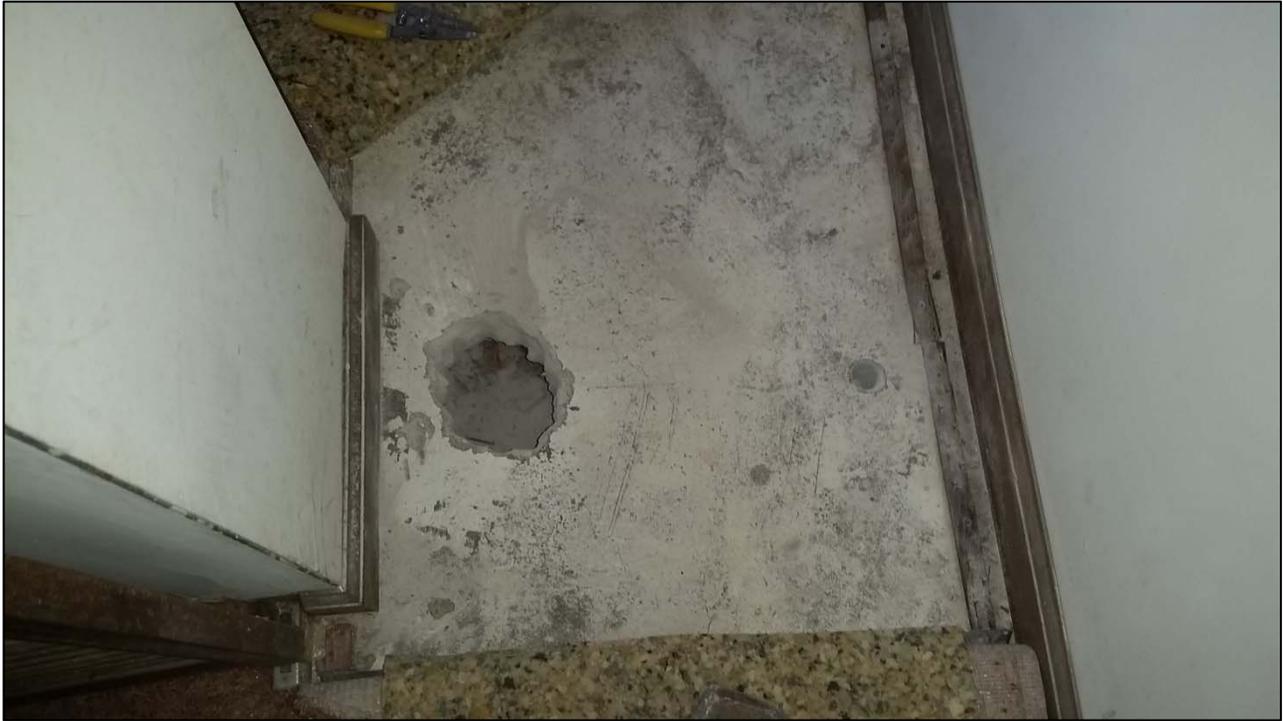
**To Order Call 1 (800) 806-7866 or 1 (877) 264-3267**

Festa Manufacturing Enterprises, LLC.  
Festa International Radon Supply Technologies, Co.  
Festa Radon Technologies Co.

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1 (800) 806-7866 1 (877) 264-3267  
47A Progress Avenue, Cranberry Twp., PA 16066

**Appendix B**  
**Installation Photographs**



Photograph 1: View of sub-slab penetration.



Photograph 2: View of gravel removed from sub-slab penetration



Photograph 3: View of soil vapor extraction point with reducer fitting.



Photograph 4: View of soil vapor extraction point with foam backer installed.



Photograph 5: View of masonry sealant installed around soil vapor extraction point.



Photograph 6: View of vacuum observation point.



Photograph 7: View of vacuum motor on exterior wall



Photograph 8: View of exterior vacuum observation points.



Photograph 9: View of exhaust piping

**Appendix C**  
**Laboratory Analytical Report**

March 17, 2016

John Lopez  
Hart & Hickman - Charlotte, NC  
2923 South Tryon Street, Suite 100  
Charlotte, NC 28203

Project Location: Greensboro, NC  
Client Job Number:  
Project Number: MSS001/002  
Laboratory Work Order Number: 16C0486

Enclosed are results of analyses for samples received by the laboratory on March 8, 2016. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Lisa A. Worthington  
Project Manager

Hart & Hickman - Charlotte, NC  
2923 South Tryon Street, Suite 100  
Charlotte, NC 28203  
ATTN: John Lopez

REPORT DATE: 3/17/2016

PURCHASE ORDER NUMBER: MSS001/002

PROJECT NUMBER: MSS001/002

**ANALYTICAL SUMMARY**

WORK ORDER NUMBER: 16C0486

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Greensboro, NC

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
783ND Unit A	16C0486-01	Air		RAD 130	
361NU Unit B	16C0486-02	Air		RAD 130	
786ND Unit D	16C0486-03	Air		RAD 130	
362NU Background	16C0486-04	Air		RAD 130	

**CASE NARRATIVE SUMMARY**

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

**RAD 130**

**Qualifications:**

---

Continuing calibration did not meet method specifications and was biased on the low side for this compound. Increased uncertainty is associated with the reported value which is likely to be biased on the low side.

**Analyte & Samples(s) Qualified:**

**Vinyl Chloride**

16C0486-01[783ND Unit A], 16C0486-02[361NU Unit B], 16C0486-03[786ND Unit D], 16C0486-04[362NU Background], B144495-BLK1, B144495-BS1, B144495-BSD1

---

The results of analyses reported only relate to samples submitted to the Con-Test Analytical Laboratory for testing.

I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.



Tod E. Kopycinski  
Laboratory Director

**ANALYTICAL RESULTS**

Project Location: Greensboro, NC  
 Date Received: 3/8/2016  
**Field Sample #: 783ND Unit A**  
**Sample ID: 16C0486-01**  
 Sample Matrix: Air  
 Sampled: 3/8/2016 11:42

Sample Description/Location:  
 Sub Description/Location:

**Work Order: 16C0486**

Flow Controller ID:  
 Sample Type:  
 Air Volume L: 10072

**RAD 130**

Analyte	Total µg			Flag	ug/m3		Dilution	Date/Time		Analyst
	Results	RL	MDL		Results	RL		Analyzed		
Vinyl Chloride	ND	0.16		V-05	ND	0.15	1	3/17/16	13:55	CJM
trans-1,2-Dichloroethene	ND	1.0			ND	1.2	1	3/17/16	13:55	CJM
cis-1,2-Dichloroethene	ND	0.20			ND	0.24	1	3/17/16	13:55	CJM
Trichloroethene	ND	0.20			ND	0.29	1	3/17/16	13:55	CJM
Tetrachloroethene	ND	0.20			ND	0.34	1	3/17/16	13:55	CJM

**ANALYTICAL RESULTS**

Project Location: Greensboro, NC  
 Date Received: 3/8/2016  
**Field Sample #: 361NU Unit B**  
**Sample ID: 16C0486-02**  
 Sample Matrix: Air  
 Sampled: 3/8/2016 11:50

Sample Description/Location:  
 Sub Description/Location:

**Work Order: 16C0486**

Flow Controller ID:  
 Sample Type:  
 Air Volume L: 10067

**RAD 130**

Analyte	Total µg			Flag	ug/m3		Dilution	Date/Time		Analyst
	Results	RL	MDL		Results	RL		Analyzed		
Vinyl Chloride	ND	0.16		V-05	ND	0.15	1	3/17/16	14:19	CJM
trans-1,2-Dichloroethene	ND	1.0			ND	1.2	1	3/17/16	14:19	CJM
cis-1,2-Dichloroethene	ND	0.20			ND	0.24	1	3/17/16	14:19	CJM
Trichloroethene	ND	0.20			ND	0.29	1	3/17/16	14:19	CJM
Tetrachloroethene	ND	0.20			ND	0.34	1	3/17/16	14:19	CJM

**ANALYTICAL RESULTS**

Project Location: Greensboro, NC  
 Date Received: 3/8/2016  
**Field Sample #: 786ND Unit D**  
**Sample ID: 16C0486-03**  
 Sample Matrix: Air  
 Sampled: 3/8/2016 11:59

Sample Description/Location:  
 Sub Description/Location:

**Work Order: 16C0486**

Flow Controller ID:  
 Sample Type:  
 Air Volume L: 10072

**RAD 130**

Analyte	Total µg			Flag	ug/m3		Dilution	Date/Time		Analyst
	Results	RL	MDL		Results	RL		Analyzed		
Vinyl Chloride	ND	0.16		V-05	ND	0.15	1	3/17/16	14:43	CJM
trans-1,2-Dichloroethene	ND	1.0			ND	1.2	1	3/17/16	14:43	CJM
cis-1,2-Dichloroethene	ND	0.20			ND	0.24	1	3/17/16	14:43	CJM
Trichloroethene	2.9	0.20			4.2	0.29	1	3/17/16	14:43	CJM
Tetrachloroethene	ND	0.20			ND	0.34	1	3/17/16	14:43	CJM

**ANALYTICAL RESULTS**

Project Location: Greensboro, NC  
 Date Received: 3/8/2016  
**Field Sample #: 362NU Background**  
**Sample ID: 16C0486-04**  
 Sample Matrix: Air  
 Sampled: 3/8/2016 12:07

Sample Description/Location:  
 Sub Description/Location:

**Work Order: 16C0486**

Flow Controller ID:  
 Sample Type:  
 Air Volume L: 10058

**RAD 130**

Analyte	Total µg			Flag	ug/m3		Dilution	Date/Time		Analyst
	Results	RL	MDL		Results	RL		Analyzed		
Vinyl Chloride	ND	0.16		V-05	ND	0.15	1	3/17/16	15:07	CJM
trans-1,2-Dichloroethene	ND	1.0			ND	1.2	1	3/17/16	15:07	CJM
cis-1,2-Dichloroethene	ND	0.20			ND	0.24	1	3/17/16	15:07	CJM
Trichloroethene	ND	0.20			ND	0.29	1	3/17/16	15:07	CJM
Tetrachloroethene	ND	0.20			ND	0.34	1	3/17/16	15:07	CJM

**Sample Extraction Data**

**Prep Method: Radiello-RAD 130**

Lab Number [Field ID]	Batch	Initial [Cartridge	Final [mL]	Date
16C0486-01 [783ND Unit A]	B144495	1.00	2.00	03/17/16
16C0486-02 [361NU Unit B]	B144495	1.00	2.00	03/17/16
16C0486-03 [786ND Unit D]	B144495	1.00	2.00	03/17/16
16C0486-04 [362NU Background]	B144495	1.00	2.00	03/17/16

**QUALITY CONTROL**

**Miscellaneous Air Analyses - Quality Control**

Analyte	Total µg		ug/m3		Spike Level	Source	%REC	RPD	RPD	Flag	
	Results	RL	Results	RL	Total µg	Result	%REC	RPD	Limit		
<b>Batch B144495 - Radiello</b>											
<b>Blank (B144495-BLK1)</b>					Prepared & Analyzed: 03/17/16						
Vinyl Chloride	ND	0.16								V-05	
trans-1,2-Dichloroethene	ND	1.0									
cis-1,2-Dichloroethene	ND	0.20									
Trichloroethene	ND	0.20									
Tetrachloroethene	ND	0.20									
<b>LCS (B144495-BS1)</b>					Prepared & Analyzed: 03/17/16						
Vinyl Chloride	5.56	0.16		0.41	10.0		55.6	40-140		V-05	
trans-1,2-Dichloroethene	7.52	1.0			10.0		75.2	40-140			
cis-1,2-Dichloroethene	6.95	0.20			10.0		69.5	40-140			
Trichloroethene	6.77	0.20			10.0		67.7	40-140			
Tetrachloroethene	6.53	0.20			10.0		65.3	40-140			
<b>LCS Dup (B144495-BSD1)</b>					Prepared & Analyzed: 03/17/16						
Vinyl Chloride	5.67	0.16		0.41	10.0		56.7	40-140	1.89	30	V-05
trans-1,2-Dichloroethene	8.39	1.0			10.0		83.9	40-140	11.0	30	
cis-1,2-Dichloroethene	8.06	0.20			10.0		80.6	40-140	14.7	30	
Trichloroethene	7.87	0.20			10.0		78.7	40-140	15.1	30	
Tetrachloroethene	7.68	0.20			10.0		76.8	40-140	16.3	30	

**FLAG/QUALIFIER SUMMARY**

- \* QC result is outside of established limits.
  - † Wide recovery limits established for difficult compound.
  - ‡ Wide RPD limits established for difficult compound.
  - # Data exceeded client recommended or regulatory level
- Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
- V-05 Continuing calibration did not meet method specifications and was biased on the low side for this compound. Increased uncertainty is associated with the reported value which is likely to be biased on the low side.

**CERTIFICATIONS**

**Certified Analyses included in this Report**

Analyte	Certifications
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**No certified Analyses included in this Report**

The CON-TEST Environmental Laboratory operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC	100033	02/1/2018
MA	Massachusetts DEP	M-MA100	06/30/2016
CT	Connecticut Department of Public Health	PH-0567	09/30/2017
NY	New York State Department of Health	10899 NELAP	04/1/2016
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2017
RI	Rhode Island Department of Health	LAO00112	12/30/2016
NC	North Carolina Div. of Water Quality	652	12/31/2016
NJ	New Jersey DEP	MA007 NELAP	06/30/2016
FL	Florida Department of Health	E871027 NELAP	06/30/2016
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2016
WA	State of Washington Department of Ecology	C2065	02/23/2016
ME	State of Maine	2011028	06/9/2017
VA	Commonwealth of Virginia	460217	12/14/2016
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2016

Company Name: Hart & Hickman  
 Address: 2923 S Tryon St Suite 100  
Charlotte, NC  
 Attention: John Lopez  
 Project Location: Greensboro, NC  
 Sampled By: Troy Eiman

Telephone: 704-586-0007  
 Project # A  
 Client PO# MSS-001007  
 DATA DELIVERY (check all that apply)  
 FAX  EMAIL  WEBSITE

Email: Slopez@hartandhickman.com  
 Format:  OPDF  EXCEL  OGIS  OTHER

Project Proposal Provided? (for billing purposes)  
 yes  proposal date

Con-Test Lab ID <small>(laboratory use only)</small>	Client Sample ID / Description	Collection		Composite	*Matrix Code	Conc Code
		Beginning Date/Time	Ending Date/Time			
01 783ND	Unit A	3/1 1200	3/8 1147		A	
02 361NU	Unit B	3/1 1203	3/8 1150		A	
03 786ND	Unit D	3/1 1205	3/8 1159		A	
04 362NU	Background	3/1 1207	3/8 1207		A	

Comments: PCE, TCE and degradation products

Please use the following codes to let Con-Test know if a specific sample may be high in concentration in Matrix/Conc. Code Box:  
 H - High; M - Medium; L - Low; C - Clean; U - Unknown

Relinquished by: (signature)	Date/Time:	Turnaround	Detection Limit Requirements
<u>[Signature]</u>	3/8/16 1300	<input type="checkbox"/> 5-Day	North Carolina <input type="checkbox"/> 2L
<u>[Signature]</u>	3/10/16 1730	<input type="checkbox"/> 5-7-Day	<input type="checkbox"/> GWPC
<u>[Signature]</u>		<input type="checkbox"/> 10-Day	<input type="checkbox"/> SWSL
<u>[Signature]</u>		<input type="checkbox"/> RUSH	<input type="checkbox"/> OTHER
<u>[Signature]</u>		<input type="checkbox"/> '24-Hr r '48-Hr	
<u>[Signature]</u>		<input type="checkbox"/> '72-Hr r '4-Day	

Requires Lab Approval

Program Information  
 DSCA  IHSB Orphaned Landfill  
 SWS Landfill  UST  REC  
 Other:

RELINQUISHED IN ACCORDANCE WITH  
 NELAC & AIHA Certified  
 WBE/DBE Certified

TURNAROUND TIME (business days) STARTS AT 9:00 A.M. THE DAY AFTER SAMPLE RECEIPT UNLESS THERE ARE QUESTIONS ON YOUR CHAIN. THIS FORM IS NOT FILLED OUT COMPLETELY OR IS INCORRECT, TURNAROUND TIME WILL NOT START UNTIL ALL QUESTIONS ARE ANSWERED.

PLEASE BE CAREFUL NOT TO CONTAMINATE THIS DOCUMENT



39 Spruce St.  
 East Longmeadow, MA.  
 01028  
 P: 413-525-2332  
 F: 413-525-6405

**AIR Only Receipt Checklist**

CLIENT NAME Hart and Hickman RECEIVED BY: RLF DATE: 3/10/2016

- 1) Was the chain(s) of custody relinquished and signed? Yes X No
- 2) Does the chain agree with the samples? Yes X No       
 If not, explain: \_\_\_\_\_
- 3) Are all the samples in good condition? Yes X No       
 If not, explain: \_\_\_\_\_
- 4) Are there any samples "On Hold"? Yes      No X Stored where:
- 5) Are there any RUSH or SHORT HOLDING TIME samples? Yes      No X  
 Who was notified \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

6) Location where samples are stored:

Permission to subcontract samples? Yes No  
 (Walk-in clients only) if not already approved  
 Client Signature: \_\_\_\_\_

7) Number of cans Individually Certified or Batch Certified?      none

<b>Containers received at Con-Test</b>		
	# of Containers	Types (Size, Duration)
<b>Summa Cans (TO-14/TO-15/APH)</b>		
Tedlar Bags		
TO-17 Tubes		
<b>Regulators</b>		
<b>Restrictors</b>		
<b>Hg/Hopcalite Tube (NIOSH 6009)</b>		
(TO-4A/ TO-10A/TO-13) PUFs		
PCB Florisil Tubes (NIOSH 5503)		
Air cassette		
PM 2.5/PM 10		
TO-11A Cartridges		
Other	4	radiellos

Unused Summas/PUF Media:

Unused Regulators:

- 1) Was all media (used & unused) checked into the WASP?
- 2) Were all returned summa cans, Restrictors & Regulators and PUF's documented as returned in the Air Lab Inbound/Outbound Excel Spreadsheet?

Laboratory Comments:																				

Page 2 of 2  
**Login Sample Receipt Checklist**  
**(Rejection Criteria Listing - Using Sample Acceptance Policy)**  
**Any False statement will be brought to the attention of Client**

<u>Question</u>	<u>Answer (True/False)</u>		<u>Comment</u>
	<u>T/F/NA</u>		
1) The coolers'/boxes' custody seal, if present, is intact.	T		
2) The cooler or samples do not appear to have been compromised or tampered with.	T		
3) Samples were received on ice.	N/A		
4) Cooler Temperature is acceptable.	N/A		
5) Cooler Temperature is recorded.	N/A		
6) COC is filled out in ink and legible.	T		
7) COC is filled out with all pertinent information.	T		
8) Field Sampler's name present on COC.	T		
9) Samples are received within Holding Time.	T		
10) Sample containers have legible labels.	T		
11) Containers/media are not broken or leaking and valves and caps are closed tightly.	T		
12) Sample collection date/times are provided.	T		
13) Appropriate sample/media containers are used.	T		
14) There is sufficient volume for all requested analyses, including any requested MS/MSDs.	T		
15) Trip blanks provided if applicable.	T		

Doc #278 Rev. 5 October 2014

Who notified of False statements?  
 Log-In Technician Initials: RLF

Date/Time:  
 Mar. 10 2016 17:30