June 26, 2013

North Carolina Department of Environment and Natural Resources
Division of Waste Management – Inactive Hazardous Sites Branch
Pre-Regulatory Landfill Unit
Green Square Complex
DENR Office Building
217 West Jones Street
Raleigh, North Carolina 27603

Attention: Ms. Analee Thornburg email: analee.thornburg@ncdenr.gov
Hydrogeologist

Reference: **Remedial Investigation – Landfill Gas Screening Report**
Flemington Landfill
Wilmington, New Hanover County, North Carolina
Task Order 3056DP-8
ID No. NCD980503056

Dear Ms. Thornburg:

S&ME, Inc. (S&ME) is submitting this revised report to the North Carolina Department of Environment and Natural Resources (NCDENR), Pre-Regulatory Landfill Unit (Unit) summarizing the results of the Remedial Investigation Contaminant Delineation Phase activities conducted at the above-referenced site in Wilmington, North Carolina. S&ME completed this investigation in general conformance with our approved proposal dated March 22, 2013 for Task Order 3056DP-8 under State contract N10003S.

Landfill Gas Screening Services

S&ME personnel performed two separate landfill gas sampling events, one on May 16, 2013 and, the other on June 14, 2013, at the Flemington Landfill site to assess the soil gas at gas monitoring points VP-1 through VP-33. In order to measure the landfill gas, a PVC slip cap fitted with a barbed tube attachment over the top of the gas probe and the cap was sealed with Teflon® tape. Tygon® tubing was attached to the barb fitting. The tubing was then fitted to each meter that was used to collect soil gas data at each sample point.

The following field instruments were used to collect soil gas data from the sample points:

- Landfill Gas Meter – GEM5000 PLUS for: methane, carbon dioxide, oxygen and barometric pressure
- Digi-sense Thermohygrometer was used to monitor ambient air for temperature, humidity and barometric pressure throughout the sampling event.
- Mini-RAE 2000 for volatile organic compounds.

The meters were operated for approximately two minutes at each location and the readings recorded.

Field forms and calibration documentation are included in **Appendix I**. The landfill gas sample locations are shown on **Figures 2A**.

Landfill Gas Screening Results

Hand-Held Meters - May 16, 2013

Methane concentrations exceeding the lower explosive limit (5% Methane) were detected in 20 of the 33 landfill gas vapor probes (VP-1, VP-2, VP-5 through VP-9, VP-11, VP-12, VP-15, VP-17, VP-21, VP-24 through VP-30, and VP-32). Methane was also detected in VP-19, and VP-33, above background levels, but below the lower explosive limit.

VOCs were detected above background levels in landfill gas probes VP-1 through VP-3, VP-5 through VP-7, VP-9, VP-11, VP-12, VP-14, VP-15, VP-17 through VP-28, VP-30 and VP-32 with the highest concentrations present in VP-19 at 19.1 parts per million (ppm) and with the lowest concentration present in VP-27 at 0.1 ppm.

Hydrogen Sulfide was detected in eight landfill gas probes (VP-1, VP-2, VP-5 through VP-7, VP-9, VP-12, VP-17, VP-21, VP-24 through VP-27 and VP-30) above background concentrations and exceeding the IHSB Residential Vapor Intrusion Screening Levels - Acceptable Soil-Gas Concentration (1,460µg/m^3). The GEM 2000 displays the hydrogen sulfide concentration as parts per million by volume (ppm-v). S&ME converted the hydrogen sulfide readings from the field meters in ppm-v to the applicable IHSB measurement of micrograms per cubic meter (µg/m^3) using the following equation:

$$1\ \text{ppm} = \frac{V_m}{M}\ \frac{1\ \mu\text{g gas}}{1\ \text{L air}}$$

Where:

V_m = standard molar volume of ideal gas (at 1 bar and 273.15 K) [3] [22.71108 L/mol]

M = molecular weight of gas (Hydrogen Sulfide = 34.08 g/mol) [g/mol]

Duplicate samples were screened from landfill gas probe VP-1 and VP-21. Results of the duplicate samples were within acceptable limits of the record sample.

Hand-Held Meters – June 14, 2013

Methane concentrations exceeding the lower explosive limit (5% Methane) were detected in 20 of the 33 landfill gas vapor probes (VP-8, VP-11, VP-12, VP-15, VP-26 through VP-28, VP-30, and VP-32). Methane was also detected in VP-1, VP-7, VP-16R, VP-18, and VP-33, above background levels, but below the lower explosive limit.

VOCs were detected above background levels in landfill gas probes VP-8, VP-11, VP-15, VP-26 and VP-30 with the highest concentrations present in VP-30 at 10.9 ppm and with the lowest concentration present in VP-8 at 1.0 ppm.

Hydrogen Sulfide was detected in eight landfill gas probes (VP-7, VP-22, VP-26 and VP-27) above background concentrations and exceeding the IHSB Residential Vapor Intrusion Screening Levels - Acceptable Soil-Gas Concentration (1,460µg/m3).

Duplicate samples were screened from landfill gas probe VP-26 and VP-27. Results of the duplicate samples were within acceptable limits of the record sample.

The results of the soil gas sampling from the landfill gas probes are summarized on **Table 1.** The methane results exceeding the lower explosive limits and hydrogen sulfide results exceeding the IHSB Residential Vapor Intrusion Screening Levels are shown on **Figure 2B**. Copies of the field sampling forms are attached in **Appendix I**.

CLOSURE

S&ME appreciates the opportunity to submit this report and we look forward to continue working with you on this project. Please feel free to contact us at 919-872-2660 if you have questions concerning this report or any of our services.

Sincerely,
S&ME, Inc.

Gerald Paul Project Manager	Tom Raymond, PE, RSM Program Manager

Attachments: Figure 2A – Landfill Gas Probe Locations Map
Table 1 – Landfill Gas Screening Results
Appendix I – Field Notes

Tables

Table 1
Summary of Landfill Gas Sample Results - Hand-Held Meters
Flemington Landfill
Wilmington, New Hanover County, North Carolina
ID No. NCD980503056
Task Order No. 3056DP-8

Air Sampling Device			Ion Science Tiger or Mini RAE 2000 (PID)	LANDTEC GEM 2000 Plus (Landfill gas Meter)						
Contaminant of Concern			VOC (ppm-v)	Methane %	Methane (LEL) %	Carbon Dioxide (ppm-v)	Oxygen %	Hydrogen Sulfide (ppm-v)	*Hydrogen Sulfide (µg/m^3)	Barometric Pressure (in-Hg)
Sample ID	Reading Date	Time								
VP-1	4/17/2013	13:41	0.0	**54.6**	>>>	36.9	0.1	**1**	**1,500**	30.11
	5/16/2013	16:00	3.6	**53**	>>>	37.6	0.0	**8**	**12,000**	29.95
	6/14/2013	15:13	0.0	0.4	8.0	0.2	21.1	0	0	29.86
VP-2	4/17/2013	16:42	0.3	**58.8**	>>>	33.2	0.0	**27**	**40,500**	30.15
	5/16/2013	16:55	1.5	**57.6**	>>>	34.2	0.0	**17**	**25,500**	29.95
	6/14/2013	13:12	0.0	0	0.0	0.0	20.9	0	0	29.86
VP-3	4/17/2013	14:08	6.5	0.1	2.0	17.3	0.9	0	0	30.17
	5/16/2013	15:39	1.5	0.0	0.0	11.7	6.4	0	0	29.95
	6/14/2013	13:03	0.0	0.0	0.0	0.0	21.3	0	0	29.86
VP-4	4/17/2013	16:28	0.3	0.1	2.0	14.5	3.1	0	0	30.16
	5/16/2013	15:15	0.0	0.0	0.0	11.2	6.4	0	0	29.95
	6/14/2013	12:45	0.0	0.0	0.0	0.1	20.5	0	0	29.86
VP-5	4/17/2013	16:34	0.7	**52.5**	>>>	25.3	0.0	**12**	**18,000**	30.13
	5/16/2013	17:24	7.6	**42.6**	>>>	25.5	0.2	**3**	**4,500**	29.95
	6/14/2013	13:07	0.0	0	0.0	0.0	21.0	0	0	29.86
VP-6	4/17/2013	16:49	0.0	**68.5**	>>>	28.8	0.0	**14**	**21,000**	30.13
	5/16/2013	17:12	15.1	**64.3**	>>>	33.8	0.3	**43**	**64,500**	29.95
	6/14/2013	13:17	0.0	0	0.0	0.0	21.0	0	0	29.86
VP-7	4/17/2013	16:09	1.3	**20.0**	>>>	18.2	0.0	0	0	30.13
	5/16/2013	15:11	0.9	**19.9**	>>>	18.2	0.2	**3**	**4,500**	29.95
	6/14/2013	12:33	0.0	4.5	90.0	3.7	15.2	**1**	**1,500**	29.86
VP-8	4/17/2013	16:15	0.9	**36.1**	>>>	13.3	0.5	0	0	30.16
	5/16/2013	14:42	0.0	**28.7**	>>>	11.1	4.5	0	0	29.95
	6/14/2013	12:39	1.0	**7.9**	>>>	3.3	15.7	0	0	29.86
VP-9	4/17/2013	16:22	7.2	**22.1**	>>>	25.3	0.0	**4**	**6,000**	30.16
	5/16/2013	14:48	5.0	**24.2**	>>>	26.4	0.1	**2**	**3,000**	29.95
	6/14/2013	12:50	0.0	0	0.0	0.0	20.6	0	0	29.86
VP-10	4/17/2013	14:18	0.0	0.1	2.0	1.5	20.2	0	0	30.17
	5/16/2013	15:00	0.0	0.0	0.0	1.3	20.9	0	0	29.95
	6/14/2013	14:40	0.0	0.0	0.0	0.8	19.5	0	0	29.86
VP-11	4/17/2013	14:26	1.5	**37.2**	>>>	32.3	0.3	**8**	**12,000**	30.17
	5/16/2013	13:21	0.3	**27.2**	>>>	28.1	0.3	0	0	29.97
	6/14/2013	14:44	1.5	**18.6**	>>>	23.7	0.3	0	0	29.86
VP-12	4/17/2013	14:56	1.5	**23.7**	>>>	26.2	0.1	**4**	**6,000**	30.15
	5/16/2013	12:52	0.4	**22.8**	>>>	25.7	0.3	**6**	**9,000**	29.97
	6/14/2013	14:26	0.0	**19.5**	>>>	21.1	3.5	0	0	29.86
VP-13	4/17/2013	15:18	0.1	0.0	0.0	0.4	21.4	0	0	30.16
	5/16/2013	11:24	0.0	0.0	0.0	0.3	20.2	0	0	29.95
	6/14/2013	14:15	0.0	0.0	0.0	0.3	20.2	0	0	29.86
VP-14	4/18/2013	13:14	0.0	0.0	0.0	0.7	20.0	0	0	30.01
	5/16/2013	11:51	1.6	0.0	0.0	1.0	18.2	0	0	29.95
	6/14/2013	13:58	0.0	0.0	0.0	2.9	17.8	0	0	29.86

Notes:
LEL = Lower Explosive Limit.
ppm-v = Parts per million - volume.
in-Hg = Inches of Mercury.
µg/m3 = micrograms per cubic meter.
VOCs (ppm) = Volatile Organic Compounds (parts per million)
>>> = Greater than the linear upper limit of the instrument which is 100% of the LEL for Methane (5%)
Bolded cells indicate methane concentration exceeding the lower explosive limit (5% Methane) or
hydrogen sulfide concentration exceeding the IHSB Vapor Intrusion Screening Levels - Acceptable Soil-Gas Concentration.(1,460 µg/m3).
See **Figures 2A** for sample locations and results.
NM = Not Measured
* = Converted meter readings from ppm-v to µg/m3 for comparison to IHSB Residential Vapor Intrusion Screening Levels - Acceptable Soil-Gas Concentration.

Table 1
Summary of Landfill Gas Sample Results - Hand-Held Meters
Flemington Landfill
Wilmington, New Hanover County, North Carolina
ID No. NCD980503056
Task Order No. 3056DP-8

Air Sampling Device			Ion Science Tiger or Mini RAE 2000 (PID)	LANDTEC GEM 2000 Plus (Landfill gas Meter)						
Contaminant of Concern			VOC (ppm-v)	Methane %	Methane (LEL) %	Carbon Dioxide (ppm-v)	Oxygen %	Hydrogen Sulfide (ppm-v)	*Hydrogen Sulfide (µg/m^3)	Barometric Pressure (in-Hg)
Sample ID	Reading Date	Time								
VP-15	4/17/2013	15:35	6.3	**12.2**	>>>	21.7	1.0	0	0	30.11
	5/16/2013	12:10	1.6	**11.0**	>>>	22.4	0.7	0	0	29.95
	6/14/2013	13:46	5.4	**9.3**	>>>	18.5	4.2	0	0	29.86
VP-16R	4/17/2013	15:41	0.0	0.2	4.0	12.5	4.4	0	0	30.15
	5/16/2013	11:11	0.0	0.0	0.0	13.9	4.1	0	0	29.95
	6/14/2013	12:24	0.0	0.1	0.0	11.6	7.4	0	0	29.86
VP-17	4/17/2013	15:57	10.7	**10.5**	>>>	19.9	1.8	0	0	30.15
	5/16/2013	13:30	1.6	**10.9**	>>>	20.6	1.3	**2**	**3,000**	29.97
	6/14/2013	13:31	0.0	0.0	0.0	21.0	0.0	0	0	29.86
VP-18	4/17/2013	16:05	0.0	0.1	2.0	8.0	10.4	0	0	30.14
	5/16/2013	16:14	9.3	0.0	0.0	15.7	1.6	0	0	29.95
	6/14/2013	14:57	0.0	0.1	2.0	6.7	11.6	0	0	29.86
VP-19	4/17/2013	13:31	2.2	0.1	2.0	16.8	0.4	0	0	30.17
	5/16/2013	16:06	19.1	0.6	12.0	17.5	0.1	0	0	29.95
	6/14/2013	15:01	0.0	0.0	0.0	0.0	21.3	0	0	29.86
VP-20	4/17/2013	13:25	1.8	0.0	0.0	3.3	17.6	0	0	30.17
	5/16/2013	16:38	4.6	0.0	0.0	4.2	17.8	0	0	29.95
	6/14/2013	15:04	0.0	0.0	0.0	2.6	18.0	0	0	29.86
VP-21	4/17/2013	13:48	0.0	**17.5**	>>>	18.7	0.2	**8**	**12,000**	30.17
	5/16/2013	16:25	9.4	**16.4**	>>>	18.9	0.7	**8**	**12,000**	29.95
	6/14/2013	15:23	0.0	0.0	0.0	0.0	21.6	0	0	29.86
VP-22	4/17/2013	13:58	0.2	0.0	0.0	5.4	16.1	0	0	30.17
	5/16/2013	15:33	2.3	0.0	0.0	4.7	17.1	0	0	29.95
	6/14/2013	15:30	0.0	0.0	0.0	6.6	14.3	**1**	1,500	29.86
VP-23	4/17/2013	14:03	0.2	0.0	0.0	0.3	21.2	0	0	30.17
	5/16/2013	15:23	3.0	0.0	0.0	0.3	22.1	0	0	29.95
	6/14/2013	15:33	0.0	0.0	0.0	0.3	20.9	0	0	29.86
VP-24	4/17/2013	13:37	0.2	**30.8**	>>>	30.5	0.2	0	0	30.17
	5/16/2013	15:52	1.7	**32.0**	>>>	32.8	0.1	**15**	**22,500**	29.95
	6/14/2013	15:17	0.0	0.0	0.0	0.0	21.6	0	0	29.86
VP-25	4/17/2013	16:58	0.4	**55.5**	>>>	37.3	0.0	0	0	30.14
	5/16/2013	17:20	7.8	**54.5**	>>>	38.1	0.1	**21**	**31,500**	29.95
	6/14/2013	13:22	0.0	0.0	0.0	0.0	20.6	0	0	29.86
VP-26	4/17/2013	15:51	9.1	**21.8**	>>>	24.1	0.3	0	0	30.14
	5/16/2013	12:18	1.6	**22.0**	>>>	25.3	0.3	**3**	**4,500**	29.95
	6/14/2013	13:39	0.2	**22.4**	>>>	25.6	0.4	**10**	**15,000**	29.86
VP-27	4/17/2013	14:41	0.8	**36.1**	>>>	27.4	1.9	0	0	30.15
	5/16/2013	13:13	0.1	**39.0**	>>>	30.8	0.7	**9**	**13,500**	29.97
	6/14/2013	14:35	0.0	**38.8**	>>>	32.2	0.1	**11**	**16,500**	29.86

Notes:
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Bolded cells indicate methane concentration exceeding the lower explosive limit (5% Methane) or
hydrogen sulfide concentration exceeding the IHSB Vapor Intrusion Screening Levels - Acceptable Soil-Gas Concentration.(1,460 µg/m3).
See **Figures 2A** for sample locations and results.
NM = Not Measured
* = Converted meter readings from ppm-v to µg/m3 for comparison to IHSB Residential Vapor Intrusion Screening Levels - Acceptable Soil-Gas Concentration.

Table 1
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Flemington Landfill
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Air Sampling Device			Ion Science Tiger or Mini RAE 2000 (PID)	LANDTEC GEM 2000 Plus (Landfill gas Meter)						
Contaminant of Concern			VOC (ppm-v)	Methane %	Methane (LEL) %	Carbon Dioxide (ppm-v)	Oxygen %	Hydrogen Sulfide (ppm-v)	*Hydrogen Sulfide ($\mu g/m^3$)	Barometric Pressure (in-Hg)
Sample ID	Reading Date	Time								
VP-28	4/17/2013	15:45	0.0	**23.9**	>>>	23.2	0.4	0	0	30.15
	5/16/2013	11:02	1.6	**20.6**	>>>	24.9	0.2	0	0	29.95
	6/14/2013	14:50	0.0	**15.9**	>>>	17.1	6.0	0	0	29.86
VP-29	4/17/2013	14:33	2.7	**32.8**	>>>	29.9	0.2	0	0	30.16
	5/16/2013	12:32	0.0	**21.1**	>>>	20.8	0.5	0	0	29.95
	6/14/2013	14:05	0.0	0.0	0.0	0.0	21.1	0	0	29.86
VP-30	4/17/2013	14:47	188.0	**10.7**	>>>	12.8	11.0	0	0	30.10
	5/16/2013	13:02	9.4	**16.5**	>>>	27.3	0.3	**5**	**7,500**	29.97
	6/14/2013	14:31	10.9	**10.6**	>>>	17.6	6.4	0	0	29.86
VP-31	4/17/2013	15:27	0.0	0.4	8.0	7.9	11.0	0	0	30.15
	5/16/2013	12:05	0.0	0.0	0.0	12.4	5.6	0	0	29.95
	6/14/2013	13:51	0.0	0.0	0.0	0.0	20.6	0	0	29.86
VP-32	4/17/2013	15:05	6.4	**17.1**	>>>	21.3	0.1	0	0	30.13
	5/16/2013	11:38	2.6	**14.8**	>>>	20.2	0.2	0	0	29.95
	6/14/2013	14:09	0.0	**13.7**	>>>	16.5	4.4	0	0	29.86
VP-33	4/17/2013	15:10	0.7	1.1	22.0	16.0	2.8	0	0	30.11
	5/16/2013	11:30	0.0	0.8	16.0	15.9	3.0	0	0	29.95
	6/14/2013	14:20	0.0	0.8	16.0	11.2	6.0	0	0	29.86
Flux Chamber	4/18/2013	13:14	0.0	0.0	0.0	0.3	20.6	0	0	30.04
Background-1	4/17/2013	12:59	0.0	0.0	0.0	0.0	20.1	0	0	30.09
		17:07	0.0	0.0	0.0	0.0	21.1	0	0	30.15
	5/16/2013	15:30	0.0	0.0	0.0	0.0	22.7	0	0	29.95
	6/14/2013	11:55	0.0	0.0	0.0	0.0	20.7	0	0	29.86
Background-2	4/17/2013	13:10	0.0	0.0	0.0	0.0	19.9	0	0	30.09
		17:12	0.0	0.0	0.0	0.0	21.1	0	0	30.15
	5/16/2013	11:27	0.0	0.0	0.0	0.0	20.7	0	0	29.95
	6/14/2013	11:36	0.0	0.0	0.0	0.0	20.3	0	0	29.85
Background-3	4/17/2013	13:16	0.0	0.0	0.0	0.0	19.9	0	0	30.09
		17:16	0.0	0.0	0.0	0.0	21.1	0	0	30.15
	5/16/2013	10:57	0.1	0.0	0.0	0.1	21.3	0	0	29.95
	6/14/2013	12:18	0.0	0.0	0.0	0.0	20.7	0	0	29.86
Background-4	4/17/2013	13:22	0.0	0.0	0.0	0.0	20.9	0	0	30.16
		17:24	0.0	0.0	0.0	0.0	21.1	0	0	30.14
	5/16/2013	16:44	0.1	0.0	0.0	0.0	22.6	0	0	29.95
	6/14/2013	12:12	0.0	0.0	0.0	0.0	20.7	0	0	29.86
Duplicate-1 (VP-6)	4/17/2013	18:00	0.1	**66.7**	>>>	25.7	0.1	**12**	**18,000**	30.14
Duplicate-1 (VP-1)	5/16/2013	16:19	3.9	**53.0**	>>>	37.9	0.0	**5**	**7,500**	29.95
Duplicate-2 (VP-21)	5/16/2013	16:47	3.6	**17.4**	>>>	19.8	0.1	**13**	**19,500**	29.95
Duplicate-1 (VP-26)	6/14/2013	15:45	0.7	**23.1**	>>>	25.5	0.1	**8**	**12,000**	29.86
Duplicate-2 (VP-27)	6/14/2013	15:40	0.0	**39.0**	>>>	32.5	0.3	**13**	**19,500**	29.86

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VOCs (ppm) = Volatile Organic Compounds (parts per million)
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See **Figure 2A** for sample locations and results.
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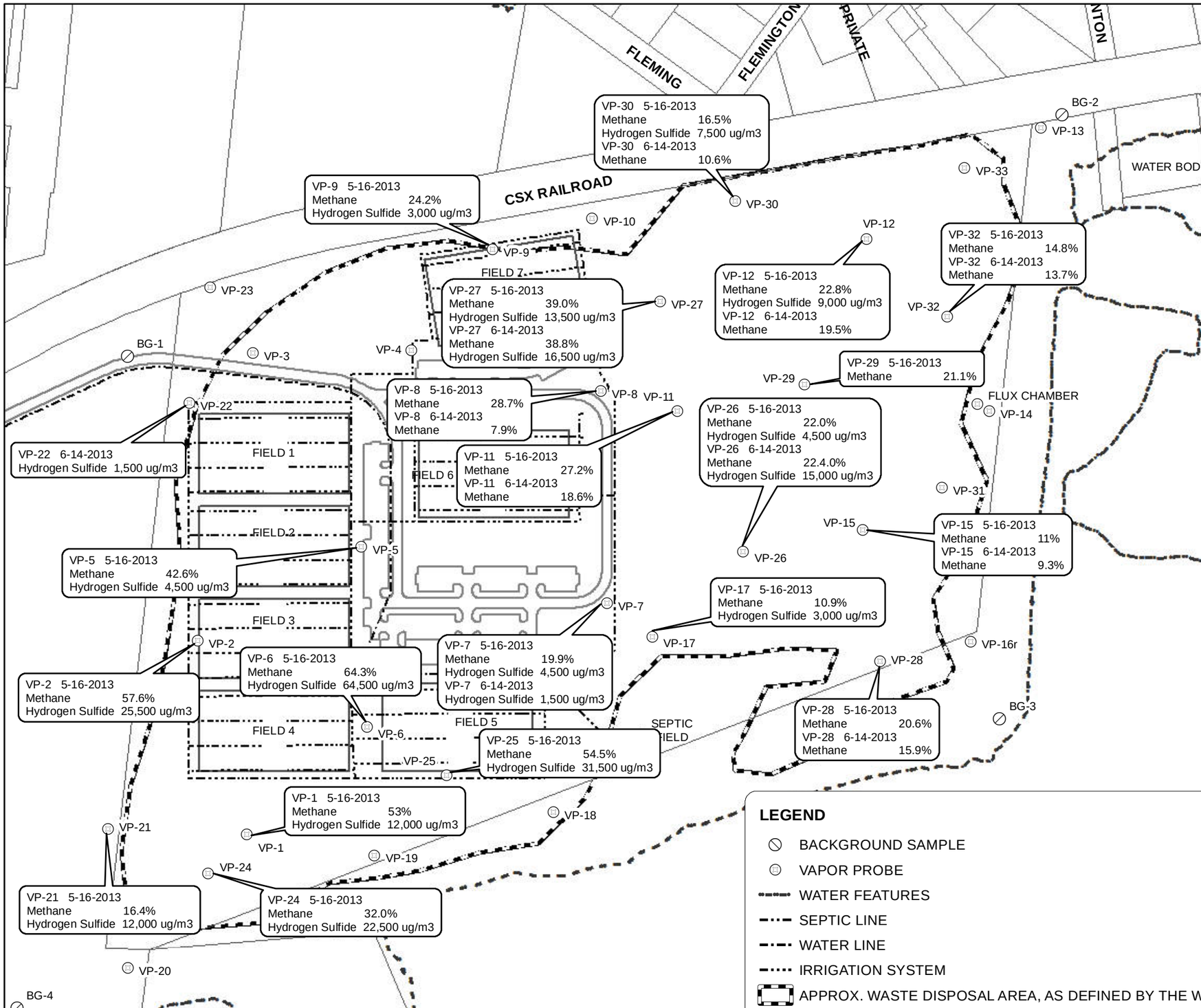
* = Converted meter readings from ppm-v to µg/m3 for comparison to IHSB Residential Vapor Intrusion Screening Levels - Acceptable Soil-Gas Concentration.

Figure



ROAD NAMES:
NEW HANOVER CO. GIS, DATED AUG. 2011

IMAGE SOURCE:
NC ONEMAPS, DATED 2010

UTILITIES DATA:
COASTAL LAND DESIGN, PLLC

NOTE: EACH SOCCER FIELD HAS IRRIGATION PLUMMING

SAMPLES COLLECTED MAY 16 & JUNE 14, 2013

ug/m3 - MICROGRAMS PER CUBIC METER

ONLY RESULTS EXCEEDING THE LOWER EXPLOSIVE LIMIT (5% METHANE) OR HYDROGEN SULFIDE CONCENRATION EXCEEDING THE IHSB VAPOR INTRUSTION SCREENING LEVEL (1,460 ug/m3) ARE SHOWN

LEGEND

- BACKGROUND SAMPLE
- VAPOR PROBE
- WATER FEATURES
- SEPTIC LINE
- WATER LINE
- IRRIGATION SYSTEM
- APPROX. WASTE DISPOSAL AREA, AS DEFINED BY THE WASTE DELINEATION BORINGS (JUNE 2012)

DATE: MAY 2013
DRAWN BY: BTR
CHECKED BY:
SCALE: 1" = 300'
PROJECT NO: 1054-11-1007
DRAWING NUMBER:

S&ME
WWW.SMEINC.COM
NC ENG. LICENSE #F-0176
3201 SPRING FOREST RD, RALEIGH, NC 27616

LANDFILL SOIL GAS RESULTS MAP
HAND-HELD METERS

FLEMINGTON LANDFILL - TASK ORDER 3056DP-7
WILMINGTON, NORTH CAROLINA

FIGURE NO.
2A

Appendix I

Project Name: **Flemington Landfill** Client:DWM-IHSB Weather: HOT / clear 86°F windy

NCDENR ID No: S&ME Sampler Name: Bob Bryant / Jamie Honeycutt

Task Order: **3056DP-8** Meter Name/Model: PID

Landtec GEM ~~2000 Plus~~ 5000

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Date: 5/16/2013

Sample Location/Name: Wilmington, NC

Sample Location/Name:	Time	VOCs	Methane		Carbon Dioxide	Oxygen	Hydrogen Sulfide	Barometric Pressure	Temperature	Humidity	
ID	hr:min	parts-per-million-volume (ppm-v) or percent (%) where noted	Percent by Volume in Air (%)	Lower Explosive Limit (LEL) %	(percentage) %	(percentage) %	parts-per-million-volume (ppm-v)	inches mercury (inHg)	degrees celcius (°C/°F)	percent	
BG-3 (VP-26)	1057	.1	0.0	0	0.1	21.3	0	29.95	31.5	40%	SW
VP-28	1102	1.6	10.6	>>>	24.9	0.2	0	29.95	31.5	40	
VP-16R	1111	0.0	~~2.2~~ 0	0	13.9	4.1	0	29.95	33.4	37	
VP-13	1124	0.0	0	0	0.3	20.2	0	29.95	35.9	36	
BG-2 (VP-33)	1127	0.0	0	0	0	20.7	0	29.95	35.9	36	
VP-33	1130	0.0	0.8	16	15.9	3.0	0	29.95	44.2	36	
VP-32	1138	2.6	14.8	>>>	20.2	0.2	0	29.95	39.1	36	
VP-14	1151	1.6	0.0	0	1.0	18.2	0	29.95	41.7	31	
VP-31	1205	0.0	0.0	0	12.4	5.6	0	29.95	36.3	37	
VP-15	1210	1.6	11.0	>>>	22.4	0.7	0	29.95	37.4	30	
VP-26	1218	1.6	22.0	>>>	25.3	0.3	3	29.95	47.2	29	
VP-29	1232	0.0	21.1	>>>	20.8	0.5	0	29.95	42.6	31	
VP-12	~~1240~~ 1252	0.4	22.8	>>>	25.7	0.3	6	29.97	~~31.2~~ 43.6	~~31~~ 29	
VP-30	1302	9.4	16.5	>>>	27.3	0.3	5	29.97	46.1	27	
VP-27	1313	0.1	39.0	>>>	30.8	0.7	9	29.97	42.1	31	
VP-11	1321	~~0.0~~ 0.3	27.2	>>>	28.1	0.3	0	29.97	48.3	27	
VP-17	1330	1.6	10.9	>>>	20.6	1.3	2	29.97	42.1	33	
VP-8	1442	0.0	28.7	>>>	11.1	4.5	0	29.95	38.1	25	
VP-9	1448	5.0	24.2	>>>	26.4	0.1	2	29.95	34.2	30	
VP-10	1500	0.0	0.0	0	1.3	20.9	0	29.95	36.0	28	X
BG-5 (VP-10)	1506	~~0.0~~	0.0	0	0.0	22.6	0	29.95	36.0	28	WSW
VP-7	1511	0.9	19.9	>>>	18.2	0.2	3	29.95	36.7	27	

NOTES:

Equipment Calibration:

Meter	Time	Initial
GEM 5000 Landtec	1010 5/16/13	CH_4 2.5% = 2.2% / H_2S 25 = 23 ppm / O_2 20.9% = 20.8% / CO_2 35% = 35 ~~34.5~~ %
PID 10M Protheck Tiger	1040 5/16/13	Isobutylene 100 ppm = 100.1 ppm

Bump Test 14:13 PID 100 = 94.5 ppm / CO_2 35% = 34.3% / CH_4 2.5% = 2.3% / H_2S 25 = 24 ppm O_2 25 = 22.7%

Project Name: **Flemington Landfill** Client:DWM-IHSB Weather: Hot clear windy 86°F

NCDENR ID No: S&ME Sampler Name: Bob Bryant / Jamie Honeycutt

Task Order: **3056DP-8** Meter Name/Model: PID

Landtec GEM ~~2000 Plus~~ 5000

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Date: 5/16/2013

Sample Location/Name: Wilmington, NC

Sample Location/Name:	Time	VOCs	Methane		Carbon Dioxide	Oxygen	Hydrogen Sulfide	Barometric Pressure	Temperature	Humidity
ID	hr:min	parts-per-million-volume (ppm-v) or percent (%) where noted	Percent by Volume in Air (%)	Lower Explosive Limit (LEL) %	(percentage) %	(percentage) %	parts-per-million-volume (ppm-v)	inches mercury (inHg)	degrees celcius (°C/°F)	percent
VP-4	1515	0.0	0.0	0.0	11.2	6.4	0	29.95	41.5	25
VP-23	1523	3.0	0.0	0.0	0.3	22.1	0	29.95	36.8	30
~~BG~~ (BG-1)	1530	0.0	0.0	0.0	0.0	22.7	0	29.95	36.6	~~23~~ 30
VP 22	1533	2.3	0.0	0.0	4.7	17.1	0	29.95	36.8	30
VP-3	1539	1.5	0.0	0.0	11.7	6.4	0	29.95	37.9	38
B VP-24	1552	1.7	32.0	>>>	32.8	0.1 ~~16.0~~	15	29.95	40.4	30
VP-1	1600	3.6	53.0	>>>	37.6	0.0	8	29.95	40.3	30
VP-19	1606	19.1	0.6	12	17.5	0.1	0	29.95	36.7	30
VP-18	1614	9.3	0.0	0.0	15.7	1.6	0	29.95	36.6	38
Duplicate (VP-1)	1619	3.9	53.0	>>>	37.9	0.	5	29.95	40.1	30
VP-21	1625	9.4	16.4	>>>	18.9	0.7	8	29.95	36.9	33
VP-20	1638	4.6	0.0	0.0	4.2	17.8	0	29.95	33.4	40
BG 4 (VP-20)	~~1644~~ 1644	0.1	0.0	0.0	0	22.6	0	29.95	33.5	40
Duplicate (VP-21)	1647	3.6	17.4	>>>	19.8	0.1	13	29.95	33.4	40
VP 2	1655	1.5	57.6	>>>	34.2	0	17	29.95	30.3	44
VP-6	1712 ~~1710~~ ~~1500~~	15.1	64.3	>>>	33.8	.3	43	29.95	30.0	50
VP-25	1720	7.8	54.5	>>>	38.1	.1	21	29.95	30.0	54
VP-5	1724	7.6	42.6	>>>	25.5	0.2	3	29.95	30	46
VP-6										
VP-8 Duplicate	1730	4.8	meter battery dead.						30	50

NOTES: 5/16/2013 PID 100 = 104.1 1740

Equipment Calibration: Meter Time: Initial

Project Name: **Flemington Landfill** Client:DWM-IHSB James Waters Candy Elliott Weather: Sunny Hot
NCDENR ID No: S&ME Sampler Name: ~~Bob Bryant~~ / ~~Jamie Honeycutt~~
Task Order: **3056DP-8** Meter Name/Model: PID
Landtec GEM ~~2000~~ 5000 Plus

Date: ~~5/16/2013~~ 6/14/13
Sample Location/Name: Wilmington, NC

Sample Location/Name:	Time	VOCs	Methane		Carbon Dioxide	Oxygen	Hydrogen Sulfide	Barometric Pressure	Temperature	Humidity
ID	hr:min	parts-per-million-volume (ppm-v) or percent (%) where noted	Percent by Volume in Air (%)	Lower Explosive Limit (LEL) %	(percentage) %	(percentage) %	parts-per-million-volume (ppm-v)	inches mercury (inHg)	degrees celcius (°C/°F)	percent
BG-2	1136		0.0	0	0.0	20.3	1	29.85	79°F	54%
BG-1	1155	0.0	0.0	0	0.0	21	0	29.85	84.8	43%
BG-4	1212	0.0	0.0	0	0.0	20.7	0	29.86	88.6	52.3%
BG-3	1216	0.0	0.0	0	0.0	20.7	0	29.86	87.9	43.7%
VP-16R	1224	0.0	0.1	0	11.6	7.4	0	29.86	88.7	51%
VP-7	1233	0.0	4.5	90	3.7	15.2	1.0	29.86	88.8	40.1%
VP-8	1239	1.0	7.9	>77	3.3	15.7	0	29.86	88.9	48%
VP-4	1245	0.0	0.0	0	0.1	20.5	0	29.86	89.1	48%
VP-9	1250	0.0	0.0	0	0.0	20.6	0	29.86	90.0	48%
VP-3	1303	0.0	0.0	0	0.0	21.3	0	29.86	83.8	42.7%
VP-5	1307	0.0	0.0	0	0.0	21.0	0	29.86	82.2	44.7%
VP-2	1312	0.0	0.0	0	0.0	20.9	0	29.86	81.6	42%
VP-6	1317	0.0	0.0	0	0.0	20.8	0	29.86	84.1	48.2%
VP-25	1322	0.0	0.0	0	0.0	20.6	0	29.86	84.1	48.4%
VP-17	1331	0.0	0.0	0	0.0	21.0	0	29.86	84.9	42.4%
VP-26	1339	0.2	28.4	>77	25.6	0.4	10	29.86	85.3	42.5%
VP-15	1346	5.4	9.3	>77	18.5	4.2	0	29.86	84.5	42.5%
VP-31	1351	0.0	0.0	0	0.0	20.6	0	29.86	85.8	42.5%
VP-14	1358	0.0	0.0	0	2.9	17.8	0	29.86	86.6	38.0%
VP-29	1405	0.0	0.0	0	0.0	21.1	0	29.86	87.9	38.0%
VP-32	1409	0.0	13.7	>77	16.5	4.4	0	29.86	89.0	32.0%
VP-13	1415	0.0	0.0	0	0.3	20.2	0	29.86	92.4	37.3%

NOTES:

Meter 6/14/13 Time: 0945 Initial

Equipment Calibration:

GEM 5000
Fresh Air: CH_4 = 0.0 = 0.0, CO_2 - 0, O_2 - 20.9 = 20.9, CO - 0 ppm = 0 ppm H_2S - 0 = 0 ppm, H_2 - 0 = 0 ppm
Methane High: CH_4 = 50.0 = 50.0, CO_2 - 35.0 = 35.1, O_2 - 0 = 0, CO, H_2S, H_2 - 0

Gas Mixture: ~~carbon~~ CO - 50 ppm = 49 ppm, CH_4 = 2.5 = 2.5, H_2S - 25 ppm = 26 ppm, O_2 - 20.9 = 20.9,

Project Name: **Flemington Landfill**
NCDENR ID No:
Task Order: **3056DP-8**

Client:DWM-IHSB
S&ME Sampler Name: Bob Bryant / Jamie Honeycutt
Meter Name/Model: PID
Landtec GEM ~~2000~~ Plus 5000

Weather: Sunny Hot

Date: ~~5/16/2013~~ 6/14/13

Sample Location/Name: Wilmington, NC

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Sample Location/Name:	Time	VOCs	Methane		Carbon Dioxide	Oxygen	Hydrogen Sulfide	Barometric Pressure	Temperature	Humidity
ID	hr:min	parts-per-million-volume (ppm-v) or percent (%) where noted	Percent by Volume in Air (%)	Lower Explosive Limit (LEL) %	(percentage) %	(percentage) %	parts-per-million-volume (ppm-v)	inches mercury (inHg)	degrees celcius (°C/°F)	percent
VP-33	1420	0.0	0.8	16	11.2	6.0	0	29.86	93.4	37.9
VP-12	1426	0.0	19.5	>77	21.1	3.5	0	29.86	94.0	33.8
VP-30	1431	10.9	10.6	>77	17.6	6.4	0	29.86	94.0	33.8
VP-27	1435	0.0	38.8	>77	32.2	0.1	11	29.86	94.0	33.8
VP-10	1440	0.0	0.0	0	0.8	19.5	0	29.86	93.3	38.7
VP-11	1444	1.5	18.6	>77	23.7	0.3	0	29.86	95.5	33.8
VP-28	1450	0.0	15.9	>77	17.1	6.0	0	29.86	92.6	37.3
VP-18	1457	0.0	0.1	2	6.7	11.6	0	29.86	94.3	37.2
VP-19	1501	0.0	0.0	0	0.0	21.3	0	29.86	91.9	35.6
VP-20	1504	0.0	0.0	0	2.6	18.0	0	29.86	93.1	37.5
VP-1	1513	0.0	0.4	8	0.2	21.1	0	29.86	89.9	32.4
VP-24	1517	0.0	0.0	0	0.0	21.6	0	29.86	88.9	36.7
VP-21	1523	0.0	0.0	0	0.0	21.6	0	29.86	88.9	41.9
~~VP-2~~	~~already measured~~			~~0~~					90.5	42.0
VP-22	1530	0.0	0.0	0	6.6	14.3	1	29.86	90.5	42
VP-23	1533	0.0	0.0	0	0.3	20.9	0	29.86	87.6	35.5
VP-27(Dup)	1540	0.0	39.0	>77	32.5	0.3	13	29.86	88.5	35.2
VP-26(Dup)	1545	0.7	23.1	>77	25.5	0.1	8	29.86	92.9	34.3
BG-2	1550	0.0	0.0	0	0.1	21.1	0	29.86	86.1	33.8
BG-3	1553	0.0	0.0	0	0.0	21.4	0	29.86	91	38.9
BG-4	1557	0.0	0.0	0	0.0	21.5	0	29.86	89.3	38.9
BG-1	1600	0.0	0.0	0	0.0	21.6	0	29.86	89.1	40.1

NOTES:

Equipment Calibration:

Meter	Time	Initial