Dare County
Closed East Lake Landfill
Facility Permit No. 28-02
Semi-Annual Sampling Report
(August 2012 Sampling Event)

Dare County

Report

October 2012

CDM Smith

DENR USE ONLY: ☐ Paper Report ☐ Electronic Data - Email CD (data loaded: Yes / No) Doc/Event #:

NC DENR
Division of Waste Management - Solid Waste

Environmental Monitoring Reporting Form

Notice: This form and any information attached to it are "Public Records" as defined in NC General Statute 132-1. As such, these documents are available for inspection and examination by any person upon request (NC General Statute 132-6).

Instructions:

- **Prepare one form for each individually monitored unit.**
- **Please type or print legibly.**
- Attach a notification table with values that attain or exceed NC 2L groundwater standards or NC 2B surface water standards. The notification must include a preliminary analysis of the cause and significance of each value. (e.g. naturally occurring, off-site source, pre-existing condition, etc.).
- Attach a notification table of any groundwater or surface water values that equal or exceed the reporting limits.
- Attach a notification table of any methane gas values that attain or exceed explosive gas levels. This includes any structures on or nearby the facility (NCAC 13B .1629 (4)(a)(i).
- Send the original signed and sealed form, any tables, and Electronic Data Deliverable to: Compliance Unit, NCDENR-DWM, Solid Waste Section, 1646 Mail Service Center, Raleigh, NC 27699-1646.

Solid Waste Monitoring Data Submittal Information

Name of entity submitting data (laboratory, consultant, facility owner):

Consultant - CDM Smith Inc.

Contact for questions about data formatting. Include data preparer's name, telephone number and E-mail address:

Name: Mathew F. Colone Phone: 919-787-5620

E-mail: colonemf@cdmsmith.com

Facility name:	Facility Address:	Facility Permit #	NC Landfill Rule: (.0500 or .1600)	Actual sampling dates (e.g., October 20-24, 2006)
Dare County Closed East Lake Landfill	U.S. Highway 64 East Lake, NC 27953	28-02	.0500	August 16, 2012

Environmental Status: (Check all that apply)

☐ Initial/Background Monitoring ☒ Detection Monitoring ☐ Assessment Monitoring ☐ Corrective Action

Type of data submitted: (Check all that apply)

☒ Groundwater monitoring data from monitoring wells
☐ Groundwater monitoring data from private water supply wells
☐ Leachate monitoring data
☒ Surface water monitoring data
☐ Methane gas monitoring data
☐ Corrective action data (specify) _____
☐ Other(specify) _____

Notification attached?

☐ No. No groundwater or surface water standards were exceeded.
☒ Yes, a notification of values exceeding a groundwater or surface water standard is attached. It includes a list of groundwater and surface water monitoring points, dates, analytical values, NC 2L groundwater standard, NC 2B surface water standard or NC Solid Waste GWPS and preliminary analysis of the cause and significance of any concentration.
☐ Yes, a notification of values exceeding an explosive methane gas limit is attached. It includes the methane monitoring points, dates, sample values and explosive methane gas limits.

Certification

To the best of my knowledge, the information reported and statements made on this data submittal and attachments are true and correct. Furthermore, I have attached complete notification of any sampling values meeting or exceeding groundwater standards or explosive gas levels, and a preliminary analysis of the cause and significance of concentrations exceeding groundwater standards. I am aware that there are significant penalties for making any false statement, representation, or certification including the possibility of a fine and imprisonment.

Mathew F. Colone — Consultant — (919) 787-5620

Facility Representative Name (Print) — Title — (Area Code) Telephone Number

Signature — 10/30/2012 Date — Affix NC Licensed/Professional Geologist Seal

NORTH CAROLINA LICENSED SEAL 1851 GEOLOGIST MATHEW F. COLONE 10/30/2012

5400 Glenwood Ave, Suite 300, Raleigh, NC 27612

Facility Representative Address

F-0412

NC PE Firm License Number (if applicable effective May 1, 2009)

Revised 6/2009

CDM Smith

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Raleigh, North Carolina 27612
tel: 919 787-5620
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October 30, 2012

Ms. Jaclynne Drummond
North Carolina Department of Environment and
Natural Resources
Division of Waste Management
Solid Waste Section
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

Subject: August 2012 Semi-Annual Monitoring Sampling Report
Closed East Lake Landfill, Dare County
Facility Permit No. 28-02

Dear Ms. Drummond:

CDM Smith Inc. (CDM Smith), on behalf of Dare County, is submitting an electronic copy of the August 2012 semi-annual sampling event report. This letter report presents the results of the most recent semi-annual sampling event that was completed at the Closed East Lake Landfill and constitutes the second semi-annual sampling event for 2012. The groundwater monitoring network consists of 10 wells (i.e. Well #1s, -#1d, -#2s, -#2d, -#3s, -#3d, -#4s, -#4d, -#5s, and -#5d) and a downstream surface water sample location. Field activities and sampling results for all wells and the surface water sample are discussed below.

Field Activities

Groundwater and surface water samples from the Closed East Lake Landfill were collected on August 16, 2012 by Environment One, Inc. Monitoring wells and the surface water sample location are shown on **Figure 1**. The monitoring wells were surveyed by a licensed North Carolina surveyor on September 19, 2012.

Groundwater elevations were measured at each well prior to sampling and are presented in **Table 1**. These groundwater elevations were used to construct a potentiometric surface map for this sampling event. The potentiometric contours are presented on **Figure 1**. In general, groundwater flows to the northeast across the site. Each well was measured in the field for pH, conductivity, temperature, and total suspended solids prior to sampling. The water quality parameters at the time samples were collected are presented in **Table 2**.

Sampling Results

Environment One, Inc. in Greenville, North Carolina analyzed the groundwater and surface water samples for the North Carolina Appendix I volatile organic compounds (VOC's) by U.S. Environmental Protection Agency (EPA) Method 8260B, metals by EPA Method 200.8 and Standard Method (SM) 3113B, chloride by SM 4500-CL B, and sulfate by SM 426C. In accordance with Solid Waste Section guidelines, the analytical results were reported to the laboratory specific method detection limit (MDL) and are quantifiable at or below Solid Waste Section Limits (SWSLs). All monitoring wells and the surface water location for the Closed East Lake Landfill had detections of analytes above the MDL with a majority of the detections below SWSLs. These detections were qualified as estimated or "J" flags.

The following list presents the analytes detected above the MDL at each sample location. No "J" flag detections are provided. Underlined analytes exceeded the North Carolina 2L Standard (NC 2L), Groundwater Protection Standard, or the North Carolina Surface Water Standards for Class C Waters. A complete summary of all detected and estimated concentrations for the August 2012 and previous sampling events are presented in **Table 3**. The historical data is not continuous but data available for select years is provided. A copy of the laboratory report is provided in **Appendix A**.

Well #1s

Inorganics:	Chloride
Metals:	Arsenic, Copper, Zinc
Volatile Organic Compounds:	None Detected

Well #1d

Inorganics:	Chloride
Metals:	Cadmium, Copper, Nickel, Zinc
Volatile Organic Compounds:	None Detected

Well #2s

Inorganics:	Chloride
Metals:	Barium, Copper, Zinc
Volatile Organic Compounds:	Benzene, Chlorobenzene, 1,4-Dichlorobenze

Well #2d

Inorganics:	Chloride
Metals:	Chromium, Copper, Zinc
Volatile Organic Compounds:	None Detected

Well #3s

Inorganics:	Chloride
Metals:	Barium, Zinc
Volatile Organic Compounds:	None Detected

Well #3d

Inorganics:	Chloride
Metals:	Copper, Zinc
Volatile Organic Compounds:	None Detected

Well #4s

Inorganics:	Chloride
Metals:	Zinc
Volatile Organic Compounds:	None Detected

Well #4d

Inorganics:	Chloride
Metals:	Copper, Zinc
Volatile Organic Compounds:	None Detected

Well #5s

Inorganics:	Chloride
Metals:	Arsenic, Barium, Zinc
Volatile Organic Compounds:	None Detected

Well #5d

Inorganics:	Chloride
Metals:	Copper, Zinc
Volatile Organic Compounds:	None Detected

Well #6s

Inorganics:	Not Sampled
Metals:	Not Sampled
Volatile Organic Compounds:	Not Sampled

Well #6d

Inorganics:	Not Sampled
Metals:	Not Sampled
Volatile Organic Compounds:	Not Sampled

Well #7s

Inorganics:	Chloride
Metals:	Zinc
Volatile Organic Compounds:	None Detected

Downstream

Inorganics:	Chloride
Metals:	Zinc
Volatile Organic Compounds:	None Detected

"J" flags were not included in the previous list, but several locations had "J" flag detections that exceeded the standards. The "J" flag constituents above the standards along with their locations are listed below.

Cobalt:	Well #2s, Well #2d, Well #4s, and Well #5s
Selenium:	Downstream
Vanadium:	Well #1s, Well #2s, Well #3s, Well #3d, Well #4s, Well #4d, Well #5s, Well #5d, and Well #7s

Benzene has been detected slightly above the NC 2L Standard in Well #2s since the August 2007 sampling event. Additional samples were collected from Well #6s, Well #6d, and Well #7s during the February 2012 sampling event to determine the horizontal and vertical extent of benzene in groundwater. The Well #2 cluster of monitoring wells is located between the Well #6 cluster and Well #7s (see Figure 1). Benzene was detected in Well #6s (i.e. 1.4 parts per billion (ppb)) at a similar concentration to the detection in Well #2s (i.e. 1.9 ppb). Benzene was not detected in the deep monitoring wells, Well #2d and Well #6d, or the shallow well, Well #7s.

Samples collected from Well #2d and Well #7s during the August 2012 sampling event were non-detect for benzene. The Well #6 cluster was inaccessible during the August 2012 sampling event. The benzene concentration in Well #2s has decreased since the initial detection in August 2007 but has been detected at the same concentration the previous two sampling events (i.e. 1.9 ppb). The benzene detection in Well #2s and Well #6s may result from an offsite source based on the direction of groundwater flow across the site (See Figure 1). CDM Smith will monitor future analytical results to determine if any trend appears.

The semi-annual groundwater monitoring program will be continued by Dare County. The first semi-annual sampling event for 2013 will be completed in February. If you have any questions or require further explanation, do not hesitate to call me at (919) 787-5620.

CDM Smith

Very truly yours,

Mathew F. Colone, P.G.
CDM Smith Inc.

Attachments

cc: Edward Mann, Dare County

Table 1
Groundwater Elevations
August 2012 Semi-Annual Sampling Event
Dare County C&D Landfill

		Date Measured	2/14/2012		8/16/2012	
Facility Permit Number	Monitoring Well I.D.	TOC Elevation (feet AMSL)	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet AMSL)	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet AMSL)
28-02	Well #1s	7.07	6.54	0.53	6.24	0.83
28-02	Well #1d	7.15	6.40	0.75	6.36	0.79
28-02	Well #2s	5.80	5.05	0.75	5.35	0.45
28-02	Well #2d	5.49	4.66	0.83	4.67	0.82
28-02	Well #3s	4.28	3.76	0.52	3.88	0.40
28-02	Well #3d	3.85	3.18	0.67	3.25	0.60
28-02	Well #4s	4.20	5.25	-1.05	5.04	-0.84
28-02	Well #4d	4.22	3.55	0.67	3.55	0.67
28-02	Well #5s	9.88	8.73	1.15	8.75	1.13
28-02	Well #5d	10.33	9.60	0.73	9.63	0.70
28-02	Well #6s	7.38	5.87	1.51	Not Measured	
28-02	Well #6d	6.88	6.51	0.37	Not Measured	
28-02	Well #7s	5.08	3.98	1.10	3.98	1.10

Notes:
1. AMSL - Above Mean Sea Level
2. btoc - Below Top of Casing
3. Vertical Control - NAVD 88
4. Horizontal Control - NAD 83

Table 2
Water Quality Field Parameters
August 2012 Semi-Annual Sampling Event
Dare County Closed East Lake Landfill

	Sample Date:	8/15/2011				2/14/2012				8/16/2012			
Facility Permit Number	Monitoring Well I.D.	pH (S.U.)	Conductivity (uS/cm)	Temperature (deg.C)	TSS (mg/L)	pH (S.U.)	Conductivity (uS/cm)	Temperature (deg.C)	TSS (mg/L)	pH (S.U.)	Conductivity (uS/cm)	Temperature (deg.C)	TSS (mg/L)
28-02	Well #1s	6.70	1,381	19	38	6.80	1,535	17	85	6.70	1,259	19	50
28-02	Well #1d	7.10	957	19	NA	7.10	1,005	18	NA	7.10	917	18	NA
28-02	Well #2s	6.40	1,300	22	51	6.50	1,700	18	134	6.40	1,306	21	55
28-02	Well #2d	6.70	1,407	21	NA	7.20	1,869	19	NA	6.80	1,383	20	NA
28-02	Well #3s	6.10	3,058	24	11	6.50	2,110	15	40	6.40	1,503	20	31
28-02	Well #3d	6.90	926	20	NA	7.20	1,004	17	NA	7.00	995	18	NA
28-02	Well #4s	6.80	1,125	22	141	6.90	1,355	15	328	6.80	1,131	20	137
28-02	Well #4d	6.90	857	20	NA	7.10	1,000	18	NA	6.90	881	19	NA
28-02	Well #5s	6.40	1,524	21	58	6.40	1,988	18	135	6.40	1,526	20	68
28-02	Well #5d	7.10	766	21	NA	7.20	860	18	NA	7.10	768	20	NA
28-02	Well #6s	NA	NA	NA	NA	6.60	1,577	18	48	NA	NA	NA	NA
28-02	Well #6d	NA	NA	NA	NA	7.00	1,644	19	NA	NA	NA	NA	NA
28-02	Well #7s	NA	NA	NA	NA	6.30	4,420	18	22	6.20	1,887	20	9.5
Surface Water Sample Location													
28-02	Downstream	6.40	6,040	29	NA	6.60	5,190	7	NA	6.60	1,709	24	NA

Notes:
1. mg/L - milligrams per liter
2. uS/cm- Microsiemens per centimeter
3. TSS - Total Suspended Solids
4. S.U. - Standard Units
5. NA - Not Analyzed
6. Well #6s and #6d were inaccessible during the August 2012 sampling event.

Table 3a
Detected Groundwater Constituents - Metals, Volatile Organic Compounds, and Inorganics
August 2012 Semi-Annual Sampling Event
Dare County Closed East Lake Landfill

			Metals																		Volatile Organic Compounds								Inorganics	
Facility Permit Number	Monitoring Well I.D.	Sample Date	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Acetone	Benzene	Carbon Disulfide	Chlorobenzene	Chloromethane	1,4-Dichlorobenzene	Methylene Chloride	Toluene	Chloride (mg/L)	Sulfate (mg/L)
North Carolina 2L Standard			1*	10	700	4*	2	10	1*	1,000	300	15	50	1	100	20	20	0.28*	0.3*	1,000	6,000	1	700	50	3	6	5	600	250	250
Solid Waste Section Limit			6	10	100	1	1	10	10	10	300	10	50	0.2	50	10	10	5.5	25	10	100	1	100	3	1	1	1	1	NE	250
28-02	Well #1s	15-Feb-90			104					13	8,150		486	0.4						23									510	55
28-02	Well #1s	2-Feb-95		75							55,350		1,119																189	275
28-02	Well #1s	12-Jan-96		65											137														17	606
28-02	Well #1s	20-Aug-01		46																									9.5	261.4
28-02	Well #1s	12-Sep-02		43																									8	93.5
28-02	Well #1s	26-Mar-03		41																									6	213
28-02	Well #1s	2-Sep-04		46																									17	188
28-02	Well #1s	19-Feb-07		25																										
28-02	Well #1s	20-Aug-07		73																										
28-02	Well #1s	25-Feb-08		28																										
28-02	Well #1s	15-Aug-11		43	66.7J		0.18J	0.22J	0.76J	1.7J		0.18J			6.4J	1.5J		0.03J	2.8J	8.7J									130	96.9J
28-02	Well #1s	14-Feb-12	0.21J	51	68.2J	0.06J	0.29J	1.1J	0.9J	79		1.5J			8.5J	1.2J	6.9J	0.03J	2.6J	37									109	109J
28-02	Well #1s	16-Aug-12		51	69.4J		0.10J	0.49J	0.62J	15		0.34J			5.0J	1.7J			1.2J	16									108	99.4J
28-02	Well #1d	2-Feb-95									1,864		1,961																78	14
28-02	Well #1d	12-Jan-96																											85	
28-02	Well #1d	20-Aug-01						78							325														67	5.3
28-02	Well #1d	12-Sep-02																											126	
28-02	Well #1d	26-Mar-03					2																						94	
28-02	Well #1d	2-Sep-04																											85	
28-02	Well #1d	19-Feb-07																												
28-02	Well #1d	20-Aug-07																												
28-02	Well #1d	25-Feb-08																												
28-02	Well #1d	15-Aug-11		0.41J	2.7J		0.50J		0.41J	9.2J		0.08J			71	0.33J			1.4J	284									97	11.2J
28-02	Well #1d	14-Feb-12		0.33J	2.9J		0.91J		0.39J	14		1.9J			57	0.72J	0.08J		0.42J	281									94	8.9J
28-02	Well #1d	16-Aug-12			3.2J		1		0.36J	13		0.62J			56	0.92J				297									85	15.1J
28-02	Well #2s	15-Feb-90			305						47,300		10,400							15									65	150
28-02	Well #2s	2-Feb-95		15				22			80,900		623											47					59	35
28-02	Well #2s	12-Jan-96		18	574			21				10			291									52					43	
28-02	Well #2s	20-Aug-01																						56					27	6.5
28-02	Well #2s	12-Sep-02		14																				41.4		7.1			19	351.7
28-02	Well #2s	26-Mar-03																						32.6					25	178.0
28-02	Well #2s	2-Sep-04																		106				44		5.1			22	
28-02	Well #2s	19-Feb-07																		13				19.9		4.5				
28-02	Well #2s	20-Aug-07			126															46		2.5		24.6		3.2				
28-02	Well #2s	25-Feb-08			153															22		2.6		26.2		4.0				323.4
28-02	Well #2s	15-Aug-11		9J	114		0.16J	0.90J	2.3J	8.8J		1.4J			22.1J	0.81J		0.03J	4.1J	38		1.2		17.4		1.8			114	14.0J
28-02	Well #2s	14-Feb-12		7J	136		0.17J	1.1J	1.8J	5.7J		1J			6.3J	0.91J	0.43J		2.7J	25		1.9		23.6		2.5			52	
28-02	Well #2s	16-Aug-12		8J	134		0.19J	1.1J	2.3J	10		1.5J			10.4J	1.4J	0.25J	0.11J	2.2J	47		1.9		28.7		1.7			40	
28-02	Well #2d	2-Feb-95									4,886		881																461	50
28-02	Well #2d	12-Jan-96																											446	39.9
28-02	Well #2d	20-Aug-01						18							62														410	37.9
28-02	Well #2d	12-Sep-02																											520	37.3
28-02	Well #2d	26-Mar-03																											410	37.2
28-02	Well #2d	2-Sep-04																		56									385	37.2
28-02	Well #2d	19-Feb-07																		20										
28-02	Well #2d	20-Aug-07																		21										
28-02	Well #2d	25-Feb-08																		37										
28-02	Well #2d	15-Aug-11		0.85J	10.5J		0.07J	10	3.0J	15		3.8J			82	2.2J	0.27J		1.7J	485									430	35.4J
28-02	Well #2d	14-Feb-12		0.56J	8.4J		0.27J	24	1.3J	14		3.4J			62	2.6J	0.49J			357									405	45.4J
28-02	Well #2d	16-Aug-12	0.32J	0.44J	7.9J		0.11J	20	1.2J	12		3.8J			25.5J	2.7J	0.35J			279									414	36.6J

Table 3a
Detected Groundwater Constituents - Metals, Volatile Organic Compounds, and Inorganics
August 2012 Semi-Annual Sampling Event
Dare County Closed East Lake Landfill

			Metals																		Volatile Organic Compounds								Inorganics	
Facility Permit Number	Monitoring Well I.D.	Sample Date	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Acetone	Benzene	Carbon Disulfide	Chlorobenzene	Chloromethane	1,4-Dichlorobenzene	Methylene Chloride	Toluene	Chloride (mg/L)	Sulfate (mg/L)
North Carolina 2L Standard			1*	10	700	4*	2	10	1*	1,000	300	15	50	1	100	20	20	0.28*	0.3*	1,000	6,000	1	700	50	3	6	5	600	250	250
Solid Waste Section Limit			6	10	100	1	1	10	10	10	300	10	50	0.2	50	10	10	5.5	25	10	100	1	100	3	1	1	1	1	NE	250
28-02	Well #3s	15-Feb-90			42						2,470		354																30	50
28-02	Well #3s	2-Feb-95		17				16			20,150		391																91	380
28-02	Well #3s	11-Jan-96																											248	250
28-02	Well #3s	20-Aug-01																											340	84.7
28-02	Well #3s	12-Sep-02																											242	262.7
28-02	Well #3s	26-Mar-03																											180	283.5
28-02	Well #3s	2-Sep-04																											82	72.0
28-02	Well #3s	19-Feb-07																												
28-02	Well #3s	20-Aug-07																												
28-02	Well #3s	25-Feb-08			151															15										
28-02	Well #3s	15-Aug-11		5.2J	370			0.61J	1.2J	6.0J		0.67J			2.3J	12	0.41J		2.3J	150									1,619	75.4J
28-02	Well #3s	14-Feb-12		1J	158	0.06J	0.15J	0.46J	0.47J	1.7J		0.46J			3.0J	2.9J	0.57J		1.8J	13									300	8.1J
28-02	Well #3s	16-Aug-12	0.06J	1.4J	128	0.07J	0.13J	0.57J	0.74J	2.6J		0.67J			4.0J	3.0J	0.68J		1.5J	43									291	15.3J
28-02	Well #3d	2-Feb-95									2,009		396																185	60
28-02	Well #3d	11-Jan-96																											171	56
28-02	Well #3d	20-Aug-01																											52	7.6
28-02	Well #3d	12-Sep-02																											5	8.1
28-02	Well #3d	26-Mar-03																											83	39.2
28-02	Well #3d	2-Sep-04																											128	51.3
28-02	Well #3d	19-Feb-07																												
28-02	Well #3d	20-Aug-07																												
28-02	Well #3d	25-Feb-08																												
28-02	Well #3d	15-Aug-11		0.82J	21.5J	0.09J	0.07J		0.13J	30		6.5J			0.50J	0.82J	0.07J		2.2J	183									99	35.1J
28-02	Well #3d	14-Feb-12			8.7J		0.16J		0.15J	27		3.8J			1.8J	0.66J	0.05J		0.69J	81									117	75J
28-02	Well #3d	16-Aug-12		0.17J	11.9J		0.05J		0.13J	35		5.0J			2.1J	0.90J			0.52J	74									121	64.7J
28-02	Well #4s	15-Feb-90			286						29,400		486	0.4						10									83	20
28-02	Well #4s	2-Feb-95		13							5,855		422																124	140
28-02	Well #4s	11-Jan-96																											760	32
28-02	Well #4s	20-Aug-01																		125									160	6.4
28-02	Well #4s	12-Sep-02																		58									50	
28-02	Well #4s	26-Mar-03																											144	5.1
28-02	Well #4s	2-Sep-04						12												74									128	
28-02	Well #4s	19-Feb-07																												
28-02	Well #4s	20-Aug-07																		50										
28-02	Well #4s	25-Feb-08																		21										
28-02	Well #4s	15-Aug-11		3.0J	86.5J	0.12J	0.09J	5.2J	3.7J	5.3J		3.0J			6.7J	1.1J	0.15J	0.03J	6.5J	87									120	12.1J
28-02	Well #4s	14-Feb-12		2.8J	154	0.19J	0.43J	8.2J	5.3J	9.5J		4.7J			12.4J	0.96J	0.41J		11.3J	115									124	6.4J
28-02	Well #4s	16-Aug-12		2.6J	79.3J	0.15J	0.10J	5.7J	3.4J	4.5J		2.7J			7.4J	1.0J	0.25J		6.0J	78									107	
28-02	Well #4d	2-Feb-95									1,543		253																50	5
28-02	Well #4d	11-Jan-96																											92	8
28-02	Well #4d	20-Aug-01																											110	8.7
28-02	Well #4d	12-Sep-02																											122	
28-02	Well #4d	26-Mar-03																											154	
28-02	Well #4d	2-Sep-04																											86	
28-02	Well #4d	19-Feb-07																												
28-02	Well #4d	20-Aug-07																		13										
28-02	Well #4d	25-Feb-08																												
28-02	Well #4d	15-Aug-11		0.38J	3.7J				0.11J	6.3J		2.0J			0.49J	0.28J			1.7J	16									73	20.8J
28-02	Well #4d	14-Feb-12		0.17J	6.3J		0.4J	0.3J	0.22J	9.2J		1.8J			2.6J	0.31J			1.1J	42									71	13.7J
28-02	Well #4d	16-Aug-12			4.8J		0.08J		0.16J	12		2.5J			2.2J	0.59J	0.25J		0.59J	12									71	14.7J

Table 3a
Detected Groundwater Constituents - Metals, Volatile Organic Compounds, and Inorganics
August 2012 Semi-Annual Sampling Event
Dare County Closed East Lake Landfill

			Metals																		Volatile Organic Compounds								Inorganics	
Facility Permit Number	Monitoring Well I.D.	Sample Date	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Acetone	Benzene	Carbon Disulfide	Chlorobenzene	Chloromethane	1,4-Dichlorobenzene	Methylene Chloride	Toluene	Chloride (mg/L)	Sulfate (mg/L)
North Carolina 2L Standard			1*	10	700	4*	2	10	1*	1,000	300	15	50	1	100	20	20	0.28*	0.3*	1,000	6,000	1	700	50	3	6	5	600	250	250
Solid Waste Section Limit			6	10	100	1	1	10	10	10	300	10	50	0.2	50	10	10	5.5	25	10	100	1	100	3	1	1	1	1	NE	250
28-02	Well #5s	15-Feb-90			419						32,200		10,400							20									720	50
28-02	Well #5s	2-Feb-95		14				12			49,600		2,267																351	290
28-02	Well #5s	11-Jan-96		10				12							67														378	250
28-02	Well #5s	20-Aug-01																											140	46.9
28-02	Well #5s	12-Sep-02																											128	47.6
28-02	Well #5s	26-Mar-03																											114	35.6
28-02	Well #5s	2-Sep-04																											95	
28-02	Well #5s	19-Feb-07																												
28-02	Well #5s	20-Aug-07			199															18										
28-02	Well #5s	25-Feb-08			159															12										
28-02	Well #5s	15-Aug-11		12	206	0.10J	0.15J	1.2J	1.7J	6.0J		1.4J			3.2J	1.9J	0.04J	0.10J	5.7J	20									73	
28-02	Well #5s	14-Feb-12		14	194	0.07J	0.21J	1.6J	1.7J	13		5.7J			6.7J	2.1J			5.4J	25									66	
28-02	Well #5s	16-Aug-12		14	212		0.10J	1.3J	1.7J	5.8J		2.2J			4.5J	2.4J			4.7J	14									66	
28-02	Well #5d	2-Feb-95									1,895		238																65	8
28-02	Well #5d	11-Jan-96																											75	11
28-02	Well #5d	20-Aug-01																											70	7.3
28-02	Well #5d	12-Sep-02																											62	5.9
28-02	Well #5d	26-Mar-03																											56	
28-02	Well #5d	2-Sep-04																											56	
28-02	Well #5d	19-Feb-07																												
28-02	Well #5d	20-Aug-07																		10										
28-02	Well #5d	25-Feb-08																												
28-02	Well #5d	15-Aug-11		0.44J	3.5J		0.32J		0.15J	8.9J		2.8J			27.5J	0.26J	0.08J	0.04J	1.6J	1,715									56	17.6J
28-02	Well #5d	14-Feb-12	0.3J		4.9J		0.57J		0.17J	32		2.8J			26J		0.07J		0.62J	1,557									55	5.5J
28-02	Well #5d	16-Aug-12			4.1J		0.49J		0.13J	30		2.1J			19.6J	0.40J			0.26J	1,363									50	13.0J
28-02	Well #6s	12-Jan-96						50	24			41			97				72	109									52	
28-02	Well #6s	14-Feb-12						0.39J		0.62J		0.06J			2.5J	0.8J			1.3J	2.8J		1.4		4.4		3.1			33	31.4J
28-02	Well #6d	12-Jan-96																											490	62.5
28-02	Well #6d	14-Feb-12						0.15J		0.5J		0.22J			1.5J	2.3J			0.86J	10									368	60.2J
28-02	Well #7s	12-Jan-96		12				22				10			84														35	294
28-02	Well #7s	14-Feb-12						0.72J		2.7J		0.25J			4.3J	8.1J			1.9J	6.9J									1,190	110J
28-02	Well #7s	16-Aug-12	0.08J	1.5J	62.4J			0.78J	0.99J	2.1J		0.14J			3.3J	4.4J			2.0J	11									567	11.4J
28-02	Well #7d	12-Jan-96		19	752	3		30	15						73					105									706	245

Notes:

1. Metal and volatile organic compound units are in micrograms per liter (parts per billion)
2. Inorganic units are in milligrams per liter (parts per million)
3. *-Groundwater Protection Standard
4. NE = Not Established
5. J - Indicates the analytical result is an estimated concentration between the method detection limit and the Solid Waste Section Reporting Limit

- Blank cell indicates analyte was not detected
- Concentration exceeds N.C. 2L or Groundwater Protection Standard

Table 3b
Detected Surface Water Constituents - Metals, Volatile Organic Compounds, and Inorganics
August 2012 Semi-Annual Sampling Event
Dare County Closed East Lake Landfill

			Metals																		Volatile Organic Compounds							Inorganics	
Facility Permit Number	Surface Water Sample Location	Sample Date	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc	Acetone	Benzene	Chlorobenzene	Chloromethane	1,4-Dichlorobenzene	Methylene Chloride	Toluene	Chloride (mg/L)	Sulfate (mg/L)
North Carolina 2B Standard			10*	10*	1,000	6.5	2	50	NS	7**	1,000**	25	200	0.01	88	5	0.06**	NS	NS	50**	NS	51	488	NS	488	NS	11	230**	250
Solid Waste Section Limit			10	10	100	1	1	10	10	10	300	10	50	0.2	50	10	10	5.5	25	10	100	1	3	1	1	1	1	5	250
28-02	Downstream	15-Feb-90			241					39	460		354							41								290	76
28-02	Downstream	2-Feb-95									1,327		92															2,059	350
28-02	Downstream	12-Jan-96																										451	204
28-02	Downstream	20-Aug-01						178							834													1,400	193.6
28-02	Downstream	12-Sep-02																										1,320	37.6
28-02	Downstream	26-Mar-03																										425	61.7
28-02	Downstream	2-Sep-04																										186	14
28-02	Downstream	19-Feb-07																											
28-02	Downstream	20-Aug-07														15													
28-02	Downstream	25-Feb-08														11													
28-02	Downstream	15-Aug-11		5.6J	37.7J				0.26J	8.1J		0.05J			0.04J	18			0.86J	4.4J								2,749	345
28-02	Downstream	14-Feb-12		2.6J	34.1J			0.26J	0.22J	3.9J		0.1J			1.6J					8.7J								1,450	149J
28-02	Downstream	16-Aug-12	0.10J	4.0J	33.6J	0.18J		5.2J	1.9J	6.2J		6.0J			4.2J	5.0J		0.24J	6.1J	52								523	29.7J

Notes:

1. Metal and volatile organic compound units are in micrograms per liter (parts per billion).
2. Inorganic units are in milligrams per liter (parts per million).
3. Standards obtained from section 15A NCAC 02B .0211 Fresh Surface Water Quality Standards for Class C Waters.
4. * - Human Health Standard
5. ** - Action Level Standard
6. NS = No Standard
7. J - Indicates the analytical result is an estimated concentration between the method detection limit and the Solid Waste Section Reporting Limit.

- Concentrations exceeds N.C. 2B Standard for Class C Waters
- Blank cell indicates analyte was not detected

CDM Smith

Scale in Feet

0 200 400 600

Figure 1: Potentiometric Surface Map
August 2012 Semi-Annual Sampling Event
Closed East Lake Landfill
East Lake, North Carolina

Appendix A

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

ID#: 6016

DARE CO. LANDFILL (EAST LAKE)
MR. EDWARD L. MANN
DARE CO. PUBLIC WORKS
P.O. BOX 1000
MANTEO ,NC 27954

DATE COLLECTED: 08/16/12
DATE REPORTED : 09/04/12

REVIEWED BY:

PARAMETERS	MDL	SWSL	Downstream	Well #1 Shallow	Well #1 Deep	Well #2 Shallow	Well #2 Deep	Analysis Date	Analyst	Method Code
PH (field measurement), Units			6.6	6.7	7.1	6.4	6.8	08/16/12	RJH	SM4500HB
Total Suspended Residue, mg/l	1.0	1.0		50		55		08/17/12	MSG	SM2540D
Chloride, mg/l	5.0	5.0	523	108	85	40	414	08/23/12	MSG	SM4500-CLB
Sulfate, mg/l	5.0	250.0	29.7 J	99.4 J	15.1 J	--- U	36.6 J	08/23/12	TRB	45008042E97
Antimony, ug/l	0.02	6.0	0.10 J			--- U		08/27/12	LFJ	EPA200.8
Antimony, ug/l	0.02	6.0		--- U	--- U		0.32 J	08/20/12	LFJ	EPA200.8
Arsenic, ug/l	0.13	10.0	4.0 J			.8 J		08/27/12	LFJ	EPA200.8
Arsenic, ug/l	0.13	10.0		51	--- U		0.44 J	08/20/12	LFJ	EPA200.8
Barium, ug/l	0.07	100.0	33.6 J			134		08/27/12	LFJ	EPA200.8
Barium, ug/l	0.07	100.0		69.4 J	3.2 J		7.9 J	08/20/12	LFJ	EPA200.8
Beryllium, ug/l	0.07	1.0	0.18 J			--- U		08/27/12	LFJ	EPA200.8
Beryllium, ug/l	0.07	1.0		--- U	--- U		--- U	08/20/12	LFJ	EPA200.8
Cadmium, ug/l	0.03	1.0	--- U			0.19 J		08/27/12	LFJ	EPA200.8
Cadmium, ug/l	0.03	1.0		0.10 J	1		0.11 J	08/20/12	LFJ	EPA200.8
Cobalt, ug/l	0.02	10.0	1.9 J			2.3 J		08/27/12	LFJ	EPA200.8
Cobalt, ug/l	0.02	10.0		0.62 J	0.36 J		1.2 J	08/20/12	LFJ	EPA200.8
Copper, ug/l	0.06	10.0	6.2 J			10		08/27/12	LFJ	EPA200.8
Copper, ug/l	0.06	10.0		15	13		12	08/20/12	LFJ	EPA200.8
Total Chromium, ug/l	0.18	10.0	5.2 J			1.1 J		08/27/12	LFJ	EPA200.8
Total Chromium, ug/l	0.18	10.0		0.49 J	--- U		20	08/20/12	LFJ	EPA200.8
Lead, ug/l	0.08	10.0	6.0 J			1.5 J		08/27/12	LFJ	EPA200.8
Lead, ug/l	0.08	10.0		0.34 J	0.62 J		3.8 J	08/20/12	LFJ	EPA200.8
Nickel, ug/l	0.06	50.0	4.2 J			10.4 J		08/27/12	LFJ	EPA200.8
Nickel, ug/l	0.06	50.0		5.0 J	56		25.5 J	08/20/12	LFJ	EPA200.8
Selenium, ug/l	0.17	10.0	5.0 J			1.4 J		08/27/12	LFJ	EPA200.8
Selenium, ug/l	0.17	10.0		1.7 J	0.92 J		2.7 J	08/20/12	LFJ	EPA200.8
Silver, ug/l	0.10	10.0	--- U			0.25 J		08/27/12	LFJ	EPA200.8
Silver, ug/l	0.10	10.0		--- U	--- U		0.35 J	08/20/12	LFJ	EPA200.8
Thallium, ug/l	0.07	5.5	0.24 J			0.11 J		08/28/12	LFJ	EPA200.8
Thallium, ug/l	0.07	5.5		--- U	--- U		--- U	08/20/12	LFJ	EPA200.8
Vanadium, ug/l	0.10	25.0	6.1 J			2.2 J		08/27/12	LFJ	EPA200.8
Vanadium, ug/l	0.10	25.0		1.2 J	--- U		--- U	08/20/12	LFJ	EPA200.8
Zinc, ug/l	0.48	10.0	52			47		08/27/12	LFJ	EPA200.8
Zinc, ug/l	0.48	10.0		16	297		279	08/20/12	LFJ	EPA200.8
Conductivity (at 25c), uMhos/cm	1.0	1.0	1709	1259	917	1306	1383	08/16/12	RJH	SM2510B
Temperature, °C			24	19	18	21	20	08/16/12	RJH	SM2550B
Static Water Level, feet				6.24	6.36	5.35	4.67	08/16/12	RJH	
Well Depth, feet				18.14	55.55	14.66	48.02	08/16/12	RJH	

J = Between MDL and SWSL, U = Below ALL Quanititation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

ID#: 6016

DARE CO. LANDFILL (EAST LAKE)
MR. EDWARD L. MANN
DARE CO. PUBLIC WORKS
P.O. BOX 1000
MANTEO ,NC 27954

DATE COLLECTED: 08/16/12
DATE REPORTED : 09/04/12

REVIEWED BY:

PARAMETERS	MDL	SWSL	Well #3 Shallow	Well #3 Deep	Well #4 Shallow	Well #4 Deep	Well #5 Shallow	Analysis Date	Analyst	Method Code
PH (field measurement), Units			6.4	7.0	6.8	6.9	6.4	08/16/12	RJH	SM4500HB
Total Suspended Residue, mg/l	1.0	1.0	31		137		68	08/17/12	MSG	SM2540D
Chloride, mg/l	5.0	5.0	291	121	107	71	66	08/23/12	MSG	SM4500-CLB
Sulfate, mg/l	5.0	250.0	15.3 J	64.7 J	--- U	14.7 J	--- U	08/23/12	TRB	4500SO42E97
Antimony, ug/l	0.02	6.0	0.06 J	- - U	--- U	--- U	--- U	08/27/12	LFJ	EPA200.8
Arsenic, ug/l	0.13	10.0	1.4 J	0.17 J	2.6 J	--- U	14	08/27/12	LFJ	EPA200.8
Barium, ug/l	0.07	100.0	128	11.9 J	79.3 J	4.8 J	212	08/27/12	LFJ	EPA200.8
Beryllium, ug/l	0.07	1.0	0.07 J	- - U	0.15 J	--- U	--- U	08/27/12	LFJ	EPA200.8
Cadmium, ug/l	0.03	1.0	0.13 J	0.05 J	0.10 J	0.08 J	0.10 J	08/27/12	LFJ	EPA200.8
Cobalt, ug/l	0.02	10.0	0.74 J	0.13 J	3.4 J	0.16 J	1.7 J	08/27/12	LFJ	EPA200.8
Copper, ug/l	0.06	10.0	2.6 J	35	4.5 J	12	5.8 J	08/27/12	LFJ	EPA200.8
Total Chromium, ug/l	0.18	10.0	0.57 J	- - U	5.7 J	--- U	1.3 J	08/27/12	LFJ	EPA200.8
Lead, ug/l	0.08	10.0	0.67 J	5.0 J	2.7 J	2.5 J	2.2 J	08/27/12	LFJ	EPA200.8
Nickel, ug/l	0.06	50.0	4.0 J	2.1 J	7.4 J	2.2 J	4.5 J	08/27/12	LFJ	EPA200.8
Selenium, ug/l	0.17	10.0	3.0 J	0.90 J	1.0 J	0.59 J	2.4 J	08/27/12	LFJ	EPA200.8
Silver, ug/l	0.10	10.0	0.68 J	--- U	0.25 J	--- U	--- U	08/27/12	LFJ	EPA200.8
Thallium, ug/l	0.07	5.5	--- U	- - U	--- U	--- U	--- U	08/28/12	LFJ	EPA200.8
Vanadium, ug/l	0.10	25.0	1.5 J	0.52 J	6.0 J	0.59 J	4.7 J	08/27/12	LFJ	EPA200.8
Zinc, ug/l	0.48	10.0	43	74	78	12	14	08/27/12	LFJ	EPA200.8
Conductivity (at 25c), uMhos/cm	1.0	1.0	1503	995	1131	881	1526	08/16/12	RJH	SM2510B
Temperature, °C			20	18	20	19	20	08/16/12	RJH	SM2550B
Static Water Level, feet			3.88	3.25	5.04	3.55	8.75	08/16/12	RJH	
Well Depth, feet			14.88	49.19	16.98	52.34	19.63	08/16/12	RJH	

J = Between MDL and SWSL, U = Below ALL Quanititation Limits.

Environment 1, Incorporated

Drinking Water ID#: 17715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

ID#: 6016

DARE CO. LANDFILL (EAST LAKE)
MR. EDWARD L. MANN
DARE CO. PUBLIC WORKS
P.O. BOX 1000
MANTEO ,NC 27954

DATE COLLECTED: 08/16/12
DATE REPORTED : 09/04/12

REVIEWED BY:

PARAMETERS	MDL	SWSL	Well #5 Deep	Analysis Date	Analyst	Method Code
PH (field measurement), Units			7.1	08/16/12	RJH	SM4500HB
Chloride, mg/l	5.0	5.0	50	08/23/12	MSG	SM4500-CLB
Sulfate, mg/l	5.0	250.0	13.0 J	08/23/12	TRB	4500SO42E97
Antimony, ug/l	0.02	6.0	--- U	08/27/12	LFJ	EPA200.8
Arsenic, ug/l	0.13	10.0	--- U	08/27/12	LFJ	EPA200.8
Barium, ug/l	0.07	100.0	4.1 J	08/27/12	LFJ	EPA200.8
Beryllium, ug/l	0.07	1.0	--- U	08/27/12	LFJ	EPA200.8
Cadmium, ug/l	0.03	1.0	0.49 J	08/27/12	LFJ	EPA200.8
Cobalt, ug/l	0.02	10.0	0.13 J	08/27/12	LFJ	EPA200.8
Copper, ug/l	0.06	10.0	30	08/27/12	LFJ	EPA200.8
Total Chromium, ug/l	0.18	10.0	--- U	08/27/12	LFJ	EPA200.8
Lead, ug/l	0.08	10.0	2.1 J	08/27/12	LFJ	EPA200.8
Nickel, ug/l	0.06	50.0	19.6 J	08/27/12	LFJ	EPA200.8
Selenium, ug/l	0.17	10.0	0.40 J	08/27/12	LFJ	EPA200.8
Silver, ug/l	0.10	10.0	--- U	08/27/12	LFJ	EPA200.8
Thallium, ug/l	0.07	5.5	--- U	08/28/12	LFJ	EPA200.8
Vanadium, ug/l	0.10	25.0	0.26 J	08/27/12	LFJ	EPA200.8
Zinc, ug/l	0.48	10.0	1363	08/27/12	LFJ	EPA200.8
Conductivity (at 25c), uMhos/cm	1.0	1.0	768	08/16/12	RJH	SM2510B
Temperature, °C			20	08/16/12	RJH	SM2550B
Static Water Level, feet			9.63	08/16/12	RJH	
Well Depth, feet			15.66	08/16/12	RJH	

J = Between MDL and SWSL, U = Below ALL Quanititation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
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CLIENT: DARE CO. LANDFILL (EAST LAKE)
MR. EDWARD L. MANN
DARE CO. PUBLIC WORKS
P.O. BOX 1000
MANTEO, NC 27954

CLIENT ID: 6016

ANALYST: MAO
DATE COLLECTED: 08/16/12
DATE ANALYZED: 08/17/12
DATE REPORTED: 09/04/12

REVIEWED BY:

VOLATILE ORGANICS
EPA METHOD 8260B R1(96)

PARAMETERS, ug/l	MDL	SWSL	Downstream	Well #1 Shallow	Well #1 Deep	Well #2 Shallow	Well #2 Deep
1. Chloromethane	0.77	1.0	--- U	--- U	--- U	--- U	--- U
2. Vinyl Chloride	0.63	1.0	--- U	--- U	--- U	--- U	--- U
3. Bromomethane	0.67	10.0	--- U	--- U	--- U	--- U	--- U
4. Chloroethane	0.48	10.0	--- U	--- U	--- U	--- U	--- U
5. Trichlorofluoromethane	0.24	1.0	--- U	--- U	--- U	--- U	--- U
6. 1,1-Dichloroethene	0.17	5.0	--- U	--- U	--- U	--- U	--- U
7. Acetone	9.06	100.0	--- U	--- U	--- U	--- U	--- U
8. Iodomethane	0.26	10.0	--- U	--- U	--- U	--- U	--- U
9. Carbon Disulfide	0.23	100.0	--- U	--- U	--- U	--- U	--- U
10. Methylene Chloride	0.64	1.0	--- U	--- U	--- U	--- U	--- U
11. trans-1,2-Dichloroethene	0.23	5.0	--- U	--- U	--- U	--- U	--- U
12. 1,1-Dichloroethane	0.20	5.0	--- U	--- U	--- U	--- U	--- U
13. Vinyl Acetate	0.20	50.0	--- U	--- U	--- U	--- U	--- U
14. Cis-1,2-Dichloroethene	0.25	5.0	--- U	--- U	--- U	--- U	--- U
15. 2-Butanone	2.21	100.0	--- U	--- U	--- U	--- U	--- U
16. Bromochloromethane	0.27	3.0	--- U	--- U	--- U	--- U	--- U
17. Chloroform	0.25	5.0	--- U	--- U	--- U	--- U	--- U
18. 1,1,1-Trichloroethane	0.19	1.0	--- U	--- U	--- U	--- U	--- U
19. Carbon Tetrachloride	0.22	1.0	--- U	--- U	--- U	--- U	--- U
20. Benzene	0.24	1.0	--- U	--- U	--- U	1.90	--- U
21. 1,2-Dichloroethane	0.27	1.0	--- U	--- U	--- U	--- U	--- U
22. Trichloroethene	0.23	1.0	--- U	--- U	--- U	--- U	--- U
23. 1,2-Dichloropropane	0.21	1.0	--- U	--- U	--- U	--- U	--- U
24. Bromodichloromethane	0.21	1.0	--- U	--- U	--- U	--- U	--- U
25. Cis-1,3-Dichloropropene	0.24	1.0	--- U	--- U	--- U	--- U	--- U
26. 4-Methyl-2-Pentanone	1.19	100.0	--- U	--- U	--- U	--- U	--- U
27. Toluene	0.23	1.0	--- U	--- U	--- U	--- U	--- U
28. trans-1,3-Dichloropropene	0.28	1.0	--- U	--- U	--- U	--- U	--- U
29. 1,1,2-Trichloroethane	0.25	1.0	--- U	--- U	--- U	--- U	--- U
30. Tetrachloroethene	0.17	1.0	--- U	--- U	--- U	--- U	--- U
31. 2-Hexanone	1.57	50.0	--- U	--- U	--- U	--- U	--- U
32. Dibromochloromethane	0.24	3.0	--- U	--- U	--- U	--- U	--- U
33. 1,2-Dibromoethane	0.26	1.0	--- U	--- U	--- U	--- U	--- U
34. Chlorobenzene	0.30	3.0	--- U	--- U	--- U	28.70	--- U
35. 1,1,1,2-Tetrachloroethane	0.22	5.0	--- U	--- U	--- U	--- U	--- U
36. Ethylbenzene	0.21	1.0	--- U	--- U	--- U	--- U	--- U
37. Xylenes	0.68	5.0	--- U	--- U	--- U	--- U	--- U
38. Dibromomethane	0.28	10.0	--- U	--- U	--- U	--- U	--- U
39. Styrene	0.19	1.0	--- U	--- U	--- U	--- U	--- U
40. Bromoform	0.20	3.0	--- U	--- U	--- U	--- U	--- U
41. 1,1,2,2-Tetrachloroethane	0.26	3.0	--- U	--- U	--- U	--- U	--- U
42. 1,2,3-Trichloropropane	0.43	1.0	--- U	--- U	--- U	--- U	--- U
43. 1,4-Dichlorobenzene	0.39	1.0	--- U	--- U	--- U	1.70	--- U
44. 1,2-Dichlorobenzene	0.32	5.0	--- U	--- U	--- U	--- U	--- U
45. 1,2-Dibromo-3-Chloropropane	0.34	13.0	--- U	--- U	--- U	--- U	--- U
46. Acrylonitrile	2.72	200.0	--- U	--- U	--- U	--- U	--- U
47. trans-1,4-Dichloro-2-Butene	0.42	100.0	--- U	--- U	--- U	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quanititation Limits.

Environment 1, Incorporated

Drinking Water ID: 37713
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: DARE CO. LANDFILL (EAST LAKE)
MR. EDWARD L. MANN
DARE CO. PUBLIC WORKS
P.O. BOX 1000
MANTEO, NC 27954

CLIENT ID: 6016

ANALYST: MAO
DATE COLLECTED: 08/16/12
DATE ANALYZED: 08/17/12
DATE REPORTED: 09/04/12

REVIEWED BY: _____

VOLATILE ORGANICS
EPA METHOD 8260B R1(96)

PARAMETERS, ug/l	MDL	SWSL	Well #3 Shallow	Well #3 Deep	Well #4 Shallow	Well #4 Deep	Well #5 Shallow
1. Chloromethane	0.77	1.0	--- U	--- U	--- U	--- U	--- U
2. Vinyl Chloride	0.63	1.0	--- U	--- U	--- U	--- U	--- U
3. Bromomethane	0.67	10.0	--- U	--- U	--- U	--- U	--- U
4. Chloroethane	0.48	10.0	--- U	--- U	--- U	--- U	--- U
5. Trichlorofluoromethane	0.24	1.0	--- U	--- U	--- U	--- U	--- U
6. 1,1-Dichloroethene	0.17	5.0	--- U	--- U	--- U	--- U	--- U
7. Acetone	9.06	100.0	--- U	--- U	--- U	--- U	--- U
8. Iodomethane	0.26	10.0	--- U	--- U	--- U	--- U	--- U
9. Carbon Disulfide	0.23	100.0	--- U	--- U	--- U	--- U	--- U
10. Methylene Chloride	0.64	1.0	--- U	--- U	--- U	--- U	--- U
11. trans-1,2-Dichloroethene	0.23	5.0	--- U	--- U	--- U	--- U	--- U
12. 1,1-Dichloroethane	0.20	5.0	--- U	--- U	--- U	--- U	--- U
13. Vinyl Acetate	0.20	50.0	--- U	--- U	--- U	--- U	--- U
14. Cis-1,2-Dichloroethene	0.25	5.0	--- U	--- U	--- U	--- U	--- U
15. 2-Butanone	2.21	100.0	--- U	--- U	--- U	--- U	--- U
16. Bromochloromethane	0.27	3.0	--- U	--- U	--- U	--- U	--- U
17. Chloroform	0.25	5.0	--- U	--- U	--- U	--- U	--- U
18. 1,1,1-Trichloroethane	0.19	1.0	--- U	--- U	--- U	--- U	--- U
19. Carbon Tetrachloride	0.22	1.0	--- U	--- U	--- U	--- U	--- U
20. Benzene	0.24	1.0	--- U	--- U	--- U	--- U	--- U
21. 1,2-Dichloroethane	0.27	1.0	--- U	--- U	--- U	--- U	--- U
22. Trichloroethene	0.23	1.0	--- U	--- U	--- U	--- U	--- U
23. 1,2-Dichloropropane	0.21	1.0	--- U	--- U	--- U	--- U	--- U
24. Bromodichloromethane	0.21	1.0	--- U	--- U	--- U	--- U	--- U
25. Cis-1,3-Dichloropropene	0.24	1.0	--- U	--- U	--- U	--- U	--- U
26. 4-Methyl-2-Pentanone	1.19	100.0	--- U	--- U	--- U	--- U	--- U
27. Toluene	0.23	1.0	--- U	--- U	--- U	--- U	--- U
28. trans-1,3-Dichloropropene	0.28	1.0	--- U	--- U	--- U	--- U	--- U
29. 1,1,2-Trichloroethane	0.25	1.0	--- U	--- U	--- U	--- U	--- U
30. Tetrachloroethene	0.17	1.0	--- U	--- U	--- U	--- U	--- U
31. 2-Hexanone	1.57	50.0	--- U	--- U	--- U	--- U	--- U
32. Dibromochloromethane	0.24	3.0	--- U	--- U	--- U	--- U	--- U
33. 1,2-Dibromoethane	0.26	1.0	--- U	--- U	--- U	--- U	--- U
34. Chlorobenzene	0.30	3.0	--- U	--- U	--- U	--- U	--- U
35. 1,1,1,2-Tetrachloroethane	0.22	5.0	--- U	--- U	--- U	--- U	--- U
36. Ethylbenzene	0.21	1.0	--- U	--- U	--- U	--- U	--- U
37. Xylenes	0.68	5.0	--- U	--- U	--- U	--- U	--- U
38. Dibromomethane	0.28	10.0	--- U	--- U	--- U	--- U	--- U
39. Styrene	0.19	1.0	--- U	--- U	--- U	--- U	--- U
40. Bromoform	0.20	3.0	--- U	--- U	--- U	--- U	--- U
41. 1,1,2,2-Tetrachloroethane	0.26	3.0	--- U	--- U	--- U	--- U	--- U
42. 1,2,3-Trichloropropane	0.43	1.0	--- U	--- U	--- U	--- U	--- U
43. 1,4-Dichlorobenzene	0.39	1.0	--- U	--- U	--- U	--- U	--- U
44. 1,2-Dichlorobenzene	0.32	5.0	--- U	--- U	--- U	--- U	--- U
45. 1,2-Dibromo-3-Chloropropane	0.34	13.0	--- U	--- U	--- U	--- U	--- U
46. Acrylonitrile	2.72	200.0	--- U	--- U	--- U	--- U	--- U
47. trans-1,4-Dichloro-2-Butene	0.42	100.0	--- U	--- U	--- U	--- U	--- U

J = Between MDL and SWSL, U = Below ALL Quanititation Limits.

Environment 1, Incorporated

Drinking Water ID: 32715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

CLIENT: DARE CO. LANDFILL (EAST LAKE)
MR. EDWARD L. MANN
DARE CO. PUBLIC WORKS
P.O. BOX 1000
MANTEO, NC 27954

CLIENT ID: 6016
ANALYST: MAO
DATE COLLECTED: 08/16/12
DATE ANALYZED: 08/17/12
DATE REPORTED: 09/04/12

REVIEWED BY:

VOLATILE ORGANICS
EPA METHOD 8260B R1(96)

PARAMETERS, ug/l	MDL	SWSL	Well #5 Deep
1. Chloromethane	0.77	1.0	--- U
2. Vinyl Chloride	0.63	1.0	--- U
3. Bromomethane	0.67	10.0	--- U
4. Chloroethane	0.48	10.0	--- U
5. Trichlorofluoromethane	0.24	1.0	--- U
6. 1,1-Dichloroethene	0.17	5.0	--- U
7. Acetone	9.06	100.0	--- U
8. Iodomethane	0.26	10.0	--- U
9. Carbon Disulfide	0.23	100.0	--- U
10. Methylene Chloride	0.64	1.0	--- U
11. trans-1,2-Dichloroethene	0.23	5.0	--- U
12. 1,1-Dichloroethane	0.20	5.0	--- U
13. Vinyl Acetate	0.20	50.0	--- U
14. Cis-1,2-Dichloroethene	0.25	5.0	--- U
15. 2-Butanone	2.21	100.0	--- U
16. Bromochloromethane	0.27	3.0	--- U
17. Chloroform	0.25	5.0	--- U
18. 1,1,1-Trichloroethane	0.19	1.0	--- U
19. Carbon Tetrachloride	0.22	1.0	--- U
20. Benzene	0.24	1.0	--- U
21. 1,2-Dichloroethane	0.27	1.0	--- U
22. Trichloroethene	0.23	1.0	--- U
23. 1,2-Dichloropropane	0.21	1.0	--- U
24. Bromodichloromethane	0.21	1.0	--- U
25. Cis-1,3-Dichloropropene	0.24	1.0	--- U
26. 4-Methyl-2-Pentanone	1.19	100.0	--- U
27. Toluene	0.23	1.0	--- U
28. trans-1,3-Dichloropropene	0.28	1.0	--- U
29. 1,1,2-Trichloroethane	0.25	1.0	--- U
30. Tetrachloroethene	0.17	1.0	--- U
31. 2-Hexanone	1.57	50.0	--- U
32. Dibromochloromethane	0.24	3.0	--- U
33. 1,2-Dibromoethane	0.26	1.0	--- U
34. Chlorobenzene	0.30	3.0	--- U
35. 1,1,1,2-Tetrachloroethane	0.22	5.0	--- U
36. Ethylbenzene	0.21	1.0	--- U
37. Xylenes	0.68	5.0	--- U
38. Dibromomethane	0.28	10.0	--- U
39. Styrene	0.19	1.0	--- U
40. Bromoform	0.20	3.0	--- U
41. 1,1,2,2-Tetrachloroethane	0.26	3.0	--- U
42. 1,2,3-Trichloropropane	0.43	1.0	--- U
43. 1,4-Dichlorobenzene	0.39	1.0	--- U
44. 1,2-Dichlorobenzene	0.32	5.0	--- U
45. 1,2-Dibromo-3-Chloropropane	0.34	13.0	--- U
46. Acrylonitrile	2.72	200.0	--- U
47. trans-1,4-Dichloro-2-Butene	0.42	100.0	--- U

J = Between MDL and SWSL, U = Below ALL Quanititation Limits.

Environment 1, Incorporated

Drinking Water ID: 37715
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

PHONE (252) 756-6208
FAX (252) 756-0633

ID#: 6016 A

DARE CO. LANDFILL (EAST LAKE)
MR. EDWARD L. MANN
DARE CO. PUBLIC WORKS
P.O. BOX 1000
MANTEO ,NC 27954

DATE COLLECTED: 08/16/12
DATE REPORTED : 09/04/12

REVIEWED BY:

PARAMETERS	MDL	SWSL	Well #7 Shallow	Analysis Date	Analyst	Method Code
PH (field measurement), Units			6.2	08/16/12	RJH	SM4500HB
Total Suspended Residue, mg/l	1.0	1.0	9.5	08/17/12	MSG	SM2540D
Chloride, mg/l	5.0	5.0	567	08/23/12	MSG	SM4500-CLB
Sulfate, mg/l	5.0	250.0	11.4 J	08/23/12	TRB	4500SO42E97
Antimony, ug/l	0.02	6.0	0.08 J	08/27/12	LFJ	EPA200.8
Arsenic, ug/l	0.13	10.0	1.5 J	08/27/12	LFJ	EPA200.8
Barium, ug/l	0.07	100.0	62.4 J	08/27/12	LFJ	EPA200.8
Beryllium, ug/l	0.07	1.0	--- U	08/27/12	LFJ	EPA200.8
Cadmium, ug/l	0.03	1.0	--- U	08/27/12	LFJ	EPA200.8
Cobalt, ug/l	0.02	10.0	0.99 J	08/27/12	LFJ	EPA200.8
Copper, ug/l	0.06	10.0	2.1 J	08/27/12	LFJ	EPA200.8
Total Chromium, ug/l	0.18	10.0	0.78 J	08/27/12	LFJ	EPA200.8
Lead, ug/l	0.08	10.0	0.14 J	08/27/12	LFJ	EPA200.8
Nickel, ug/l	0.06	50.0	3.3 J	08/27/12	LFJ	EPA200.8
Selenium, ug/l	0.17	10.0	4.4 J	08/27/12	LFJ	EPA200.8
Silver, ug/l	0.10	10.0	--- U	08/27/12	LFJ	EPA200.8
Thallium, ug/l	0.07	5.5	--- U	08/28/12	LFJ	EPA200.8
Vanadium, ug/l	0.10	25.0	2.0 J	08/27/12	LFJ	EPA200.8
Zinc, ug/l	0.48	10.0	11	08/27/12	LFJ	EPA200.8
Conductivity (at 25c), uMhos/cm	1.0	1.0	1887	08/16/12	RJH	SM2510B
Temperature, °C			20	08/16/12	RJH	SM2550B
Static Water Level, feet			3.98	08/16/12	RJH	
Well Depth, feet			20.59	08/16/12	RJH	

J = Between MDL and SWSL, U = Below ALL Quanititation Limits.

Environment 1, Incorporated

Drinking Water ID: 37716
Wastewater ID: 10

P.O. BOX 7085, 114 OAKMONT DRIVE
GREENVILLE, N.C. 27835-7085

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CLIENT: DARE CO. LANDFILL (EAST LAKE)
MR. EDWARD L. MANN
DARE CO. PUBLIC WORKS
P.O. BOX 1000
MANTEO, NC 27954

CLIENT ID: 6016 A

ANALYST: MAO
DATE COLLECTED: 08/16/12
DATE ANALYZED: 08/24/12
DATE REPORTED: 09/04/12

REVIEWED BY:

VOLATILE ORGANICS
EPA METHOD 8260B R1(96)

PARAMETERS, ug/l	MDL	SWSL	Well #7 Shallow
1. Chloromethane	0.77	1.0	--- U
2. Vinyl Chloride	0.63	1.0	--- U
3. Bromomethane	0.67	10.0	--- U
4. Chloroethane	0.48	10.0	--- U
5. Trichlorofluoromethane	0.24	1.0	--- U
6. 1,1-Dichloroethene	0.17	5.0	--- U
7. Acetone	9.06	100.0	--- U
8. Iodomethane	0.26	10.0	--- U
9. Carbon Disulfide	0.23	100.0	--- U
10. Methylene Chloride	0.64	1.0	--- U
11. trans-1,2-Dichloroethene	0.23	5.0	--- U
12. 1,1-Dichloroethane	0.20	5.0	--- U
13. Vinyl Acetate	0.20	50.0	--- U
14. Cis-1,2-Dichloroethene	0.25	5.0	--- U
15. 2-Butanone	2.21	100.0	--- U
16. Bromochloromethane	0.27	3.0	--- U
17. Chloroform	0.25	5.0	--- U
18. 1,1,1-Trichloroethane	0.19	1.0	--- U
19. Carbon Tetrachloride	0.22	1.0	--- U
20. Benzene	0.24	1.0	--- U
21. 1,2-Dichloroethane	0.27	1.0	--- U
22. Trichloroethene	0.23	1.0	--- U
23. 1,2-Dichloropropane	0.21	1.0	--- U
24. Bromodichloromethane	0.21	1.0	--- U
25. Cis-1,3-Dichloropropene	0.24	1.0	--- U
26. 4-Methyl-2-Pentanone	1.19	100.0	--- U
27. Toluene	0.23	1.0	--- U
28. trans-1,3-Dichloropropene	0.28	1.0	--- U
29. 1,1,2-Trichloroethane	0.25	1.0	--- U
30. Tetrachloroethene	0.17	1.0	--- U
31. 2-Hexanone	1.57	50.0	--- U
32. Dibromochloromethane	0.24	3.0	--- U
33. 1,2-Dibromoethane	0.26	1.0	--- U
34. Chlorobenzene	0.30	3.0	--- U
35. 1,1,1,2-Tetrachloroethane	0.22	5.0	--- U
36. Ethylbenzene	0.21	1.0	--- U
37. Xylenes	0.68	5.0	--- U
38. Dibromomethane	0.28	10.0	--- U
39. Styrene	0.19	1.0	--- U
40. Bromoform	0.20	3.0	--- U
41. 1,1,2,2-Tetrachloroethane	0.26	3.0	--- U
42. 1,2,3-Trichloropropane	0.43	1.0	--- U
43. 1,4-Dichlorobenzene	0.39	1.0	--- U
44. 1,2-Dichlorobenzene	0.32	5.0	--- U
45. 1,2-Dibromo-3-Chloropropane	0.34	13.0	--- U
46. Acrylonitrile	2.72	200.0	--- U
47. trans-1,4-Dichloro-2-Butene	0.42	100.0	--- U

J = Between MDL and SWSL, U = Below ALL Quanititation Limits.

Environment 1, Inc.
P.O. Box 7085, 114 Oakmont Dr.
Greenville, NC 27858

Phone (252) 756-6208 • Fax (252) 756-0633

CHAIN OF CUSTODY RECORD

CLIENT: 6016 Week: 35

DARE CO. LANDFILL (EAST LAKE)
MR. EDWARD L. MANN
DARE CO. PUBLIC WORKS
P.O. BOX 1000
MANTEO NC 27954

DISINFECTION: ☐ CHLORINE ☐ UV ☐ NONE ☐ _____

SAMPLE LOCATION	COLLECTION DATE	COLLECTION TIME	TOTAL CHLORINE, mg/l AT COLLECTION	TEMPERATURE, °C AT COLLECTION	# OF CONTAINERS	Field pH	TSR	Chloride	Sulfate	Metals	Conductivity	Temperature	Field Parameter	EPA 8260B	8260 Dup. 1	8260 Dup. 2
CHLORINE NEUTRALIZED AT COLLECTION																
pH CHECK (LAB)										12				12	12	12
CONTAINER TYPE, P/G						P	P	P	P	P	P	P		G	G	G
CHEMICAL PRESERVATION						A	A	A	A	A	A	A		E	E	E
Downstream 08	16 12	0855		21	6	■		■	■	■	■	■		■	■	
Well #1 Shallow 08	16 12	0930		19	8	■	■	■	■	■	■	■	■	■	■	■
Well #1 Deep 08	16 12	0920		18	6	■		■	■	■	■	■	■	■	■	
Well #2 Shallow 08	16 12	1140		21	7	■	■	■	■	■	■	■	■	■	■	
Well #2 Deep 08	16 12	1150		20	6	■		■	■	■	■	■	■	■	■	
Well #3 Shallow 08	16 12	1055		20	7	■	■	■	■	■	■	■	■	■	■	
Well #3 Deep 08	16 12	1045		18	6	■		■	■	■	■	■	■	■	■	
Well #4 Shallow 08	16 12	0955		20	7	■	■	■	■	■	■	■	■	■	■	
Well #4 Deep 08	16 12	0945		19	6	■		■	■	■	■	■	■	■	■	
Well #5 Shallow 08	16 12	1030		20	7	■	■	■	■	■	■	■	■	■	■	
Well #5 Deep 08	16 12	1015		20	6	■		■	■	■	■	■	■	■	■	

PARAMETERS

A - NONE
B - HNO_3
C - H_2SO_4
D - NAOH
E - HCL
F - ZINC ACETATE
G - NA THIOSULFATE

CLASSIFICATION:
☐ WASTEWATER (NPDES)
☐ DRINKING WATER
☐ DWQ/GW
☒ SOLID WASTE SECTION

CHAIN OF CUSTODY MAINTAINED DURING SHIPMENT/DELIVERY: Y N

SAMPLES COLLECTED BY: (Please Print) [illegible] Fox

SAMPLES RECEIVED IN LAB AT 06 °C

RELINQUISHED BY (SIG.) (SAMPLER)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
[illegible] 08	16 12	[illegible]	8/14 335
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME

COMMENTS:

PLEASE READ Instructions for completing this form on the reverse side.

Sampler must place a "C" for composite sample or a "G" for Grab sample in the blocks above for each parameter requested.

FORM #5

№ 246790

Environment 1, Inc.
P.O. Box 7085, 114 Oakmont Dr.
Greenville, NC 27858

Phone (252) 756-6208 • Fax (252) 756-0633

CHAIN OF CUSTODY RECORD

CLIENT: 6016 A Week: 35

DARE CO. LANDFILL (EAST LAKE)
MR. EDWARD L. MANN
DARE CO. PUBLIC WORKS
P.O. BOX 1000
MANTEO NC 27954

DISINFECTION: ☐ CHLORINE ☐ UV ☐ NONE ☐ _____

SAMPLE LOCATION	COLLECTION DATE	COLLECTION TIME	TOTAL CHLORINE, mg/l AT COLLECTION	TEMPERATURE, °C AT COLLECTION	# OF CONTAINERS	Field pH	TSR	Chloride	Sulfate	Metals	Conductivity	Temperature	Field Parameter	EPA 8260B	8260 Dup. 1
CHLORINE NEUTRALIZED AT COLLECTION															
pH CHECK (LAB)										12				12	12
CONTAINER TYPE, P/G						P	P	P	P	P	P	P		G	G
CHEMICAL PRESERVATION						A	A	A	A	A	A	A		E	E
Well #6 Shallow					7	■	■	■	■	■	■	■	■	■	■
Well #6 Deep					6	■		■	■	■	■	■	■	■	■
Well #7 Shallow 08	16/12	1130		20	7	G	G	G	G	G	G	G	G	G	G

PARAMETERS

A - NONE
B - HNO_3
C - H_2SO_4
D - NAOH
E - HCL
F - ZINC ACETATE
G - NA THIOSULFATE

CLASSIFICATION:
☐ WASTEWATER (NPDES)
☐ DRINKING WATER
☐ DWQ/GW
☒ SOLID WASTE SECTION

CHAIN OF CUSTODY MAINTAINED DURING SHIPMENT/DELIVERY: (Y) N

SAMPLES COLLECTED BY: (Please Print) [illegible]

SAMPLES RECEIVED IN LAB AT 0.6 °C

RELINQUISHED BY (SIG.) (SAMPLER)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
[illegible]	08/16/12	[illegible]	8/16 1335
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME
RELINQUISHED BY (SIG.)	DATE/TIME	RECEIVED BY (SIG.)	DATE/TIME

COMMENTS: W.65.6D COULD NOT LOCATE (WILL CALL FOR INFO)

PLEASE READ Instructions for completing this form on the reverse side.

Sampler must place a "C" for composite sample or a "G" for Grab sample in the blocks above for each parameter requested.

FORM #5

№ 246789