CDM
5400 Glenwood Avenue, Suite 300
Raleigh, North Carolina 27612
tel: 919 787-5620
fax: 919 781-5730

August 30, 2010

Ms. Christine Ritter
Solid Waste Section
Division of Waste Management
401 Oberlin Road
Suite 150
Raleigh, North Carolina 27605

Subject: Groundwater and Landfill Gas Monitoring Well Installation and Initial Sampling Report
Dare County C&D Landfill - Cell 4 Expansion

Dear Ms. Ritter:

The purpose of this letter is to notify the Solid Waste Section that groundwater monitoring wells GW-16 and GW-17 have been installed adjacent to the recently constructed Dare County C&D Landfill - Cell 4. The wells were installed and located in accordance with the approved Water Quality Monitoring Plan. Each well was slug tested to determine horizontal hydraulic conductivity and initial water quality samples were collected. In addition, landfill gas monitoring wells M-1, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, and -12 were installed and located in accordance with the approved Landfill Gas Monitoring Plan. A summary of the groundwater/landfill gas monitoring well installation, slug testing, and initial sampling is provided below.

Groundwater Monitoring Well Installation and Sampling
Fishburne Drilling, Inc., installed the groundwater monitoring wells on July 7, 2010 under supervision of a CDM geologist. The wells were drilled with a rubber-tire CME 550 ATV rig utilizing hollow-stem drilling methods. The location of the newly installed wells along with the existing monitoring wells is provided on **Figure 1**.

Monitoring well GW-16 was drilled to a depth of 17 feet below land surface (bls) and constructed of 2-inch schedule 40 PVC with 12.5 feet of 0.010-inch slotted screen. Monitoring well GW-17 was drilled to a depth of 13 feet bls and constructed of 2-inch schedule 40 PVC with 10 feet of 0.010-inch slotted screen. Following installation, each well was completed with a 3-foot by 3-foot by 6-inch concrete pad, locking steel protective cover, and well ID placard. Each well was developed to remove fine-grained sediments following well construction and was surveyed by a North Carolina registered land surveyor for horizontal and vertical control. A well construction summary table is presented in **Table 1**. Boring logs and well construction diagrams are attached to this letter report.

Each monitoring well was sampled within 24 hours of development. Prior to sample collection, groundwater elevations were measured in each well and water quality parameters were recorded for pH, conductivity, temperature, turbidity, and oxidation/reduction potential. Water quality parameters measured at sample collection time are provided in **Table 2**.

Groundwater samples were collected from each well on July 8, 2010 and submitted to ENCO Laboratories, Inc. in Cary, North Carolina for analysis of the North Carolina Appendix I Volatile Organic Compounds (VOCs) by EPA Method 8260B, metals by EPA Methods 6010C and 6020A, mercury by EPA Method 7470A, chloride and sulfate by EPA Method 300, alkalinity by EPA Method 310.2, and total dissolved solids by SM 2540C. In addition, each sample, including the trip blank, was analyzed for tetrahydrofuran as a tentatively identified compound (TIC).

All detected VOCs were below the North Carolina 2L Standard (2L). The sample collected from GW-16 had detections of acetone. The sample form GW-17 had detections of 2-butanone and carbon disulfide. Each of the VOC detections were reported as "J" flags, or estimated concentrations. Analysis of tetrahydrofuran as a TIC did not indicate its presence in samples collected from GW-16 and GW-17.

Samples collected from GW-16 and GW-17 had detections of arsenic, chromium, and manganese above their respective 2L Standard. Lead and nickel were detected above the 2L Standard in samples collected from GW-17. In addition, selenium was detected in samples from GW-16 above the 2L Standard. Each well had detections of thallium and vanadium above the Groundwater Protection Standard. Cobalt was detected in samples from GW-17 above the Groundwater Protection Standard. Since GW-16 and GW-17 were recently installed, soil particles are still suspended in the groundwater samples as indicated by the elevated turbidity readings shown in **Table 2**. As the samples were not filtered, the suspended particles most likely account for the detections of metals. It can be expected that metal concentrations will decrease as purging of GW-16 and GW-17 continues as part of semi-annual groundwater sampling activities. Dare County will monitor future sampling events to determine if any trends appear.

Samples collected from GW-16 had detections of total dissolved solids above the 2L Standard. The trip blank had no VOC detections. A summary of the initial sampling results is provided in **Table 2**. Copies of the laboratory data are attached to this letter report.

Landfill Gas Monitoring Well Installation and Initial Monitoring Results
Fishburne Drilling, Inc., installed the methane monitoring wells on July 7 - 9, 2010 under supervision of a CDM geologist. The wells were drilled with a rubber-tire CME 550 ATV rig

utilizing hollow-stem drilling methods. The location of the newly installed wells is provided on **Figure 1**.

All twelve landfill gas monitoring wells were installed to a depth of 7 feet bls and constructed of 2-inch schedule 40 PVC with 5 feet of 0.010-inch slotted screen. Following installation, each well was completed with a 3-foot by 3-foot by 6-inch concrete pad, locking steel protective cover, and well ID placard. Each well was surveyed by a North Carolina registered land surveyor for horizontal and vertical control. A well construction summary table is presented in **Table 1**. Boring logs and well construction diagrams are attached to this letter report.

A GEM 2000 Landfill Gas Analyzer was used to gauge each of the landfill gas monitoring wells on July 9, 2010. Methane was not detected in any of the monitoring wells with the exception of M-11. M-11 had a detection of methane at 0.9% with a lower explosive limit (L.E.L.) of 17%. The detection of methane in M-11 did not exceed 100% of the L.E.L for methane.

Slug Testing

Following installation and development of the new groundwater monitoring wells, a single-well hydraulic conductivity, or slug test, was conducted for each well on July 8, 2010. This test allows for the estimation of the in-situ hydraulic conductivity (K) of the surficial aquifer underlying the site. The test was performed by inserting a solid aluminum slug measuring 1.5 inches by 60 inches into the well and recording the rate at which the water level stabilized. The introduction of the slug (slug-in test) was followed by removal of the slug (slug-out test), when the resultant rate of recovery was also recorded. Water level data were recorded using a pressure transducer and Win-Situ 4 software.

Data from the slug test were analyzed using the Bouwer and Rice (1976) method. Analysis of the data suggested that the slug-out (or rising-head) data were more reliable and less impacted by "noise" caused by surging of groundwater within the filter pack and formation immediately around the well. Analysis of the slug-out data indicates that the horizontal hydraulic conductivity at GW-16 is 7.62 feet/day and 2.20 feet/day at GW-17. The slug-in data indicates that the horizontal hydraulic conductivity at GW-16 is 9.99 feet/day and 3.17 feet/day at GW-17. Raw slug test data, test curves, and interpretations of slug-in/out data for GW-16 and GW-17 are attached to this letter report.

CDM

By submittal of this information (installation and initial sampling of monitoring wells GW-16 and GW-17 and installation and initial readings of methane wells M-1 through M-12) groundwater and methane monitoring criteria necessary to obtain the Permit to Operate for Cell 4 of the Dare County C&D Landfill has been satisfied. If you have any questions or need additional information, please do not hesitate to call me.

Sincerely,

Mat Colone

Mathew F. Colone, P.G.
Camp Dresser & McKee

NORTH CAROLINA
1851
MATHEW F. COLONE

8/30/2010

xc: Ed Mann, Dare County
Ming Chao, P.E., NCDENR
Mike Brinchek, P.E., CDM

NOTES:

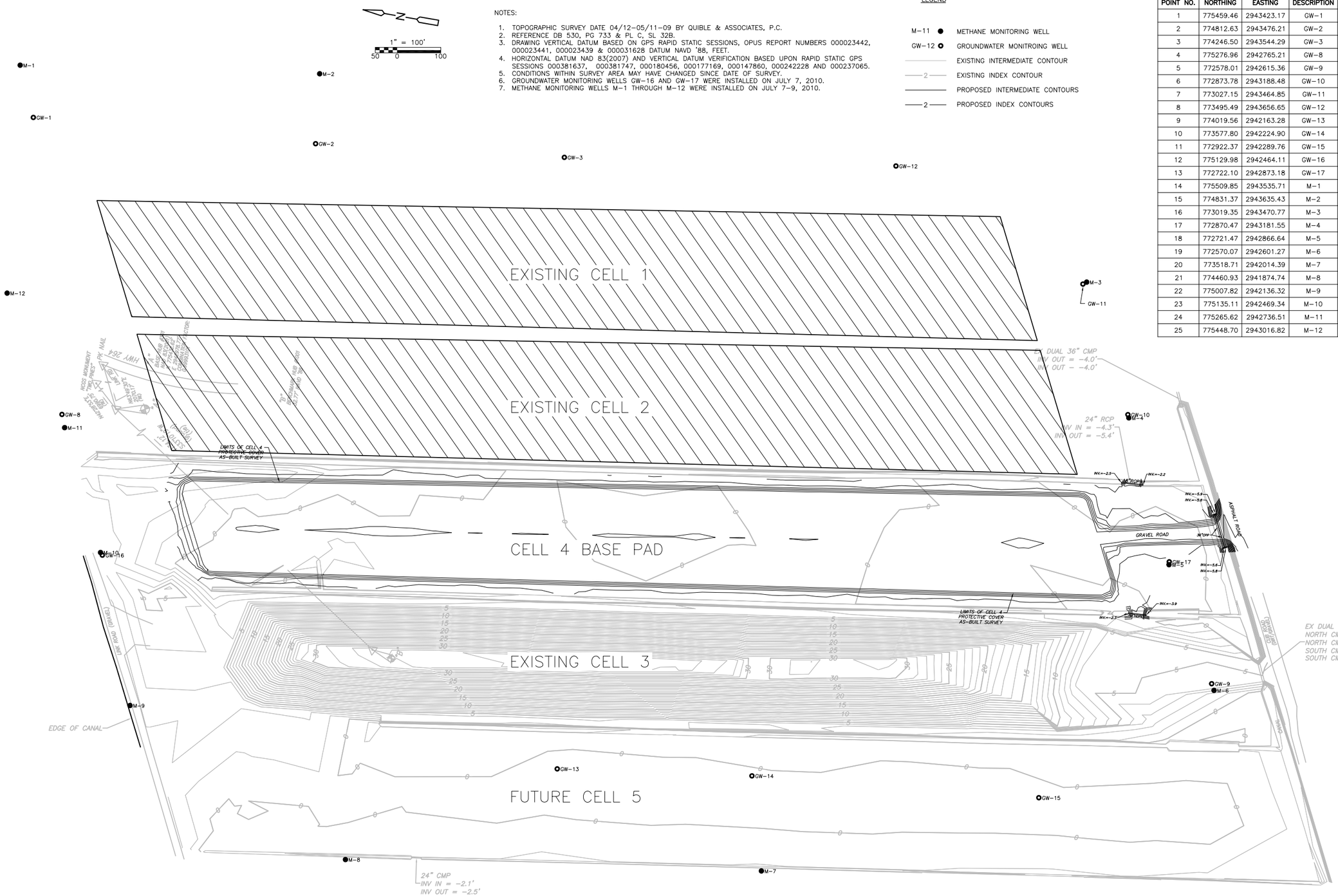
1. TOPOGRAPHIC SURVEY DATE 04/12–05/11–09 BY QUIBLE & ASSOCIATES, P.C.
2. REFERENCE DB 530, PG 733 & PL C, SL 32B.
3. DRAWING VERTICAL DATUM BASED ON GPS RAPID STATIC SESSIONS, OPUS REPORT NUMBERS 000023442, 000023441, 000023439 & 000031628 DATUM NAVD '88, FEET.
4. HORIZONTAL DATUM NAD 83(2007) AND VERTICAL DATUM VERIFICATION BASED UPON RAPID STATIC GPS SESSIONS 000381637, 000381747, 000180456, 000177169, 000147860, 000242228 AND 000237065.
5. CONDITIONS WITHIN SURVEY AREA MAY HAVE CHANGED SINCE DATE OF SURVEY.
6. GROUNDWATER MONITORING WELLS GW–16 AND GW–17 WERE INSTALLED ON JULY 7, 2010.
7. METHANE MONITORING WELLS M–1 THROUGH M–12 WERE INSTALLED ON JULY 7–9, 2010.

LEGEND

M–11 ●	METHANE MONITORING WELL
GW–12 ○	GROUNDWATER MONITROING WELL
	EXISTING INTERMEDIATE CONTOUR
—2—	EXISTING INDEX CONTOUR
	PROPOSED INTERMEDIATE CONTOURS
—2—	PROPOSED INDEX CONTOURS

POINT TABLE

POINT NO.	NORTHING	EASTING	DESCRIPTION	TOP CASING EL.
1	775459.46	2943423.17	GW–1	1.61
2	774812.63	2943476.21	GW–2	1.55
3	774246.50	2943544.29	GW–3	1.74
4	775276.96	2942765.21	GW–8	2.90
5	772578.01	2942615.36	GW–9	3.59
6	772873.78	2943188.48	GW–10	2.87
7	773027.15	2943464.85	GW–11	3.56
8	773495.49	2943656.65	GW–12	2.80
9	774019.56	2942163.28	GW–13	2.96
10	773577.80	2942224.90	GW–14	2.96
11	772922.37	2942289.76	GW–15	3.17
12	775129.98	2942464.11	GW–16	5.56
13	772722.10	2942873.18	GW–17	2.85
14	775509.85	2943535.71	M–1	1.63
15	774831.37	2943635.43	M–2	1.72
16	773019.35	2943470.77	M–3	4.52
17	772870.47	2943181.55	M–4	4.31
18	772721.47	2942866.64	M–5	3.41
19	772570.07	2942601.27	M–6	4.25
20	773518.71	2942014.39	M–7	2.49
21	774460.93	2941874.74	M–8	1.79
22	775007.82	2942136.32	M–9	4.31
23	775135.11	2942469.34	M–10	4.98
24	775265.62	2942736.51	M–11	5.26
25	775448.70	2943016.82	M–12	5.26



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: P. STOUT
DRAWN BY: D. FORBES
SHEET CHK'D BY: P. STOUT
CROSS CHK'D BY: D. FORBES
APPROVED BY:
DATE: AUGUST 2010

CDM
Camp Dresser & McKee
5400 Glenwood Avenue, Suite 300
Raleigh, NC 27612
Tel: (919) 787-5620 Fax: (919) 781-5730
North Carolina Firm Licensure: F-0412
consulting • engineering • construction • operations

DARE COUNTY
NORTH CAROLINA
CONSTRUCTION & DEMOLITION DEBRIS LANDFILL
PHASE IV MONITORING WELL LOCATIONS

EXISTING CONDITIONS

PROJECT NO. 17952 56960
FILE NAME: FIG –1.DWG
SHEET NO.
FIG-1

08/23/10 1:12:19 PM L:\17952-56960\GEO-MAP\100%\C002LFPL.DWG

Table 1
Summary of Monitoring Well Completion Data
Cell 4 C&D Landfill Expansion
Dare County, North Carolina

Well	Completion Date	Drilling Method	Monitoring Interval Lithology	Top of PVC Elevation (feet msl)	Ground Surface Elevation (feet msl)	Borehole Depth (feet bgs)	Screen Interval (feet bgs)	Top of Screen Elevation (feet msl)	Bottom of Screen Elevation (feet msl)	Top of Sand (feet bgs)	Top of Seal (feet bgs)	Borehole Diameter (inches)	Casing Diameter (inches)
GW-16	07-Jul-10	HSA	Surficial	5.56	2.98	17	4.5-17	-1.52	-14.02	3	1	8	2.0
GW-17	07-Jul-10	HSA	Surficial	2.85	0.68	13	3-13	-2.32	-12.32	2	1	8	2.0
M-1	09-Jul-10	HSA	Surficial	1.63	-1.28	7	2-7	-3.28	-8.28	1.5	1	8	2.0
M-2	08-Jul-10	HSA	Surficial	1.72	-0.99	7	2-7	-2.99	-7.99	1.5	1	8	2.0
M-3	09-Jul-10	HSA	Surficial	4.52	1.84	7	2-7	-0.16	-5.16	1.5	1	8	2.0
M-4	09-Jul-10	HSA	Surficial	4.31	1.96	7	2-7	-0.04	-5.04	1.5	1	8	2.0
M-5	07-Jul-10	HSA	Surficial	3.41	0.65	7	2-7	-1.35	-6.35	2	1	8	2.0
M-6	09-Jul-10	HSA	Surficial	4.25	1.59	7	2-7	-0.41	-5.41	1.5	1	8	2.0
M-7	08-Jul-10	HSA	Surficial	2.49	-0.09	7	2-7	-2.09	-7.09	1.5	1	8	2.0
M-8	08-Jul-10	HSA	Surficial	1.79	-0.60	7	2-7	-2.60	-7.60	1.5	1	8	2.0
M-9	08-Jul-10	HSA	Surficial	4.31	1.63	7	2-7	-0.37	-5.37	1.5	1	8	2.0
M-10	07-Jul-10	HSA	Surficial	4.98	2.57	7	2-7	0.57	-4.43	1.5	1	8	2.0
M-11	08-Jul-10	HSA	Surficial	5.26	2.49	7	2-7	0.49	-4.51	1.5	1	8	2.0
M-12	08-Jul-10	HSA	Surficial	5.26	2.23	7	2-7	0.23	-4.77	1.5	1	8	2.0

Notes:

1. MSL - Mean Sea Level
2. BGS - Below Ground Surface
3. HSA - Hollow-Stem Auger
4. GW - Groundwater Monitoring Well
5. M - Methane Monitoring Well

Table 2
Initial Groundwater Sampling Results and Water Quality Parameters
Cell 4 C&D Landfill Expansion
Dare County, North Carolina

		Final Field Parameters						Metals (ug/L)														VOCs (ug/L)			Inorganics (ug/L)			
Well I.D.	Sample Date	pH	Temperature (C)	Conductivity (uS/cm)	Dissolved Oxygen (mg/l)	Turbidity (NTU)	ORP (mv)	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Nickel	Selenium	Thallium	Vanadium	Zinc	Acetone	2-Butanone	Carbon Disulfide	Alkalinity	Chloride	Sulfate	Total Dissolved Solids
NC2L Standard		--	--	--	--	--	--	**10**	**700**	**4***	**2**	**10**	**70***	**1,000**	**15**	**50**	**100**	**20**	**0.28***	**3.5***	**1,000**	**6,000**	**4,000**	**700**	--	**250,000**	**250,000**	**500,000**
SWSL		--	--	--	--	--	--	**10**	**100**	**1**	**1**	**10**	**10**	**10**	**10**	**50**	**50**	**10**	**5.5**	**25**	**60.8**	**100**	**100**	**100**	--	--	**250,000**	--
GW-16	8-Jul-10	6.16	22.36	6,499	4.18	150	-37.1	**27.2**	487	<0.1	0.655J	**31.2**	11.2	4.41J	11.6	**429**	16.2J	**35.6**	**12J**	**33.2**	33.2	7.7J	<1	<0.54	97,000	**2,400,000**	170,000J	**2,400,000**
GW-17	8-Jul-10	6.31	22.32	382	3.39	600	39.7	**120**	565	2.34	1.12	**245**	**118**	74.4	**105**	**1,960**	**186**	<16.6	**8.3J**	**281**	970	17J	2.9J	1.1J	44,000	17,000	57,000J	190,000

Notes:
1. All units are in micrograms per liter (parts per billion).
2. SWSL - Solid Waste Section Limit
3. uS/cm - Microsiemens per Centimeter
4. mg/L - Milligrams per Liter
5. ORP - Oxidation Reduction Potential
6. mV - Millivolts
7. VOCs - Volatile Organic Compounds

Monitoring Well Logs and Drillers Well Completion Records

FIELD BOREHOLE LOG

BOREHOLE NO.: **GW-16**

TOTAL DEPTH: **17'**

PROJECT INFORMATION	DRILLING INFORMATION
PROJECT: **Cell No. 4 C&D Landfill Expansion**	DRILLING CO: **Fishburne Drilling**
SITE LOCATION: **Dare County**	DRILLER: **Tim Donahue**
JOB NO: **17952-44296**	RIG TYPE: **CME 550**
GEOLOGIST: **Mat Colone**	METHOD OF DRILLING: **8" hollow stem auger**
DATE DRILLED: **7/07/2010**	SAMPLING METHODS: **Split Spoon**
	HAMMER WT./DROP: **140 lb., 30 in.**

Depth	Soil Symbol	Soil Description	Sample	Blows/6"	Well Construction	Well Description
0		FILL, SAND, dark brown, fine grained, very loose, moist	S1 (0-2)	1-1-2-2		Above Grade Locking Cover Concrete Bentonite
		FILL, (rock, concrete, brick), moist	S2 (2-4)	4-9-6-5		2-inch Schedule 40 PVC Riser
-5			S3 (4-6)	6-6-9-9		
		SAND, gray,medium grained, very loose to medium dense, wet	S4 (8-10)	10-10-10-10		#2 Silica Sand Filter Pack
-10						2-inch Schedule 40 PVC Screen from 4.5' to 17' bls
-15			S5 (13-15)	1-2-1-2		

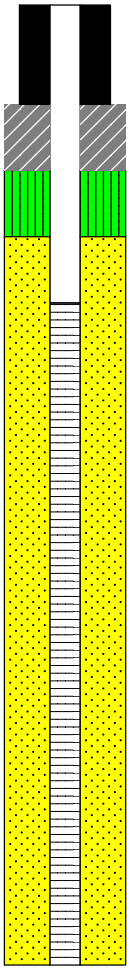
Notes: Water Encountered at 4' Below Land Surface

FIELD BOREHOLE LOG

BOREHOLE NO.: **GW-17**

TOTAL DEPTH: **15'**

PROJECT INFORMATION	DRILLING INFORMATION
PROJECT: **Cell No. 4 C&D Landfill Expansion**	DRILLING CO: **Fishburne Drilling**
SITE LOCATION: **Dare County**	DRILLER: **Tim Donahue**
JOB NO: **17952-44296**	RIG TYPE: **CME 550**
GEOLOGIST: **Mat Colone**	METHOD OF DRILLING: **8" hollow stem auger**
DATE DRILLED: **7/07/2010**	SAMPLING METHODS: **Split Spoon**
	HAMMER WT./DROP: **140 lb., 30 in.**

Depth	Soil Symbol	Soil Description	Sample	Blows/6" (Recovery)	Well Construction	Well Description
0		SAND, dark brown, fine grained, loose, moist	S1 (0-2)	2-3-3-3 (3")		Above Grade Locking Cover Concrete Bentonite 2-inch Schedule 40 PVC Riser
		SAND, trace SILT, gray, very fine grained, some mottling, loose, moist to wet	S2 (2-4)	2-3-2-4 (18")		
-5			S3 (4-6)	2-4-4-5 (20")		
		SAND, dark gray, fine grained, loose, wet				#2 Silica Sand Filter Pack
			S4 (8-10)	2-2-3-4 (12")		
-10						2-inch Schedule 40 PVC Screen from 3' to 13' bls
		CLAY and SILT, gray, very soft, wet				
-15			S5 (13-15)	WOH (12")		

Notes: Water Encountered at 4' Below Land Surface

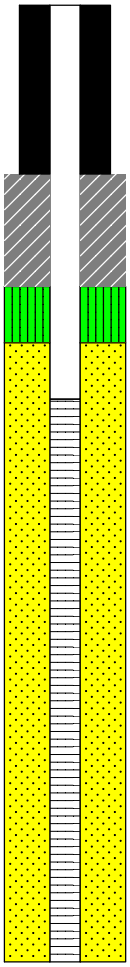
FIELD BOREHOLE LOG

BOREHOLE NO.: **M-1**

TOTAL DEPTH: **7'**

PROJECT INFORMATION	DRILLING INFORMATION
PROJECT: **Methane Well Installation**	DRILLING CO: **Fishburne Drilling**
SITE LOCATION: **Dare County**	DRILLER: **Tim Donahue**
JOB NO: **17952-44296**	RIG TYPE: **CME 550**
GEOLOGIST: **Aaron Weispfenning**	METHOD OF DRILLING: **8" hollow stem auger**
DATE DRILLED: **7/09/2010**	SAMPLING METHODS: **Split Spoon**
	HAMMER WT./DROP: **140 lb., 30 in.**

Depth	Soil Symbol	Soil Description	Sample	Blows/6"	Well Construction	Well Description
0		SAND, dark brown to gray, fine grained, moist				Above Grade Locking Cover Concrete 2-inch Schedule 40 PVC Riser Bentonite #2 Silica Sand Filter Pack 2-inch Schedule 40 PVC Screen from 2' to 7' bls
-5						



Notes:

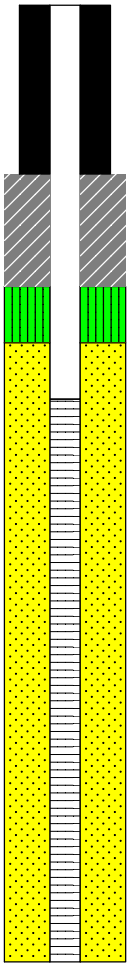
FIELD BOREHOLE LOG

BOREHOLE NO.: **M-2**

TOTAL DEPTH: **7'**

PROJECT INFORMATION	DRILLING INFORMATION
PROJECT: **Methane Well Installation**	DRILLING CO: **Fishburne Drilling**
SITE LOCATION: **Dare County**	DRILLER: **Tim Donahue**
JOB NO: **17952-44296**	RIG TYPE: **CME 550**
GEOLOGIST: **Aaron Weispfenning**	METHOD OF DRILLING: **8" hollow stem auger**
DATE DRILLED: **7/08/2010**	SAMPLING METHODS: **Split Spoon**
	HAMMER WT./DROP: **140 lb., 30 in.**

Depth	Soil Symbol	Soil Description	Sample	Blows/6"	Well Construction	Well Description
0		SAND, dark brown to gray, fine grained, moist				Above Grade Locking Cover Concrete 2-inch Schedule 40 PVC Riser Bentonite #2 Silica Sand Filter Pack 2-inch Schedule 40 PVC Screen from 2' to 7' bls
-5						



Notes:

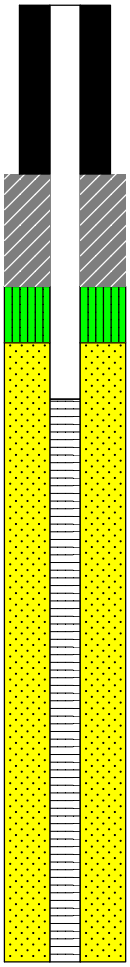
FIELD BOREHOLE LOG

BOREHOLE NO.: **M-3**

TOTAL DEPTH: **7'**

PROJECT INFORMATION	DRILLING INFORMATION
PROJECT: **Methane Well Installation**	DRILLING CO: **Fishburne Drilling**
SITE LOCATION: **Dare County**	DRILLER: **Tim Donahue**
JOB NO: **17952-44296**	RIG TYPE: **CME 550**
GEOLOGIST: **Aaron Weispfenning**	METHOD OF DRILLING: **8" hollow stem auger**
DATE DRILLED: **7/09/2010**	SAMPLING METHODS: **Split Spoon**
	HAMMER WT./DROP: **140 lb., 30 in.**

Depth	Soil Symbol	Soil Description	Sample	Blows/6"	Well Construction	Well Description
0		SAND, dark brown to gray, fine grained, moist				Above Grade Locking Cover Concrete 2-inch Schedule 40 PVC Riser Bentonite #2 Silica Sand Filter Pack 2-inch Schedule 40 PVC Screen from 2' to 7' bls
-5						



Notes:

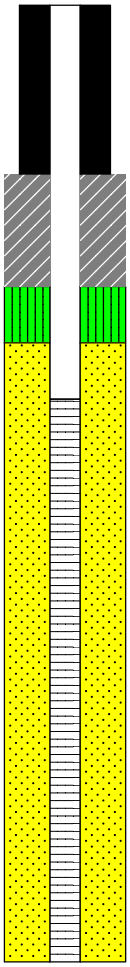
FIELD BOREHOLE LOG

BOREHOLE NO.: **M-4**

TOTAL DEPTH: **7'**

PROJECT INFORMATION	DRILLING INFORMATION
PROJECT: **Methane Well Installation**	DRILLING CO: **Fishburne Drilling**
SITE LOCATION: **Dare County**	DRILLER: **Tim Donahue**
JOB NO: **17952-44296**	RIG TYPE: **CME 550**
GEOLOGIST: **Aaron Weispfenning**	METHOD OF DRILLING: **8" hollow stem auger**
DATE DRILLED: **7/09/2010**	SAMPLING METHODS: **Split Spoon**
	HAMMER WT./DROP: **140 lb., 30 in.**

Depth	Soil Symbol	Soil Description	Sample	Blows/6"	Well Construction	Well Description
0		SAND, dark brown to gray, fine grained, moist				Above Grade Locking Cover Concrete 2-inch Schedule 40 PVC Riser Bentonite #2 Silica Sand Filter Pack 2-inch Schedule 40 PVC Screen from 2' to 7' bls
-5						



Notes:

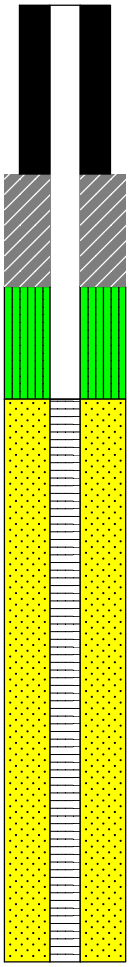
FIELD BOREHOLE LOG

BOREHOLE NO.: **M-5**

TOTAL DEPTH: **7'**

PROJECT INFORMATION	DRILLING INFORMATION
PROJECT: **Methane Well Installation**	DRILLING CO: **Fishburne Drilling**
SITE LOCATION: **Dare County**	DRILLER: **Tim Donahue**
JOB NO: **17952-44296**	RIG TYPE: **CME 550**
GEOLOGIST: **Mat Colone**	METHOD OF DRILLING: **8" hollow stem auger**
DATE DRILLED: **7/07/2010**	SAMPLING METHODS: **Split Spoon**
	HAMMER WT./DROP: **140 lb., 30 in.**

Depth	Soil Symbol	Soil Description	Sample	Blows/6"	Well Construction	Well Description
0		SAND, dark brown to gray, fine grained, moist				Above Grade Locking Cover Concrete 2-inch Schedule 40 PVC Riser Bentonite #2 Silica Sand Filter Pack 2-inch Schedule 40 PVC Screen from 2' to 7' bls
-5						



Notes:

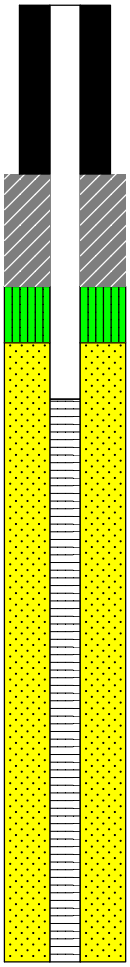
FIELD BOREHOLE LOG

BOREHOLE NO.: **M-6**

TOTAL DEPTH: **7'**

PROJECT INFORMATION	DRILLING INFORMATION
PROJECT: **Methane Well Installation**	DRILLING CO: **Fishburne Drilling**
SITE LOCATION: **Dare County**	DRILLER: **Tim Donahue**
JOB NO: **17952-44296**	RIG TYPE: **CME 550**
GEOLOGIST: **Aaron Weispfenning**	METHOD OF DRILLING: **8" hollow stem auger**
DATE DRILLED: **7/09/2010**	SAMPLING METHODS: **Split Spoon**
	HAMMER WT./DROP: **140 lb., 30 in.**

Depth	Soil Symbol	Soil Description	Sample	Blows/6"	Well Construction	Well Description
0		SAND, dark brown to gray, fine grained, moist				Above Grade Locking Cover Concrete 2-inch Schedule 40 PVC Riser Bentonite #2 Silica Sand Filter Pack 2-inch Schedule 40 PVC Screen from 2' to 7' bls
-5						



Notes:

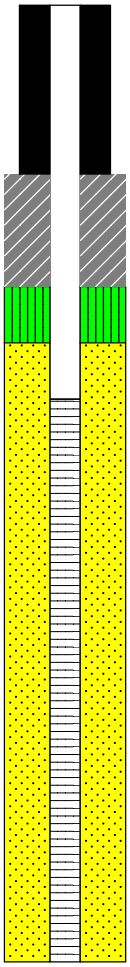
FIELD BOREHOLE LOG

BOREHOLE NO.: **M-7**

TOTAL DEPTH: **7'**

PROJECT INFORMATION	DRILLING INFORMATION
PROJECT: **Methane Well Installation**	DRILLING CO: **Fishburne Drilling**
SITE LOCATION: **Dare County**	DRILLER: **Tim Donahue**
JOB NO: **17952-44296**	RIG TYPE: **CME 550**
GEOLOGIST: **Aaron Weispfenning**	METHOD OF DRILLING: **8" hollow stem auger**
DATE DRILLED: **7/08/2010**	SAMPLING METHODS: **Split Spoon**
	HAMMER WT./DROP: **140 lb., 30 in.**

Depth	Soil Symbol	Soil Description	Sample	Blows/6"	Well Construction	Well Description
0		SAND, dark brown to gray, fine grained, moist				Above Grade Locking Cover Concrete 2-inch Schedule 40 PVC Riser Bentonite #2 Silica Sand Filter Pack 2-inch Schedule 40 PVC Screen from 2' to 7' bls
-5						



Notes:

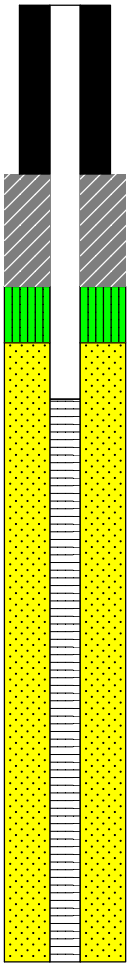
FIELD BOREHOLE LOG

BOREHOLE NO.: **M-8**

TOTAL DEPTH: **7'**

PROJECT INFORMATION	DRILLING INFORMATION
PROJECT: **Methane Well Installation**	DRILLING CO: **Fishburne Drilling**
SITE LOCATION: **Dare County**	DRILLER: **Tim Donahue**
JOB NO: **17952-44296**	RIG TYPE: **CME 550**
GEOLOGIST: **Aaron Weispfenning**	METHOD OF DRILLING: **8" hollow stem auger**
DATE DRILLED: **7/08/2010**	SAMPLING METHODS: **Split Spoon**
	HAMMER WT./DROP: **140 lb., 30 in.**

Depth	Soil Symbol	Soil Description	Sample	Blows/6"	Well Construction	Well Description
0		SAND, dark brown to gray, fine grained, moist				Above Grade Locking Cover Concrete 2-inch Schedule 40 PVC Riser Bentonite #2 Silica Sand Filter Pack 2-inch Schedule 40 PVC Screen from 2' to 7' bls
-5						



Notes:

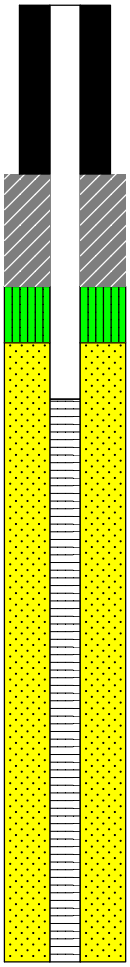
FIELD BOREHOLE LOG

BOREHOLE NO.: **M-9**

TOTAL DEPTH: **7'**

PROJECT INFORMATION	DRILLING INFORMATION
PROJECT: **Methane Well Installation**	DRILLING CO: **Fishburne Drilling**
SITE LOCATION: **Dare County**	DRILLER: **Tim Donahue**
JOB NO: **17952-44296**	RIG TYPE: **CME 550**
GEOLOGIST: **Aaron Weispfenning**	METHOD OF DRILLING: **8" hollow stem auger**
DATE DRILLED: **7/08/2010**	SAMPLING METHODS: **Split Spoon**
	HAMMER WT./DROP: **140 lb., 30 in.**

Depth	Soil Symbol	Soil Description	Sample	Blows/6"	Well Construction	Well Description
0		SAND, dark brown to gray, fine grained, moist				Above Grade Locking Cover Concrete 2-inch Schedule 40 PVC Riser Bentonite #2 Silica Sand Filter Pack 2-inch Schedule 40 PVC Screen from 2' to 7' bls
-5						



Notes:

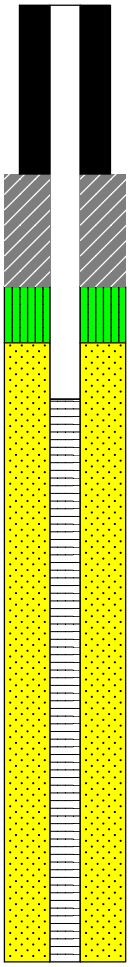
FIELD BOREHOLE LOG

BOREHOLE NO.: **M-10**

TOTAL DEPTH: **7'**

PROJECT INFORMATION	DRILLING INFORMATION
PROJECT: **Methane Well Installation**	DRILLING CO: **Fishburne Drilling**
SITE LOCATION: **Dare County**	DRILLER: **Tim Donahue**
JOB NO: **17952-44296**	RIG TYPE: **CME 550**
GEOLOGIST: **Mat Colone**	METHOD OF DRILLING: **8" hollow stem auger**
DATE DRILLED: **7/07/2010**	SAMPLING METHODS: **Split Spoon**
	HAMMER WT./DROP: **140 lb., 30 in.**

Depth	Soil Symbol	Soil Description	Sample	Blows/6"	Well Construction	Well Description
0		SAND, dark brown to gray, fine grained, moist				Above Grade Locking Cover Concrete 2-inch Schedule 40 PVC Riser Bentonite #2 Silica Sand Filter Pack 2-inch Schedule 40 PVC Screen from 2' to 7' bls
-5						



Notes:

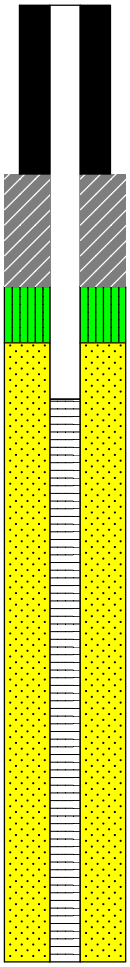
FIELD BOREHOLE LOG

BOREHOLE NO.: **M-11**

TOTAL DEPTH: **7'**

PROJECT INFORMATION	DRILLING INFORMATION
PROJECT: **Methane Well Installation**	DRILLING CO: **Fishburne Drilling**
SITE LOCATION: **Dare County**	DRILLER: **Tim Donahue**
JOB NO: **17952-44296**	RIG TYPE: **CME 550**
GEOLOGIST: **Aaron Weispfenning**	METHOD OF DRILLING: **8" hollow stem auger**
DATE DRILLED: **7/08/2010**	SAMPLING METHODS: **Split Spoon**
	HAMMER WT./DROP: **140 lb., 30 in.**

Depth	Soil Symbol	Soil Description	Sample	Blows/6"	Well Construction	Well Description
0		SAND, dark brown to gray, fine grained, moist				Above Grade Locking Cover Concrete 2-inch Schedule 40 PVC Riser Bentonite #2 Silica Sand Filter Pack 2-inch Schedule 40 PVC Screen from 2' to 7' bls
-5						



Notes:

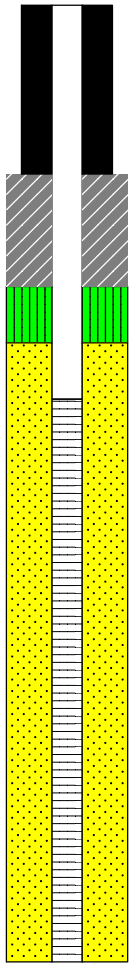
FIELD BOREHOLE LOG

BOREHOLE NO.: **M-12**

TOTAL DEPTH: **7'**

PROJECT INFORMATION	DRILLING INFORMATION
PROJECT: **Methane Well Installation**	DRILLING CO: **Fishburne Drilling**
SITE LOCATION: **Dare County**	DRILLER: **Tim Donahue**
JOB NO: **17952-44296**	RIG TYPE: **CME 550**
GEOLOGIST: **Aaron Weispfenning**	METHOD OF DRILLING: **8" hollow stem auger**
DATE DRILLED: **7/08/2010**	SAMPLING METHODS: **Split Spoon**
	HAMMER WT./DROP: **140 lb., 30 in.**

Depth	Soil Symbol	Soil Description	Sample	Blows/6"	Well Construction	Well Description
0		SAND, dark brown to gray, fine grained, moist				Above Grade Locking Cover Concrete 2-inch Schedule 40 PVC Riser Bentonite #2 Silica Sand Filter Pack 2-inch Schedule 40 PVC Screen from 2' to 7' bls
-5						



Notes:

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources - Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 3263-A

1. WELL CONTRACTOR:

Timothy Warren Donahue
Well Contractor (Individual) Name

FISHBURNE DRILLING INC.
Well Contractor Company Name

STREET ADDRESS 3219 S. MILITARY HWY

Chesapeake VA. 23323
City or Town State Zip Code

(757) 487-0066
Area code- Phone number

2. WELL INFORMATION:

SITE WELL ID #(if applicable) GW-16

STATE WELL PERMIT#(if applicable)

DWQ or OTHER PERMIT #(if applicable)

WELL USE (Check Applicable Box) Monitoring [X] Municipal/Public [ ]
Industrial/Commercial [ ] Agricultural [ ] Recovery [ ] Injection [ ]
Irrigation [ ] Other [ ] (list use)

DATE DRILLED July 8th 2010

TIME COMPLETED _____ AM [ ] PM [ ]

3. WELL LOCATION:

CITY: Manns Harbor COUNTY Dare Co

Bear RD.
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:
[ ] Slope [ ] Valley [X] Flat [ ] Ridge [ ] Other
(check appropriate box)

LATITUDE 35° 50' 03.90
LONGITUDE -75° 48' 59.27

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: [ ] GPS [X] Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

4. FACILITY - is the name of the business where the well is located.

FACILITY ID #(if applicable)

NAME OF FACILITY Landfill / Dare Co., N.C

STREET ADDRESS Cub RD.

N.C.
City or Town State Zip Code

CONTACT PERSON Mr. Matt Cologne

MAILING ADDRESS CDM 5400 Glenwood ave
Suite 300 Raleigh N.C. 27612
City or Town State Zip Code

(919) 325-3569
Area code - Phone number

5. WELL DETAILS:

a. TOTAL DEPTH: 17'

b. DOES WELL REPLACE EXISTING WELL? YES [ ] NO [X]

c. WATER LEVEL Below Top of Casing: 6 FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 2 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. YIELD (gpm): _____ METHOD OF TEST _____

f. DISINFECTION: Type _____ Amount _____

g. WATER ZONES (depth):

From	To	From	To

6. CASING:

From	To	Ft.	Diameter	Thickness/ Weight	Material
0	5		2"	40	PVC

7. GROUT:

From	To	Ft.	Material	Method
0	1		grout	pour
1'	3'		Bentonite	pour

8. SCREEN:

From	To	Ft.	Diameter in.	Slot Size in.	Material
5	17'		2	0.10	PVC

9. SAND/GRAVEL PACK:

From	To	Ft.	Size	Material
3'	17		#2	Sand

10. DRILLING LOG

From	To	Formation Description
0	7'	Top Soil
7'	17'	Brown gray sand

11. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR 7/15/2010 DATE

Timothy Warren Donahue
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit the original to the Division of Water Quality within 30 days. Attn: Information Mgt
1617 Mail Service Center - Raleigh, NC [illegible]

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 3263-A

1. WELL CONTRACTOR:

Timothy Warren Donahue
Well Contractor (Individual) Name

FISHBurne DRilling INC.
Well Contractor Company Name

STREET ADDRESS 3219 S. mill HARY Hwy

Chesapeake VA. 23323
City or Town State Zip Code

(757) 487-0066
Area code- Phone number

2. WELL INFORMATION:

SITE WELL ID #(if applicable) GW-17

STATE WELL PERMIT#(if applicable)

DWQ or OTHER PERMIT #(if applicable)

WELL USE (Check Applicable Box) Monitoring [X] Municipal/Public ☐ Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐ Irrigation ☐ Other ☐ (list use)

DATE DRILLED July 8th 2010

TIME COMPLETED _____ AM ☐ PM ☐

3. WELL LOCATION:

CITY: Manns Harbor COUNTY Dare Co

Bear RD.
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley [X] Flat ☐ Ridge ☐ Other
(check appropriate box)

LATITUDE 35°50'03.90
LONGITUDE 75°48'59.27

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: ☐ GPS [X] Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

4. FACILITY- is the name of the business where the well is located.

FACILITY ID #(if applicable)

NAME OF FACILITY Landfill / Dare Co., N.C

STREET ADDRESS Cub RD.

N.C.
City or Town State Zip Code

CONTACT PERSON Mr. Matt Cologne

MAILING ADDRESS CDM 5400 Glenwood ave
Suite 300 Raleigh N.C. 27612
City or Town State Zip Code

(919) 325-3569
Area code - Phone number

5. WELL DETAILS:

a. TOTAL DEPTH: 15'

b. DOES WELL REPLACE EXISTING WELL? YES ☐ NO [X]

c. WATER LEVEL Below Top of Casing: 6 FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 2 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. YIELD (gpm): _____ METHOD OF TEST _____

f. DISINFECTION: Type _____ Amount _____

g. WATER ZONES (depth):

From	To	From	To

6. CASING:

From	To	Depth Ft.	Diameter	Thickness/ Weight	Material
0	5		2"	40	PVC

7. GROUT:

From	To	Depth Ft.	Material	Method
0	2		grout	Pour
2	3		Bentonite	Pour

8. SCREEN:

From	To	Depth Ft.	Diameter in.	Slot Size in.	Material
5	15		2	0.10	PVC

9. SAND/GRAVEL PACK:

From	To	Depth Ft.	Size	Material
3	15		#2	Sand

10. DRILLING LOG

From	To	Formation Description
0	9"	Top Soil
9"	15'	Brown Sand

11. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR 7/15/2010 DATE

Timothy Warren Donahue
PRINTED NAME OF PERSON CONSTRUCTING THE WELL

Submit the original to the Division of Water Quality within 30 days. Attn: Information Mgt
1617 Mail Service Center – Raleigh, NC 27699-1617

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 3263-A

1. WELL CONTRACTOR:
Timothy Warren Donahue
Well Contractor (Individual) Name
Fishburne Drilling Inc.
Well Contractor Company Name
STREET ADDRESS 3219 S. Mill Hary Hwy
Chesapeake VA. 23323
City or Town State Zip Code
(757) 487-0066
Area code- Phone number

2. WELL INFORMATION:
SITE WELL ID #(if applicable) M-1
STATE WELL PERMIT #(if applicable)
DWQ or OTHER PERMIT #(if applicable)
WELL USE (Check Applicable Box) Monitoring ☒ Municipal/Public ☐
Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐
Irrigation ☐ Other ☐ (list use)
DATE DRILLED July 8th 2010
TIME COMPLETED AM ☐ PM ☐

3. WELL LOCATION:
CITY: Manns Harbor COUNTY Dare Co
Bear Rd.
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley ☒ Flat ☐ Ridge ☐ Other
(check appropriate box)
LATITUDE 35°50'03.90
LONGITUDE 75°48'59.27
May be in degrees, minutes, seconds or in a decimal format
Latitude/longitude source: ☐ GPS ☒ Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

4. FACILITY- is the name of the business where the well is located.
FACILITY ID #(if applicable)
NAME OF FACILITY Landfill / Dare Co., N.C
STREET ADDRESS Cub Rd.
N.C.
City or Town State Zip Code
CONTACT PERSON Mr. Matt Cologne
MAILING ADDRESS CDM 5400 Glenwood Ave
Suite 300 Raleigh N.C. 27612
City or Town State Zip Code
(919) 325-3569
Area code - Phone number

5. WELL DETAILS:
a. TOTAL DEPTH: 7'
b. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
c. WATER LEVEL Below Top of Casing: 5' FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 2 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.
e. YIELD (gpm): METHOD OF TEST
f. DISINFECTION: Type Amount
g. WATER ZONES (depth):
From To From To
From To From To
From To From To

6. CASING:

From	To	Ft.	Diameter	Thickness/Weight	Material
0	2		2"	.10	PVC

7. GROUT:

From	To	Ft.	Material	Method
0	1'		Portland	Pour

8. SCREEN:

From	To	Ft.	Diameter in.	Slot Size in.	Material
2	7		2 in.	.010 in.	PVC
			in.	in.	
			in.	in.	

9. SAND/GRAVEL PACK:

From	To	Ft.	Size	Material
1'	7'		#2	Sand

10. DRILLING LOG

From	To	Formation Description
0	6"	Top Soil
6"	7'	Brown Sand

11. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR 7/15/2010 DATE
Timothy Warren Donahue

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 3263-A

1. WELL CONTRACTOR:
Timothy Warren Donahue
Well Contractor (Individual) Name
FISHBURNE DRILLING INC.
Well Contractor Company Name
STREET ADDRESS 3219 S. MILITARY HWY
Chesapeake VA. 23323
City or Town State Zip Code
(757) 487-0066
Area code- Phone number

2. WELL INFORMATION:
SITE WELL ID #(if applicable) M-2
STATE WELL PERMIT#(if applicable)
DWQ or OTHER PERMIT #(if applicable)
WELL USE (Check Applicable Box) Monitoring [X] Municipal/Public ☐
Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐
Irrigation ☐ Other ☐ (list use)
DATE DRILLED July 8th 2010
TIME COMPLETED _____ AM ☐ PM ☐

3. WELL LOCATION:
CITY: Manns Harbor COUNTY Dare Co
Bear RD.
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley [X] Flat ☐ Ridge ☐ Other
(check appropriate box)
LATITUDE 35° 50' 03.90
LONGITUDE -75° 48' 59.27
May be in degrees, minutes, seconds or in a decimal format
Latitude/longitude source: ☐ GPS [X] Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

4. FACILITY- is the name of the business where the well is located.
FACILITY ID #(if applicable)
NAME OF FACILITY Landfill / Dare Co. N.C
STREET ADDRESS Cub RD.
N.C.
City or Town State Zip Code
CONTACT PERSON Mr. Matt Cologne
MAILING ADDRESS CDM 5400 Glenwood Ave
Suite 300 Raleigh N.C. 27612
City or Town State Zip Code
(919) 325-3569
Area code - Phone number

5. WELL DETAILS:
a. TOTAL DEPTH: 7'
b. DOES WELL REPLACE EXISTING WELL? YES ☐ NO [X]
c. WATER LEVEL Below Top of Casing: 5' FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 2 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.
e. YIELD (gpm): _____ METHOD OF TEST
f. DISINFECTION: Type _____ Amount
g. WATER ZONES (depth):
From To From To
From To From To
From To From To

6. CASING:

From	To	Depth	Diameter	Thickness/ Weight	Material
0	2	Ft.	2"	.110	PVC
		Ft.			
		Ft.			

7. GROUT:

From	To	Depth	Material	Method
0	1'	Ft.	Portland	Pour
		Ft.		
		Ft.		

8. SCREEN:

From	To	Depth	Diameter	Slot Size	Material
2	7	Ft.	2 in.	.010 in.	PVC
		Ft.	in.	in.	
		Ft.	in.	in.	

9. SAND/GRAVEL PACK:

From	To	Depth	Size	Material
1'	7'	Ft.	#2	Sand
		Ft.		
		Ft.		

10. DRILLING LOG

From	To	Formation Description
0	6"	Top Soil
6"	7'	Brown Sand

11. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR 7/15/2010 DATE
Timothy Warren Donahue

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 3263-A

1. WELL CONTRACTOR:
Timothy Warren Donahue
Well Contractor (Individual) Name
FISHBURNE DRILLING INC.
Well Contractor Company Name
STREET ADDRESS 3219 S. MILITARY HWY
Chesapeake VA. 23323
City or Town State Zip Code
(757) 487-0066
Area code- Phone number

2. WELL INFORMATION:
SITE WELL ID #(if applicable) M-3
STATE WELL PERMIT#(if applicable)
DWQ or OTHER PERMIT #(if applicable)
WELL USE (Check Applicable Box) Monitoring [X] Municipal/Public [ ]
Industrial/Commercial [ ] Agricultural [ ] Recovery [ ] Injection [ ]
Irrigation [ ] Other [ ] (list use)
DATE DRILLED July 8th 2010
TIME COMPLETED AM [ ] PM [ ]

3. WELL LOCATION:
CITY: Manns Harbor COUNTY Dare Co
Bear RD.
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
TOPOGRAPHIC / LAND SETTING:
[ ] Slope [ ] Valley [X] Flat [ ] Ridge [ ] Other
(check appropriate box)
LATITUDE 35°50'63.90
LONGITUDE 75°48'59.27
May be in degrees, minutes, seconds or in a decimal format
Latitude/longitude source: [ ] GPS [X] Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

4. FACILITY- is the name of the business where the well is located.
FACILITY ID #(if applicable)
NAME OF FACILITY Landfill / Dare Co., N.C
STREET ADDRESS Cub RD.
N.C.
City or Town State Zip Code
CONTACT PERSON Mr. Matt Cologne
MAILING ADDRESS CDM 5400 Glenwood ave
Suite 300 Raleigh N.C. 27612
City or Town State Zip Code
(919) 325-3569
Area code - Phone number

5. WELL DETAILS:
a. TOTAL DEPTH: 7'
b. DOES WELL REPLACE EXISTING WELL? YES [ ] NO [X]
c. WATER LEVEL Below Top of Casing: 5' FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 2 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.
e. YIELD (gpm): METHOD OF TEST
f. DISINFECTION: Type Amount
g. WATER ZONES (depth):
From To From To
From To From To
From To From To

6. CASING:

	Depth		Diameter	Thickness/ Weight	Material
From 0	To 2	Ft.	2"	.90	PVC
From	To	Ft.			
From	To	Ft.			

7. GROUT:

	Depth		Material	Method
From 0	To 1'	Ft.	Portland	Pour
From	To	Ft.		
From	To	Ft.		

8. SCREEN:

	Depth		Diameter	Slot Size	Material
From 2	To 7	Ft.	2 in.	010 in.	PVC
From	To	Ft.	in.	in.	
From	To	Ft.	in.	in.	

9. SAND/GRAVEL PACK:

Depth			Size	Material
From 1'	To 7'	Ft.	#2	Sand
From	To	Ft.		
From	To	Ft.		

10. DRILLING LOG

From	To	Formation Description
0	6"	Top Soil
6"	7'	Brown Sand

11. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR DATE 7/15/2010
Timothy Warren Donahue

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 3263-A

1. WELL CONTRACTOR:

Timothy Warren Donahue
Well Contractor (Individual) Name

FISHBURNE DRILLING INC.
Well Contractor Company Name

STREET ADDRESS 3219 S. MILITARY HWY
Chesapeake VA. 23323
City or Town State Zip Code

(757) 487-0066
Area code- Phone number

2. WELL INFORMATION:

SITE WELL ID #(if applicable) M-4

STATE WELL PERMIT #(if applicable)

DWQ or OTHER PERMIT #(if applicable)

WELL USE (Check Applicable Box) Monitoring ☒ Municipal/Public ☐

Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐

Irrigation ☐ Other ☐ (list use)

DATE DRILLED July 8th 2010

TIME COMPLETED _____ AM ☐ PM ☐

3. WELL LOCATION:

CITY: Manns Harbor COUNTY Dare Co

Bear RD.
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:

☐ Slope ☐ Valley ☒ Flat ☐ Ridge ☐ Other
(check appropriate box)

LATITUDE 35°50'63.90
LONGITUDE 25°48'59.27

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: ☐ GPS ☒ Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

4. FACILITY: is the name of the business where the well is located.

FACILITY ID #(if applicable)

NAME OF FACILITY Landfill / Dare Co., N.C

STREET ADDRESS Cub RD.
N.C.
City or Town State Zip Code

CONTACT PERSON Mr. Matt Cologne

MAILING ADDRESS CDM 5400 Glenwood Ave
Suite 300 Raleigh N.C. 27612
City or Town State Zip Code

(919) 325-3569
Area code - Phone number

5. WELL DETAILS:

a. TOTAL DEPTH: 7'

b. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒

c. WATER LEVEL Below Top of Casing: 5' FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 2 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. YIELD (gpm): _____ METHOD OF TEST _____

f. DISINFECTION: Type _____ Amount _____

g. WATER ZONES (depth):

From ____ To ____ From ____ To ____
From ____ To ____ From ____ To ____
From ____ To ____ From ____ To ____

6. CASING:

	Depth		Diameter	Thickness/ Weight	Material
From 0	To 2	Ft.	2"	.190	PVC
From	To	Ft.			
From	To	Ft.			

7. GROUT:

	Depth		Material	Method
From 0	To 1'	Ft.	Portland	Pour
From	To	Ft.		
From	To	Ft.		

8. SCREEN:

	Depth		Diameter	Slot Size	Material
From 2	To 7	Ft.	2 in.	.010 in.	PVC
From	To	Ft.	in.	in.	
From	To	Ft.	in.	in.	

9. SAND/GRAVEL PACK:

Depth			Size	Material
From 1'	To 7'	Ft.	#2	Sand
From	To	Ft.		
From	To	Ft.		

10. DRILLING LOG

From	To	Formation Description
0	6"	Top Soil
6"	7'	Brown Sand

11. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR 7/15/2010 DATE

Timothy Warren Donahue

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 3263-A

1. WELL CONTRACTOR:
Timothy Warren Donahue
Well Contractor (Individual) Name
FISHBURNE DRILLING INC.
Well Contractor Company Name
STREET ADDRESS 3219 S. MILITARY HWY
Chesapeake VA. 23323
City or Town State Zip Code
(757) 487-0066
Area code- Phone number

2. WELL INFORMATION:
SITE WELL ID #(if applicable) M-5
STATE WELL PERMIT#(if applicable)
DWQ or OTHER PERMIT #(if applicable)
WELL USE (Check Applicable Box) Monitoring ☒ Municipal/Public ☐
Industrial/Commercial ☐ Agricultural (I) Recovery (I) Injection (I)
Irrigation ☐ Other (I) (list use)
DATE DRILLED July 8th 2010
TIME COMPLETED AM ☐ PM ☐

3. WELL LOCATION:
CITY: Manns Harbor COUNTY Dare Co
Bear RD.
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley ☒ Flat ☐ Ridge ☐ Other
(check appropriate box)
LATITUDE 35°50'03.90
LONGITUDE 75°48'59.27
May be in degrees, minutes, seconds or in a decimal format
Latitude/longitude source: ☐ GPS ☒ Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

4. FACILITY- is the name of the business where the well is located.
FACILITY ID #(if applicable)
NAME OF FACILITY Landfill / Dare Co., N.C
STREET ADDRESS Cub RD.
N.C.
City or Town State Zip Code
CONTACT PERSON Mr. Matt Cologne
MAILING ADDRESS CDM 5400 Glenwood ave
Suite 300 Raleigh N.C. 27612
City or Town State Zip Code
(919) 325-3569
Area code - Phone number

5. WELL DETAILS:
a. TOTAL DEPTH: 7'
b. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
c. WATER LEVEL Below Top of Casing: 5' FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 2 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.
e. YIELD (gpm): METHOD OF TEST
f. DISINFECTION: Type Amount
g. WATER ZONES (depth):
From To From To
From To From To
From To From To

6. CASING:

From	To	Depth	Diameter	Thickness/ Weight	Material
0	2	Ft.	2"	.40	PVC
		Ft.			
		Ft.			

7. GROUT:

From	To	Depth	Material	Method
0	1'	Ft.	Portland	Pour
		Ft.		
		Ft.		

8. SCREEN:

From	To	Depth	Diameter	Slot Size	Material
2	7	Ft.	2 in.	.010 in.	PVC
		Ft. in.		in.	
		Ft. in.		in.	

9. SAND/GRAVEL PACK:

From	To	Depth	Size	Material
1'	7'	Ft.	#2	Sand
		Ft.		
		Ft.		

10. DRILLING LOG

From	To	Formation Description
0	6"	Top Soil
6"	7'	Brown Sand

11. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR 7/15/2010 DATE
Timothy Warren Donahue

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 3263-A

1. WELL CONTRACTOR:
Timothy Warren Donahue
Well Contractor (Individual) Name
FISHBurne DRilling INC.
Well Contractor Company Name
STREET ADDRESS 3219 S. mill HARY Hwy
Chesapeake VA. 23323
City or Town State Zip Code
(757) 487-0066
Area code- Phone number

2. WELL INFORMATION:
SITE WELL ID #(if applicable) M-6
STATE WELL PERMIT#(if applicable)
DWQ or OTHER PERMIT #(if applicable)
WELL USE (Check Applicable Box) Monitoring [X] Municipal/Public ☐
Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐
Irrigation ☐ Other ☐ (list use)
DATE DRILLED July 8th 2010
TIME COMPLETED AM ☐ PM ☐

3. WELL LOCATION:
CITY: Manns Harbor COUNTY Dare Co
Bear RD.
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley [X] Flat ☐ Ridge ☐ Other
(check appropriate box)
LATITUDE 35°50'63.90
LONGITUDE 75°48'59.27
May be in degrees, minutes, seconds or in a decimal format
Latitude/longitude source: ☐ GPS [X] Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

4. FACILITY- is the name of the business where the well is located.
FACILITY ID #(if applicable)
NAME OF FACILITY Landfill / Dare Co., N.C
STREET ADDRESS Cub RD.
N.C.
City or Town State Zip Code
CONTACT PERSON Mr. Matt Cologne
MAILING ADDRESS CDM 5400 Glenwood Ave
Suite 300 Raleigh N.C. 27612
City or Town State Zip Code
(919) 325-3569
Area code - Phone number

5. WELL DETAILS:
a. TOTAL DEPTH: 7'
b. DOES WELL REPLACE EXISTING WELL? YES ☐ NO [X]
c. WATER LEVEL Below Top of Casing: 5' FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 2 FT. Above Land Surface*
*Top of casing terminated after below land surface may require a variance in accordance with 15A NCAC 2C .0118.
e. YIELD (gpm): METHOD OF TEST
f. DISINFECTION: Type Amount
g. WATER ZONES (depth):
From To From To
From To From To
From To From To

6. CASING:

	Depth		Diameter	Thickness/ Weight	Material
From 0	To 2	Ft.	2"	.90	PVC
From	To	Ft.			
From	To	Ft.			

7. GROUT:

	Depth		Material	Method
From 0	To 1'	Ft.	Portland	Pour
From	To	Ft.		
From	To	Ft.		

8. SCREEN:

	Depth		Diameter	Slot Size	Material
From 2	To 7	Ft.	2 in.	.010 in.	PVC
From	To	Ft.	in.	in.	
From	To	Ft.	in.	in.	

9. SAND/GRAVEL PACK:

	Depth		Size	Material
From 1'	To 7'	Ft.	#2	Sand
From	To	Ft.		
From	To	Ft.		

10. DRILLING LOG

From	To	Formation Description
0	6"	Top Soil
6"	7'	Brown Sand

11. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR 7/15/2010 DATE
Timothy Warren Donahue

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 3263-A

1. WELL CONTRACTOR:

Timothy Warren Donahue
Well Contractor (Individual) Name

FISHBURNE DRILLING INC.
Well Contractor Company Name

STREET ADDRESS 3219 S. MILLITARY HWY

Chesapeake VA. 23323
City or Town State Zip Code

(757) 487-0066
Area code- Phone number

2. WELL INFORMATION:

SITE WELL ID #(if applicable) M-7

STATE WELL PERMIT#(if applicable)

DWQ or OTHER PERMIT #(if applicable)

WELL USE (Check Applicable Box) Monitoring ☒ Municipal/Public ☐

Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐

Irrigation ☐ Other ☐ (list use)

DATE DRILLED July 8th 2010

TIME COMPLETED _____ AM ☐ PM ☐

3. WELL LOCATION:

CITY: Manns Harbor COUNTY Dare Co

Bear RD.
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:

☐ Slope ☐ Valley ☒ Flat ☐ Ridge ☐ Other
(check appropriate box)

LATITUDE 35° 50' 63.90

LONGITUDE 25° 48' 59.27

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: ☐ GPS ☒ Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

4. FACILITY- is the name of the business where the well is located.

FACILITY ID #(if applicable)

NAME OF FACILITY Landfill / Dare Co., N.C

STREET ADDRESS Cub RD.

N.C.
City or Town State Zip Code

CONTACT PERSON Mr. Matt Cologne

MAILING ADDRESS CDM 5400 Glenwood ave

Suite 300 Raleigh N.C. 27612
City or Town State Zip Code

(919) 325-3569
Area code - Phone number

5. WELL DETAILS:

a. TOTAL DEPTH: 7'

b. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒

c. WATER LEVEL Below Top of Casing: 5' FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 2 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. YIELD (gpm): _____ METHOD OF TEST _____

f. DISINFECTION: Type _____ Amount _____

g. WATER ZONES (depth):

From ____ To ____ From ____ To ____
From ____ To ____ From ____ To ____
From ____ To ____ From ____ To ____

6. CASING:

	Depth	Diameter	Thickness/ Weight	Material
From 0	To 2 Ft.	2"	.190	PVC
From ____	To ____ Ft.			
From ____	To ____ Ft.			

7. GROUT:

	Depth	Material	Method
From 0	To 1' Ft.	Portland	Pour
From ____	To ____ Ft.		
From ____	To ____ Ft.		

8. SCREEN:

	Depth	Diameter	Slot Size	Material
From 2	To 7 Ft.	2 in.	.010 in.	PVC
From ____	To ____ Ft.	in.	in.	
From ____	To ____ Ft.	in.	in.	

9. SAND/GRAVEL PACK:

	Depth	Size	Material
From 1'	To 7' Ft.	#2	Sand
From ____	To ____ Ft.		
From ____	To ____ Ft.		

10. DRILLING LOG

From	To	Formation Description
0	6"	Top Soil
6"	7'	Brown Sand

11. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR 7/15/2010 DATE

Timothy Warren Donahue

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 3263-A

1. WELL CONTRACTOR:
Timothy Warren Donahue
Well Contractor (Individual) Name
FISHBURNE DRILLING INC.
Well Contractor Company Name
STREET ADDRESS 3219 S. MILITARY HWY
Chesapeake VA. 23323
City or Town State Zip Code
(757) 487-0066
Area code- Phone number

2. WELL INFORMATION:
SITE WELL ID #(if applicable) M-8
STATE WELL PERMIT#(if applicable)
DWQ or OTHER PERMIT #(if applicable)
WELL USE (Check Applicable Box) Monitoring [X] Municipal/Public ☐
Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐
Irrigation ☐ Other ☐ (list use)
DATE DRILLED July 8th 2010
TIME COMPLETED AM ☐ PM ☐

3. WELL LOCATION:
CITY: Manns Harbor COUNTY Dare Co
Bear RD.
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley [X] Flat ☐ Ridge ☐ Other
(check appropriate box)
LATITUDE 35°50'03.90
LONGITUDE 75°48'59.27
May be in degrees, minutes, seconds or in a decimal format
Latitude/longitude source: ☐ GPS [X] Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

4. FACILITY- is the name of the business where the well is located.
FACILITY ID #(if applicable)
NAME OF FACILITY Landfill / Dare Co., N.C
STREET ADDRESS Cub RD.
N.C.
City or Town State Zip Code
CONTACT PERSON Mr. Matt Cologne
MAILING ADDRESS CDM 5400 Glenwood ave
Suite 300 Raleigh N.C. 27612
City or Town State Zip Code
(919) 325-3569
Area code - Phone number

5. WELL DETAILS:
a. TOTAL DEPTH: 7'
b. DOES WELL REPLACE EXISTING WELL? YES ☐ NO [X]
c. WATER LEVEL Below Top of Casing: 5' FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 2 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.
e. YIELD (gpm): METHOD OF TEST
f. DISINFECTION: Type Amount
g. WATER ZONES (depth):
From To From To
From To From To
From To From To

6. CASING:

	Depth		Diameter	Thickness/ Weight	Material
From 0	To 2	Ft.	2"	.40	PVC
From	To	Ft.			
From	To	Ft.			

7. GROUT:

	Depth		Material	Method
From 0	To 1'	Ft.	Portland	Pour
From	To	Ft.		
From	To	Ft.		

8. SCREEN:

	Depth		Diameter	Slot Size	Material
From 2	To 7	Ft.	2 in.	.010 in.	PVC
From	To	Ft.	in.	in.	
From	To	Ft.	in.	in.	

9. SAND/GRAVEL PACK:

	Depth		Size	Material
From 1'	To 7'	Ft.	#2	Sand
From	To	Ft.		
From	To	Ft.		

10. DRILLING LOG

From	To	Formation Description
0	6"	Top Soil
6"	7'	Brown Sand

11. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR 7/15/2010 DATE
Timothy Warren Donahue

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 3263-A

1. WELL CONTRACTOR:
Timothy Warren Donahue
Well Contractor (Individual) Name
FISHBURNE DRILLING INC.
Well Contractor Company Name
STREET ADDRESS 3219 S. MILLITARY HWY
Chesapeake VA. 23323
City or Town State Zip Code
757-487-0066
Area code- Phone number

2. WELL INFORMATION:
SITE WELL ID #(if applicable) M-9
STATE WELL PERMIT#(if applicable)
DWQ or OTHER PERMIT #(if applicable)
WELL USE (Check Applicable Box) Monitoring [X] Municipal/Public ☐
Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐
Irrigation ☐ Other ☐ (list use)
DATE DRILLED July 8th 2010
TIME COMPLETED AM ☐ PM ☐

3. WELL LOCATION:
CITY: Manns Harbor COUNTY Dare Co
Bear RD.
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley [X] Flat ☐ Ridge ☐ Other
(check appropriate box)
LATITUDE 35° 50' 03.90
LONGITUDE 75° 48' 59.27
May be in degrees, minutes, seconds or in a decimal format
Latitude/longitude source: ☐ GPS [X] Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

4. FACILITY- is the name of the business where the well is located.
FACILITY ID #(if applicable)
NAME OF FACILITY Landfill / Dare Co. N.C
STREET ADDRESS Cub RD.
N.C.
City or Town State Zip Code
CONTACT PERSON Mr. Matt Cologne
MAILING ADDRESS CDM 5400 Glenwood ave
Suite 300 Raleigh N.C. 27612
City or Town State Zip Code
919-325-3569
Area code - Phone number

5. WELL DETAILS:
a. TOTAL DEPTH: 7'
b. DOES WELL REPLACE EXISTING WELL? YES ☐ NO [X]
c. WATER LEVEL Below Top of Casing: 5' FT.
(Use "+" If Above Top of Casing)

d. TOP OF CASING IS 2 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.
e. YIELD (gpm): METHOD OF TEST
f. DISINFECTION: Type Amount
g. WATER ZONES (depth):
From To From To
From To From To
From To From To

6. CASING:

	Depth From	Depth To	Diameter	Thickness/ Weight	Material
	0	2	2"	.40	PVC

7. GROUT:

	Depth From	Depth To	Material	Method
	0	1'	Portland	Pour

8. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	2	7	2 in.	.010 in.	PVC
			in.	in.	
			in.	in.	

9. SAND/GRAVEL PACK:

	Depth From	Depth To	Size	Material
	1'	7'	#2	Sand

10. DRILLING LOG

From	To	Formation Description
0	6"	Top Soil
6"	7'	Brown Sand

11. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR 7/15/2010 DATE
Timothy Warren Donahue

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 3263-A

1. WELL CONTRACTOR:
Timothy Warren Donahue
Well Contractor (Individual) Name
FISHBURNE DRILLING INC.
Well Contractor Company Name
STREET ADDRESS 3219 S. MILITARY HWY
Chesapeake VA. 23323
City or Town State Zip Code
(757) 487-0066
Area code- Phone number

2. WELL INFORMATION:
SITE WELL ID #(if applicable) M-10
STATE WELL PERMIT #(if applicable)
DWQ or OTHER PERMIT #(if applicable)
WELL USE (Check Applicable Box) Monitoring [X] Municipal/Public ☐
Industrial/Commercial ☐ Agricultural ☐ Recovery ☐ Injection ☐
Irrigation ☐ Other ☐ (list use)
DATE DRILLED July 8th 2010
TIME COMPLETED AM ☐ PM ☐

3. WELL LOCATION:
CITY: Manns Harbor COUNTY Dare Co
Bear RD.
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
TOPOGRAPHIC / LAND SETTING:
☐ Slope ☐ Valley [X] Flat ☐ Ridge ☐ Other
(check appropriate box)
LATITUDE 35° 50' 03.90
LONGITUDE 75° 48' 59.27
May be in degrees, minutes, seconds or in a decimal format
Latitude/longitude source: ☐ GPS [X] Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

4. FACILITY- is the name of the business where the well is located.
FACILITY ID #(if applicable)
NAME OF FACILITY Landfill / Dare Co., N.C
STREET ADDRESS Cub RD.
N.C.
City or Town State Zip Code
CONTACT PERSON Mr. Matt Cologne
MAILING ADDRESS CDM 5400 Glenwood ave
Suite 300 Raleigh N.C. 27612
City or Town State Zip Code
(919) 325-3569
Area code - Phone number

5. WELL DETAILS:
a. TOTAL DEPTH: 7'
b. DOES WELL REPLACE EXISTING WELL? YES ☐ NO [X]
c. WATER LEVEL Below Top of Casing: 5' FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 2 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.
e. YIELD (gpm): METHOD OF TEST
f. DISINFECTION: Type Amount
g. WATER ZONES (depth):
From To From To
From To From To
From To From To

6. CASING:

	Depth		Diameter	Thickness/ Weight	Material
From 0	To 2	Ft.	2"	.190	PVC
From	To	Ft.			
From	To	Ft.			

7. GROUT:

	Depth		Material	Method
From 0	To 1'	Ft.	Portland	Pour
From	To	Ft.		
From	To	Ft.		

8. SCREEN:

	Depth		Diameter	Slot Size	Material
From 2	To 7	Ft.	2 in.	010 in.	PVC
From	To	Ft.	in.	in.	
From	To	Ft.	in.	in.	

9. SAND/GRAVEL PACK:

	Depth		Size	Material
From 1'	To 7'	Ft.	#2	Sand
From	To	Ft.		
From	To	Ft.		

10. DRILLING LOG

From	To	Formation Description
0	6"	Top Soil
6"	7'	Brown Sand

11. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR 7/15/2010 DATE
Timothy Warren Donahue

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 3263-A

1. WELL CONTRACTOR:
Timothy Warren Donahue
Well Contractor (Individual) Name
FISHBurne DRilling INC.
Well Contractor Company Name
STREET ADDRESS 3219 S. mill ITARY Hwy
CHesapeaKe VA. 23323
City or Town State Zip Code
(757) 487-0066
Area code- Phone number

2. WELL INFORMATION:
SITE WELL ID #(if applicable) M-11
STATE WELL PERMIT#(if applicable)
DWQ or OTHER PERMIT #(if applicable)
WELL USE (Check Applicable Box) Monitoring [X] Municipal/Public [ ]
Industrial/Commercial [ ] Agricultural [ ] Recovery [ ] Injection [ ]
Irrigation [ ] Other [ ] (list use)
DATE DRILLED July 8th 2010
TIME COMPLETED _____ AM [ ] PM [ ]

3. WELL LOCATION:
CITY: Manns Harbor COUNTY Dare Co
Bear RD.
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)
TOPOGRAPHIC / LAND SETTING:
[ ] Slope [ ] Valley [X] Flat [ ] Ridge [ ] Other
(check appropriate box)
LATITUDE 35° 50' 63.90
LONGITUDE 75° 48' 59.27
May be in degrees, minutes, seconds or in a decimal format
Latitude/longitude source: [ ] GPS [X] Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

4. FACILITY- is the name of the business where the well is located.
FACILITY ID #(if applicable)
NAME OF FACILITY Landfill / Dare Co., N.C
STREET ADDRESS Cub RD.
N.C.
City or Town State Zip Code
CONTACT PERSON Mr. Matt Cologne
MAILING ADDRESS CDM 5400 Glenwood ave
Suite 300 Raleigh N.C. 27612
City or Town State Zip Code
(919) 325-3569
Area code - Phone number

5. WELL DETAILS:
a. TOTAL DEPTH: 7'
b. DOES WELL REPLACE EXISTING WELL? YES [ ] NO [X]
c. WATER LEVEL Below Top of Casing: 5' FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 2 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.
e. YIELD (gpm): _____ METHOD OF TEST _____
f. DISINFECTION: Type _____ Amount _____
g. WATER ZONES (depth):
From ____ To ____ From ____ To ____
From ____ To ____ From ____ To ____
From ____ To ____ From ____ To ____

6. CASING:

	Depth		Diameter	Thickness/ Weight	Material
From 0	To 2	Ft.	2"	.130	PVC
From ____	To ____	Ft.			
From ____	To ____	Ft.			

7. GROUT:

	Depth		Material	Method
From 0	To 1'	Ft.	Portland	Pour
From ____	To ____	Ft.		
From ____	To ____	Ft.		

8. SCREEN:

	Depth		Diameter	Slot Size	Material
From 2	To 7	Ft.	2 in.	0.10 in.	PVC
From ____	To ____	Ft.	in.	in.	
From ____	To ____	Ft.	in.	in.	

9. SAND/GRAVEL PACK:

	Depth		Size	Material
From 1'	To 7'	Ft.	#2	Sand
From ____	To ____	Ft.		
From ____	To ____	Ft.		

10. DRILLING LOG

From	To	Formation Description
0	6"	Top Soil
6"	7'	Brown Sand

11. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR 7/15/2010 DATE
Timothy Warren Donahue

NON RESIDENTIAL WELL CONSTRUCTION RECORD

North Carolina Department of Environment and Natural Resources- Division of Water Quality

WELL CONTRACTOR CERTIFICATION # 3263-A

1. WELL CONTRACTOR:

Timothy Warren Donahue
Well Contractor (Individual) Name

FISHBURNE DRILLING INC.
Well Contractor Company Name

STREET ADDRESS 3219 S. MILLITARY HWY
Chesapeake VA. 23323
City or Town State Zip Code

(757) 487-0066
Area code- Phone number

2. WELL INFORMATION:

SITE WELL ID #(if applicable) M-12

STATE WELL PERMIT #(if applicable)

DWQ or OTHER PERMIT #(if applicable)

WELL USE (Check Applicable Box) Monitoring [X] Municipal/Public [ ]
Industrial/Commercial [ ] Agricultural [ ] Recovery [ ] Injection [ ]
Irrigation [ ] Other [ ] (list use)

DATE DRILLED July 8th 2010

TIME COMPLETED _____ AM [ ] PM [ ]

3. WELL LOCATION:

CITY: Manns Harbor COUNTY Dare Co

Bear RD.
(Street Name, Numbers, Community, Subdivision, Lot No., Parcel, Zip Code)

TOPOGRAPHIC / LAND SETTING:
[ ] Slope [ ] Valley [X] Flat [ ] Ridge [ ] Other
(check appropriate box)

LATITUDE 35°50'63.90
LONGITUDE 75°48'59.27

May be in degrees, minutes, seconds or in a decimal format

Latitude/longitude source: [ ] GPS [X] Topographic map
(location of well must be shown on a USGS topo map and attached to this form if not using GPS)

4. FACILITY- is the name of the business where the well is located.

FACILITY ID #(if applicable)

NAME OF FACILITY Landfill / Dare Co., N.C

STREET ADDRESS Cub RD.

N.C.
City or Town State Zip Code

CONTACT PERSON Mr. Matt Cologne

MAILING ADDRESS CDM 5400 Glenwood ave
Suite 300 Raleigh N.C. 27612
City or Town State Zip Code

(919) 325-3569
Area code - Phone number

5. WELL DETAILS:

a. TOTAL DEPTH: 7'

b. DOES WELL REPLACE EXISTING WELL? YES [ ] NO [X]

c. WATER LEVEL Below Top of Casing: 5' FT.
(Use "+" if Above Top of Casing)

d. TOP OF CASING IS 2 FT. Above Land Surface*
*Top of casing terminated at/or below land surface may require a variance in accordance with 15A NCAC 2C .0118.

e. YIELD (gpm): _____ METHOD OF TEST _____

f. DISINFECTION: Type _____ Amount _____

g. WATER ZONES (depth):

From	To	From	To

6. CASING:

From	To	Depth Ft.	Diameter	Thickness/ Weight	Material
0	2		2"	.90	PVC

7. GROUT:

From	To	Depth Ft.	Material	Method
0	1'		Portland	Pour

8. SCREEN:

From	To	Depth Ft.	Diameter in.	Slot Size in.	Material
2	7		2 in.	.010 in.	PVC
			in.	in.	
			in.	in.	

9. SAND/GRAVEL PACK:

From	To	Depth Ft.	Size	Material
1'	7'		#2	Sand

10. DRILLING LOG

From	To	Formation Description
0	6"	Top Soil
6"	7'	Brown Sand

11. REMARKS:

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CERTIFIED WELL CONTRACTOR 7/15/2010 DATE

Timothy Warren Donahue

Groundwater Analytical Laboratory Data

Environmental Conservation Laboratories, Inc.
102-A Woodwinds Industrial Court
Cary NC, 27511
Phone: 919.467.3090 FAX: 919.467.3515
www.encolabs.com

Wednesday, August 18, 2010

CDM (CD004)

Attn: Dan Forbes

5400 GLENWOOD AVE SUITE 300

RALEIGH, NC 27612-

RE: Laboratory Results for
Project Number: [none], Project Name/Desc: Dare County C&D
ENCO Workorder: C007931

Dear Dan Forbes,

Enclosed is a copy of your laboratory report for test samples received by our laboratory on Monday, July 12, 2010.

Unless otherwise noted in an attached project narrative, all samples were received in acceptable condition and processed in accordance with the referenced methods/procedures. Results for these procedures apply only to the samples as submitted.

The analytical results contained in this report are in compliance with NELAC standards, except as noted in the project narrative. This report shall not be reproduced except in full, without the written approval of the Laboratory.

This report contains only those analyses performed by Environmental Conservation Laboratories. Unless otherwise noted, all analyses were performed at ENCO Cary. Data from outside organizations will be reported under separate cover.

If you have any questions or require further information, please do not hesitate to contact me.

Sincerely,

Chuck Smith

Project Manager

Enclosure(s)

The total number of pages in this report, including this page is 30.

PROJECT NARRATIVE

Client: CDM (CD004)
Project: Dare County C&D
Lab ID: C007931

Overview

Environmental Conservation Laboratories, Inc. (ENCO) analyzed all submitted samples in accordance with the methods referenced in the laboratory report. Any particular difficulties encountered during sample handling by ENCO are discussed in the QC Remarks section below.

Quality Control Samples

No Comments

Quality Control Remarks

No Comments

Other Comments

Samples 2803-GW16, 2803-GW17 and the Trip Blank were searched for the presence of Tetrahydrofuran as a Tentatively Identified Compound (TIC). It was not found in any of the the three samples.

The analytical data presented in this report are consistent with the methods as referenced in the analytical report. Any exceptions or deviations are noted in the QC remarks section of this narrative or in the Flags/Notes and Definitions section of the report.

Released By:
Environmental Conservation Laboratories, Inc.

Chuck Smith
Project Manager

www.encolabs.com

SAMPLE SUMMARY/LABORATORY CHRONICLE

Client ID: 2803-GW16	Lab ID: C007931-01	Sampled: 07/08/10 10:30	Received: 07/12/10 10:30

Parameter	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 310.2	07/22/10	07/14/10 06:46	7/14/2010 07:39
EPA 6010C	01/04/11	07/14/10 12:47	7/15/2010 11:53
EPA 6020A	01/04/11	07/14/10 13:51	7/19/2010 10:28
EPA 7470A	08/05/10	07/14/10 10:48	7/14/2010 15:58
EPA 8260B	07/22/10	07/14/10 15:15	7/15/2010 09:59
SM 2540C	07/15/10	07/14/10 10:26	7/14/2010 10:26

Client ID: 2803-GW16	Lab ID: C007931-01RE1	Sampled: 07/08/10 10:30	Received: 07/12/10 10:30

Parameter	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 300.0	08/05/10	07/19/10 07:27	7/20/2010 08:52

Client ID: 2803-GW16	Lab ID: C007931-01RE2	Sampled: 07/08/10 10:30	Received: 07/12/10 10:30

Parameter	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 300.0	08/05/10	07/19/10 07:27	7/20/2010 09:11

Client ID: 2803-GW17	Lab ID: C007931-02	Sampled: 07/08/10 11:15	Received: 07/12/10 10:30

Parameter	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 300.0	08/05/10	07/19/10 07:27	7/19/2010 22:44
EPA 310.2	07/22/10	07/14/10 06:46	7/14/2010 07:43
EPA 6010C	01/04/11	07/14/10 12:47	7/15/2010 12:04
EPA 6020A	01/04/11	07/14/10 13:51	7/19/2010 10:46
EPA 7470A	08/05/10	07/14/10 10:48	7/14/2010 16:13
EPA 8260B	07/22/10	07/14/10 15:15	7/15/2010 10:29
SM 2540C	07/15/10	07/14/10 10:26	7/14/2010 10:26

Client ID: 2803-TripBlank	Lab ID: C007931-03	Sampled: 07/08/10 10:30	Received: 07/12/10 10:30

Parameter	Hold Date/Time(s)	Prep Date/Time(s)	Analysis Date/Time(s)
EPA 8260B	07/22/10	07/14/10 15:15	7/15/2010 10:59

www.encolabs.com

NORTH CAROLINA SWS SAMPLE DETECTION SUMMARY

Client ID: 2803-GW16 **Lab ID: C007931-01**

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
Acetone	7.7	J	1	1.5	5.0	100	ug/L	EPA 8260B	
Arsenic - Total	27.2		1	2.80	10.0	10	ug/L	EPA 6010C	
Barium - Total	487		1	1.00	10.0	100	ug/L	EPA 6010C	
Cadmium - Total	0.655	J	1	0.360	1.00	1	ug/L	EPA 6010C	
Chromium - Total	31.2		1	1.00	10.0	10	ug/L	EPA 6010C	
Cobalt - Total	11.2		1	1.10	10.0	10	ug/L	EPA 6010C	
Copper - Total	4.41	J	1	1.60	10.0	10	ug/L	EPA 6010C	
Iron - Total	64500		1	22.0	50.0	300	ug/L	EPA 6010C	
Lead - Total	11.6		1	1.90	10.0	10	ug/L	EPA 6010C	
Manganese - Total	429		1	1.10	10.0	50	ug/L	EPA 6010C	
Nickel - Total	16.2	J	1	1.80	10.0	50	ug/L	EPA 6010C	
Selenium - Total	35.6	D	20	16.6	20.0	10	ug/L	EPA 6020A	
Thallium - Total	12.0	JD	20	2.20	20.0	5.5	ug/L	EPA 6020A	
Total Alkalinity	97000		1	8000	15000	NE	ug/L	EPA 310.2	
Total Dissolved Solids	2400000		1	10000	10000	NE	ug/L	SM 2540C	
Vanadium - Total	33.2		1	1.40	10.0	25	ug/L	EPA 6010C	
Zinc - Total	60.8		1	3.80	10.0	10	ug/L	EPA 6010C	

Client ID: 2803-GW16 **Lab ID: C007931-01RE1**

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
Sulfate as SO4	170000	JD	4	480	20000	250000	ug/L	EPA 300.0	

Client ID: 2803-GW16 **Lab ID: C007931-01RE2**

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
Chloride	2400000	D	50	900	250000	NE	ug/L	EPA 300.0	

Client ID: 2803-GW17 **Lab ID: C007931-02**

Analyte	Results	Flag	DF	MDL	MRL	NC SWSL	Units	Method	Notes
2-Butanone	2.9	J	1	1.0	5.0	100	ug/L	EPA 8260B	
Acetone	17	J	1	1.5	5.0	100	ug/L	EPA 8260B	
Arsenic - Total	120		1	2.80	10.0	10	ug/L	EPA 6010C	
Barium - Total	565		1	1.00	10.0	100	ug/L	EPA 6010C	
Beryllium - Total	2.34		1	0.100	1.00	1	ug/L	EPA 6010C	
Cadmium - Total	1.12		1	0.360	1.00	1	ug/L	EPA 6010C	
Carbon disulfide	1.1	J	1	0.54	5.0	100	ug/L	EPA 8260B	
Chloride	17000		1	18	5000	NE	ug/L	EPA 300.0	
Chromium - Total	245		1	1.00	10.0	10	ug/L	EPA 6010C	
Cobalt - Total	118		1	1.10	10.0	10	ug/L	EPA 6010C	
Copper - Total	74.4		1	1.60	10.0	10	ug/L	EPA 6010C	
Iron - Total	210000		1	22.0	50.0	300	ug/L	EPA 6010C	
Lead - Total	105		1	1.90	10.0	10	ug/L	EPA 6010C	
Manganese - Total	1960		1	1.10	10.0	50	ug/L	EPA 6010C	
Nickel - Total	186		1	1.80	10.0	50	ug/L	EPA 6010C	
Sulfate as SO4	57000	J	1	120	5000	250000	ug/L	EPA 300.0	
Thallium - Total	8.30	JD	20	2.20	20.0	5.5	ug/L	EPA 6020A	
Total Alkalinity	44000		1	8000	15000	NE	ug/L	EPA 310.2	
Total Dissolved Solids	190000		1	10000	10000	NE	ug/L	SM 2540C	
Vanadium - Total	281		1	1.40	10.0	25	ug/L	EPA 6010C	
Zinc - Total	970		1	3.80	10.0	10	ug/L	EPA 6010C	

www.encolabs.com

ANALYTICAL RESULTS

Description: 2803-GW16 | **Lab Sample ID:** C007931-01 | **Received:** 07/12/10 10:30

Matrix: Ground Water | **Sampled:** 07/08/10 10:30 | **Work Order:** C007931

Project: Dare County C&D | **Sampled By:** Aaron Weispfenning

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
1,1,1,2-Tetrachloroethane [630-20-6] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	07/15/10 09:59	JKG	
1,1,1-Trichloroethane [71-55-6] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
1,1,2,2-Tetrachloroethane [79-34-5] ^	0.33	U	ug/L	1	0.33	1.0	3	EPA 8260B	07/15/10 09:59	JKG	
1,1,2-Trichloroethane [79-00-5] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
1,1-Dichloroethane [75-34-3] ^	0.33	U	ug/L	1	0.33	1.0	5	EPA 8260B	07/15/10 09:59	JKG	
1,1-Dichloroethene [75-35-4] ^	0.24	U	ug/L	1	0.24	1.0	5	EPA 8260B	07/15/10 09:59	JKG	
1,2,3-Trichloropropane [96-18-4] ^	0.55	U	ug/L	1	0.55	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
1,2-Dibromo-3-chloropropane [96-12-8] ^	0.48	U	ug/L	1	0.48	1.0	13	EPA 8260B	07/15/10 09:59	JKG	
1,2-Dibromoethane [106-93-4] ^	0.42	U	ug/L	1	0.42	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
1,2-Dichlorobenzene [95-50-1] ^	0.27	U	ug/L	1	0.27	1.0	5	EPA 8260B	07/15/10 09:59	JKG	
1,2-Dichloroethane [107-06-2] ^	0.65	U	ug/L	1	0.65	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
1,2-Dichloropropane [78-87-5] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
1,4-Dichlorobenzene [106-46-7] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
2-Butanone [78-93-3] ^	1.0	U	ug/L	1	1.0	5.0	100	EPA 8260B	07/15/10 09:59	JKG	
2-Hexanone [591-78-6] ^	0.69	U	ug/L	1	0.69	5.0	50	EPA 8260B	07/15/10 09:59	JKG	
4-Methyl-2-pentanone [108-10-1] ^	1.1	U	ug/L	1	1.1	5.0	100	EPA 8260B	07/15/10 09:59	JKG	
Acetone [67-64-1] ^	**7.7**	J	ug/L	1	1.5	5.0	100	EPA 8260B	07/15/10 09:59	JKG	
Acrylonitrile [107-13-1] ^	2.1	U	ug/L	1	2.1	10	200	EPA 8260B	07/15/10 09:59	JKG	
Benzene [71-43-2] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
Bromochloromethane [74-97-5] ^	0.42	U	ug/L	1	0.42	1.0	3	EPA 8260B	07/15/10 09:59	JKG	
Bromodichloromethane [75-27-4] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
Bromoform [75-25-2] ^	0.71	U	ug/L	1	0.71	1.0	3	EPA 8260B	07/15/10 09:59	JKG	
Bromomethane [74-83-9] ^	0.49	U	ug/L	1	0.49	1.0	10	EPA 8260B	07/15/10 09:59	JKG	
Carbon disulfide [75-15-0] ^	0.54	U	ug/L	1	0.54	5.0	100	EPA 8260B	07/15/10 09:59	JKG	
Carbon tetrachloride [56-23-5] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
Chlorobenzene [108-90-7] ^	0.27	U	ug/L	1	0.27	1.0	3	EPA 8260B	07/15/10 09:59	JKG	
Chloroethane [75-00-3] ^	0.30	U	ug/L	1	0.30	1.0	10	EPA 8260B	07/15/10 09:59	JKG	
Chloroform [67-66-3] ^	0.20	U	ug/L	1	0.20	1.0	5	EPA 8260B	07/15/10 09:59	JKG	
Chloromethane [74-87-3] ^	0.34	U	ug/L	1	0.34	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
cis-1,2-Dichloroethene [156-59-2] ^	0.36	U	ug/L	1	0.36	1.0	5	EPA 8260B	07/15/10 09:59	JKG	
cis-1,3-Dichloropropene [10061-01-5] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
Dibromochloromethane [124-48-1] ^	0.32	U	ug/L	1	0.32	1.0	3	EPA 8260B	07/15/10 09:59	JKG	
Dibromomethane [74-95-3] ^	0.37	U	ug/L	1	0.37	1.0	10	EPA 8260B	07/15/10 09:59	JKG	
Ethylbenzene [100-41-4] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
Iodomethane [74-88-4] ^	0.52	U	ug/L	1	0.52	5.0	10	EPA 8260B	07/15/10 09:59	JKG	
Methylene chloride [75-09-2] ^	0.53	U	ug/L	1	0.53	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
Styrene [100-42-5] ^	0.26	U	ug/L	1	0.26	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
Tetrachloroethene [127-18-4] ^	0.36	U	ug/L	1	0.36	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
Toluene [108-88-3] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
trans-1,2-Dichloroethene [156-60-5] ^	0.34	U	ug/L	1	0.34	1.0	5	EPA 8260B	07/15/10 09:59	JKG	
trans-1,3-Dichloropropene [10061-02-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
trans-1,4-Dichloro-2-butene [110-57-6] ^	0.54	U	ug/L	1	0.54	1.0	100	EPA 8260B	07/15/10 09:59	JKG	
Trichloroethene [79-01-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	07/15/10 09:59	JKG	

www.encolabs.com

Description: 2803-GW16
Matrix: Ground Water
Project: Dare County C&D

Lab Sample ID: C007931-01
Sampled: 07/08/10 10:30
Sampled By: Aaron Weispfenning

Received: 07/12/10 10:30
Work Order: C007931

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Trichlorofluoromethane [75-69-4] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
Vinyl acetate [108-05-4] ^	0.98	U	ug/L	1	0.98	5.0	50	EPA 8260B	07/15/10 09:59	JKG	
Vinyl chloride [75-01-4] ^	0.30	U	ug/L	1	0.30	1.0	1	EPA 8260B	07/15/10 09:59	JKG	
Xylenes (Total) [1330-20-7] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	07/15/10 09:59	JKG	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*40*	*1*	*50.0*	*80 %*	*51-122*	*0G14044*	*EPA 8260B*	*07/15/10 09:59*	*JKG*	
Dibromofluoromethane	*41*	*1*	*50.0*	*82 %*	*68-117*	*0G14044*	*EPA 8260B*	*07/15/10 09:59*	*JKG*	
Toluene-d8	*41*	*1*	*50.0*	*82 %*	*69-110*	*0G14044*	*EPA 8260B*	*07/15/10 09:59*	*JKG*	

www.encolabs.com

Description: 2803-GW16
Matrix: Ground Water
Project: Dare County C&D

Lab Sample ID: C007931-01
Sampled: 07/08/10 10:30
Sampled By: Aaron Weispfenning

Received: 07/12/10 10:30
Work Order: C007931

Tentatively Identified Compounds by Volatile GCMS

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Tentatively Identified Compounds [NA]	0.0		ug/L	1				EPA 8260B	07/15/10 09:59	JKG	

www.encolabs.com

Description: 2803-GW16
Matrix: Ground Water
Project: Dare County C&D

Lab Sample ID: C007931-01
Sampled: 07/08/10 10:30
Sampled By: Aaron Weispfenning

Received: 07/12/10 10:30
Work Order: C007931

Metals by EPA 6000/7000 Series Methods

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Mercury [7439-97-6] ^	0.170	U	ug/L	1	0.170	0.200	0.2	EPA 7470A	07/14/10 15:58	NLH	

www.encolabs.com

Description: 2803-GW16 | **Lab Sample ID:** C007931-01 | **Received:** 07/12/10 10:30

Matrix: Ground Water | **Sampled:** 07/08/10 10:30 | **Work Order:** C007931

Project: Dare County C&D | **Sampled By:** Aaron Weispfenning

Metals (total recoverable) by EPA 6000/7000 Series Methods

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Antimony [7440-36-0] ^	4.40	UD	ug/L	20	4.40	40.0	6	EPA 6020A	07/19/10 10:28	VLO	
Arsenic [7440-38-2] ^	**27.2**		ug/L	1	2.80	10.0	10	EPA 6010C	07/15/10 11:53	JDH	
Barium [7440-39-3] ^	**487**		ug/L	1	1.00	10.0	100	EPA 6010C	07/15/10 11:53	JDH	
Beryllium [7440-41-7] ^	0.100	U	ug/L	1	0.100	1.00	1	EPA 6010C	07/15/10 11:53	JDH	
Cadmium [7440-43-9] ^	**0.655**	J	ug/L	1	0.360	1.00	1	EPA 6010C	07/15/10 11:53	JDH	
Chromium [7440-47-3] ^	**31.2**		ug/L	1	1.00	10.0	10	EPA 6010C	07/15/10 11:53	JDH	
Cobalt [7440-48-4] ^	**11.2**		ug/L	1	1.10	10.0	10	EPA 6010C	07/15/10 11:53	JDH	
Copper [7440-50-8] ^	**4.41**	J	ug/L	1	1.60	10.0	10	EPA 6010C	07/15/10 11:53	JDH	
Iron [7439-89-6] ^	**64500**		ug/L	1	22.0	50.0	300	EPA 6010C	07/15/10 11:53	JDH	
Lead [7439-92-1] ^	**11.6**		ug/L	1	1.90	10.0	10	EPA 6010C	07/15/10 11:53	JDH	
Manganese [7439-96-5] ^	**429**		ug/L	1	1.10	10.0	50	EPA 6010C	07/15/10 11:53	JDH	
Nickel [7440-02-0] ^	**16.2**	J	ug/L	1	1.80	10.0	50	EPA 6010C	07/15/10 11:53	JDH	
Selenium [7782-49-2] ^	**35.6**	D	ug/L	20	16.6	20.0	10	EPA 6020A	07/19/10 10:28	VLO	
Silver [7440-22-4] ^	1.90	U	ug/L	1	1.90	10.0	10	EPA 6010C	07/15/10 11:53	JDH	
Thallium [7440-28-0] ^	**12.0**	JD	ug/L	20	2.20	20.0	5.5	EPA 6020A	07/19/10 10:28	VLO	
Vanadium [7440-62-2] ^	**33.2**		ug/L	1	1.40	10.0	25	EPA 6010C	07/15/10 11:53	JDH	
Zinc [7440-66-6] ^	**60.8**		ug/L	1	3.80	10.0	10	EPA 6010C	07/15/10 11:53	JDH	

www.encolabs.com

Description: 2803-GW16
Matrix: Ground Water
Project: Dare County C&D

Lab Sample ID: C007931-01
Sampled: 07/08/10 10:30
Sampled By: Aaron Weispfenning

Received: 07/12/10 10:30
Work Order: C007931

Classical Chemistry Parameters

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Chloride [16887-00-6] ^	**2400000**	D	ug/L	50	900	250000	NE	EPA 300.0	07/20/10 09:11	PEV	
Sulfate as SO4 [14808-79-8] ^	**170000**	JD	ug/L	4	480	20000	250000	EPA 300.0	07/20/10 08:52	PEV	
Total Alkalinity [471-34-1] ^	**97000**		ug/L	1	8000	15000	NE	EPA 310.2	07/14/10 07:39	PEV	
Total Dissolved Solids [ECL-0156] ^	**2400000**		ug/L	1	10000	10000	NE	SM 2540C	07/14/10 10:26	CCB	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

www.encolabs.com

Description: 2803-GW17 | **Lab Sample ID:** C007931-02 | **Received:** 07/12/10 10:30

Matrix: Ground Water | **Sampled:** 07/08/10 11:15 | **Work Order:** C007931

Project: Dare County C&D | **Sampled By:** Aaron Weispfenning

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
1,1,1,2-Tetrachloroethane [630-20-6] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	07/15/10 10:29	JKG	
1,1,1-Trichloroethane [71-55-6] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
1,1,2,2-Tetrachloroethane [79-34-5] ^	0.33	U	ug/L	1	0.33	1.0	3	EPA 8260B	07/15/10 10:29	JKG	
1,1,2-Trichloroethane [79-00-5] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
1,1-Dichloroethane [75-34-3] ^	0.33	U	ug/L	1	0.33	1.0	5	EPA 8260B	07/15/10 10:29	JKG	
1,1-Dichloroethene [75-35-4] ^	0.24	U	ug/L	1	0.24	1.0	5	EPA 8260B	07/15/10 10:29	JKG	
1,2,3-Trichloropropane [96-18-4] ^	0.55	U	ug/L	1	0.55	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
1,2-Dibromo-3-chloropropane [96-12-8] ^	0.48	U	ug/L	1	0.48	1.0	13	EPA 8260B	07/15/10 10:29	JKG	
1,2-Dibromoethane [106-93-4] ^	0.42	U	ug/L	1	0.42	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
1,2-Dichlorobenzene [95-50-1] ^	0.27	U	ug/L	1	0.27	1.0	5	EPA 8260B	07/15/10 10:29	JKG	
1,2-Dichloroethane [107-06-2] ^	0.65	U	ug/L	1	0.65	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
1,2-Dichloropropane [78-87-5] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
1,4-Dichlorobenzene [106-46-7] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
2-Butanone [78-93-3] ^	**2.9**	J	ug/L	1	1.0	5.0	100	EPA 8260B	07/15/10 10:29	JKG	
2-Hexanone [591-78-6] ^	0.69	U	ug/L	1	0.69	5.0	50	EPA 8260B	07/15/10 10:29	JKG	
4-Methyl-2-pentanone [108-10-1] ^	1.1	U	ug/L	1	1.1	5.0	100	EPA 8260B	07/15/10 10:29	JKG	
Acetone [67-64-1] ^	**17**	J	ug/L	1	1.5	5.0	100	EPA 8260B	07/15/10 10:29	JKG	
Acrylonitrile [107-13-1] ^	2.1	U	ug/L	1	2.1	10	200	EPA 8260B	07/15/10 10:29	JKG	
Benzene [71-43-2] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
Bromochloromethane [74-97-5] ^	0.42	U	ug/L	1	0.42	1.0	3	EPA 8260B	07/15/10 10:29	JKG	
Bromodichloromethane [75-27-4] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
Bromoform [75-25-2] ^	0.71	U	ug/L	1	0.71	1.0	3	EPA 8260B	07/15/10 10:29	JKG	
Bromomethane [74-83-9] ^	0.49	U	ug/L	1	0.49	1.0	10	EPA 8260B	07/15/10 10:29	JKG	
Carbon disulfide [75-15-0] ^	**1.1**	J	ug/L	1	0.54	5.0	100	EPA 8260B	07/15/10 10:29	JKG	
Carbon tetrachloride [56-23-5] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
Chlorobenzene [108-90-7] ^	0.27	U	ug/L	1	0.27	1.0	3	EPA 8260B	07/15/10 10:29	JKG	
Chloroethane [75-00-3] ^	0.30	U	ug/L	1	0.30	1.0	10	EPA 8260B	07/15/10 10:29	JKG	
Chloroform [67-66-3] ^	0.20	U	ug/L	1	0.20	1.0	5	EPA 8260B	07/15/10 10:29	JKG	
Chloromethane [74-87-3] ^	0.34	U	ug/L	1	0.34	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
cis-1,2-Dichloroethene [156-59-2] ^	0.36	U	ug/L	1	0.36	1.0	5	EPA 8260B	07/15/10 10:29	JKG	
cis-1,3-Dichloropropene [10061-01-5] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
Dibromochloromethane [124-48-1] ^	0.32	U	ug/L	1	0.32	1.0	3	EPA 8260B	07/15/10 10:29	JKG	
Dibromomethane [74-95-3] ^	0.37	U	ug/L	1	0.37	1.0	10	EPA 8260B	07/15/10 10:29	JKG	
Ethylbenzene [100-41-4] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
Iodomethane [74-88-4] ^	0.52	U	ug/L	1	0.52	5.0	10	EPA 8260B	07/15/10 10:29	JKG	
Methylene chloride [75-09-2] ^	0.53	U	ug/L	1	0.53	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
Styrene [100-42-5] ^	0.26	U	ug/L	1	0.26	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
Tetrachloroethene [127-18-4] ^	0.36	U	ug/L	1	0.36	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
Toluene [108-88-3] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
trans-1,2-Dichloroethene [156-60-5] ^	0.34	U	ug/L	1	0.34	1.0	5	EPA 8260B	07/15/10 10:29	JKG	
trans-1,3-Dichloropropene [10061-02-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
trans-1,4-Dichloro-2-butene [110-57-6] ^	0.54	U	ug/L	1	0.54	1.0	100	EPA 8260B	07/15/10 10:29	JKG	
Trichloroethene [79-01-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
Trichlorofluoromethane [75-69-4] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	07/15/10 10:29	JKG	
Vinyl acetate [108-05-4] ^	0.98	U	ug/L	1	0.98	5.0	50	EPA 8260B	07/15/10 10:29	JKG	
Vinyl chloride [75-01-4] ^	0.30	U	ug/L	1	0.30	1.0	1	EPA 8260B	07/15/10 10:29	JKG	

www.encolabs.com

Description: 2803-GW17
Matrix: Ground Water
Project: Dare County C&D

Lab Sample ID: C007931-02
Sampled: 07/08/10 11:15
Sampled By: Aaron Weispfenning

Received: 07/12/10 10:30
Work Order: C007931

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Xylenes (Total) [1330-20-7] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	07/15/10 10:29	JKG	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*40*	*1*	*50.0*	*81 %*	*51-122*	*0G14044*	*EPA 8260B*	*07/15/10 10:29*	*JKG*	
Dibromofluoromethane	*41*	*1*	*50.0*	*83 %*	*68-117*	*0G14044*	*EPA 8260B*	*07/15/10 10:29*	*JKG*	
Toluene-d8	*41*	*1*	*50.0*	*81 %*	*69-110*	*0G14044*	*EPA 8260B*	*07/15/10 10:29*	*JKG*	

www.encolabs.com

Description: 2803-GW17
Matrix: Ground Water
Project: Dare County C&D

Lab Sample ID: C007931-02
Sampled: 07/08/10 11:15
Sampled By: Aaron Weispfenning

Received: 07/12/10 10:30
Work Order: C007931

Tentatively Identified Compounds by Volatile GCMS

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Tentatively Identified Compounds [NA]	0.0		ug/L	1				EPA 8260B	07/15/10 10:29	JKG	

www.encolabs.com

Description: 2803-GW17
Matrix: Ground Water
Project: Dare County C&D

Lab Sample ID: C007931-02
Sampled: 07/08/10 11:15
Sampled By: Aaron Weispfenning

Received: 07/12/10 10:30
Work Order: C007931

Metals by EPA 6000/7000 Series Methods

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Mercury [7439-97-6] ^	0.170	U	ug/L	1	0.170	0.200	0.2	EPA 7470A	07/14/10 16:13	NLH	

www.encolabs.com

Description: 2803-GW17 | **Lab Sample ID:** C007931-02 | **Received:** 07/12/10 10:30

Matrix: Ground Water | **Sampled:** 07/08/10 11:15 | **Work Order:** C007931

Project: Dare County C&D | **Sampled By:** Aaron Weispfenning

Metals (total recoverable) by EPA 6000/7000 Series Methods

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Antimony [7440-36-0] ^	4.40	UD	ug/L	20	4.40	40.0	6	EPA 6020A	07/19/10 10:46	VLO	
Arsenic [7440-38-2] ^	**120**		ug/L	1	2.80	10.0	10	EPA 6010C	07/15/10 12:04	JDH	
Barium [7440-39-3] ^	**565**		ug/L	1	1.00	10.0	100	EPA 6010C	07/15/10 12:04	JDH	
Beryllium [7440-41-7] ^	**2.34**		ug/L	1	0.100	1.00	1	EPA 6010C	07/15/10 12:04	JDH	
Cadmium [7440-43-9] ^	**1.12**		ug/L	1	0.360	1.00	1	EPA 6010C	07/15/10 12:04	JDH	
Chromium [7440-47-3] ^	**245**		ug/L	1	1.00	10.0	10	EPA 6010C	07/15/10 12:04	JDH	
Cobalt [7440-48-4] ^	**118**		ug/L	1	1.10	10.0	10	EPA 6010C	07/15/10 12:04	JDH	
Copper [7440-50-8] ^	**74.4**		ug/L	1	1.60	10.0	10	EPA 6010C	07/15/10 12:04	JDH	
Iron [7439-89-6] ^	**210000**		ug/L	1	22.0	50.0	300	EPA 6010C	07/15/10 12:04	JDH	
Lead [7439-92-1] ^	**105**		ug/L	1	1.90	10.0	10	EPA 6010C	07/15/10 12:04	JDH	
Manganese [7439-96-5] ^	**1960**		ug/L	1	1.10	10.0	50	EPA 6010C	07/15/10 12:04	JDH	
Nickel [7440-02-0] ^	**186**		ug/L	1	1.80	10.0	50	EPA 6010C	07/15/10 12:04	JDH	
Selenium [7782-49-2] ^	16.6	UD	ug/L	20	16.6	20.0	10	EPA 6020A	07/19/10 10:46	VLO	
Silver [7440-22-4] ^	1.90	U	ug/L	1	1.90	10.0	10	EPA 6010C	07/15/10 12:04	JDH	
Thallium [7440-28-0] ^	**8.30**	JD	ug/L	20	2.20	20.0	5.5	EPA 6020A	07/19/10 10:46	VLO	
Vanadium [7440-62-2] ^	**281**		ug/L	1	1.40	10.0	25	EPA 6010C	07/15/10 12:04	JDH	
Zinc [7440-66-6] ^	**970**		ug/L	1	3.80	10.0	10	EPA 6010C	07/15/10 12:04	JDH	

www.encolabs.com

Description: 2803-GW17
Matrix: Ground Water
Project: Dare County C&D

Lab Sample ID: C007931-02
Sampled: 07/08/10 11:15
Sampled By: Aaron Weispfenning

Received: 07/12/10 10:30
Work Order: C007931

Classical Chemistry Parameters

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Chloride [16887-00-6] ^	**17000**		ug/L	1	18	5000	NE	EPA 300.0	07/19/10 22:44	PEV	
Sulfate as SO4 [14808-79-8] ^	**57000**	J	ug/L	1	120	5000	250000	EPA 300.0	07/19/10 22:44	PEV	
Total Alkalinity [471-34-1] ^	**44000**		ug/L	1	8000	15000	NE	EPA 310.2	07/14/10 07:43	PEV	
Total Dissolved Solids [ECL-0156] ^	**190000**		ug/L	1	10000	10000	NE	SM 2540C	07/14/10 10:26	CCB	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

www.encolabs.com

Description: 2803-TripBlank
Matrix: Water
Project: Dare County C&D

Lab Sample ID: C007931-03
Sampled: 07/08/10 10:30
Sampled By: ENCO

Received: 07/12/10 10:30
Work Order: C007931

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
1,1,1,2-Tetrachloroethane [630-20-6] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	07/15/10 10:59	JKG	
1,1,1-Trichloroethane [71-55-6] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
1,1,2,2-Tetrachloroethane [79-34-5] ^	0.33	U	ug/L	1	0.33	1.0	3	EPA 8260B	07/15/10 10:59	JKG	
1,1,2-Trichloroethane [79-00-5] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
1,1-Dichloroethane [75-34-3] ^	0.33	U	ug/L	1	0.33	1.0	5	EPA 8260B	07/15/10 10:59	JKG	
1,1-Dichloroethene [75-35-4] ^	0.24	U	ug/L	1	0.24	1.0	5	EPA 8260B	07/15/10 10:59	JKG	
1,2,3-Trichloropropane [96-18-4] ^	0.55	U	ug/L	1	0.55	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
1,2-Dibromo-3-chloropropane [96-12-8] ^	0.48	U	ug/L	1	0.48	1.0	13	EPA 8260B	07/15/10 10:59	JKG	
1,2-Dibromoethane [106-93-4] ^	0.42	U	ug/L	1	0.42	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
1,2-Dichlorobenzene [95-50-1] ^	0.27	U	ug/L	1	0.27	1.0	5	EPA 8260B	07/15/10 10:59	JKG	
1,2-Dichloroethane [107-06-2] ^	0.65	U	ug/L	1	0.65	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
1,2-Dichloropropane [78-87-5] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
1,4-Dichlorobenzene [106-46-7] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
2-Butanone [78-93-3] ^	1.0	U	ug/L	1	1.0	5.0	100	EPA 8260B	07/15/10 10:59	JKG	
2-Hexanone [591-78-6] ^	0.69	U	ug/L	1	0.69	5.0	50	EPA 8260B	07/15/10 10:59	JKG	
4-Methyl-2-pentanone [108-10-1] ^	1.1	U	ug/L	1	1.1	5.0	100	EPA 8260B	07/15/10 10:59	JKG	
Acetone [67-64-1] ^	1.5	U	ug/L	1	1.5	5.0	100	EPA 8260B	07/15/10 10:59	JKG	
Acrylonitrile [107-13-1] ^	2.1	U	ug/L	1	2.1	10	200	EPA 8260B	07/15/10 10:59	JKG	
Benzene [71-43-2] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
Bromochloromethane [74-97-5] ^	0.42	U	ug/L	1	0.42	1.0	3	EPA 8260B	07/15/10 10:59	JKG	
Bromodichloromethane [75-27-4] ^	0.37	U	ug/L	1	0.37	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
Bromoform [75-25-2] ^	0.71	U	ug/L	1	0.71	1.0	3	EPA 8260B	07/15/10 10:59	JKG	
Bromomethane [74-83-9] ^	0.49	U	ug/L	1	0.49	1.0	10	EPA 8260B	07/15/10 10:59	JKG	
Carbon disulfide [75-15-0] ^	0.54	U	ug/L	1	0.54	5.0	100	EPA 8260B	07/15/10 10:59	JKG	
Carbon tetrachloride [56-23-5] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
Chlorobenzene [108-90-7] ^	0.27	U	ug/L	1	0.27	1.0	3	EPA 8260B	07/15/10 10:59	JKG	
Chloroethane [75-00-3] ^	0.30	U	ug/L	1	0.30	1.0	10	EPA 8260B	07/15/10 10:59	JKG	
Chloroform [67-66-3] ^	0.20	U	ug/L	1	0.20	1.0	5	EPA 8260B	07/15/10 10:59	JKG	
Chloromethane [74-87-3] ^	0.34	U	ug/L	1	0.34	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
cis-1,2-Dichloroethene [156-59-2] ^	0.36	U	ug/L	1	0.36	1.0	5	EPA 8260B	07/15/10 10:59	JKG	
cis-1,3-Dichloropropene [10061-01-5] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
Dibromochloromethane [124-48-1] ^	0.32	U	ug/L	1	0.32	1.0	3	EPA 8260B	07/15/10 10:59	JKG	
Dibromomethane [74-95-3] ^	0.37	U	ug/L	1	0.37	1.0	10	EPA 8260B	07/15/10 10:59	JKG	
Ethylbenzene [100-41-4] ^	0.20	U	ug/L	1	0.20	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
Iodomethane [74-88-4] ^	0.52	U	ug/L	1	0.52	5.0	10	EPA 8260B	07/15/10 10:59	JKG	
Methylene chloride [75-09-2] ^	0.53	U	ug/L	1	0.53	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
Styrene [100-42-5] ^	0.26	U	ug/L	1	0.26	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
Tetrachloroethene [127-18-4] ^	0.36	U	ug/L	1	0.36	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
Toluene [108-88-3] ^	0.27	U	ug/L	1	0.27	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
trans-1,2-Dichloroethene [156-60-5] ^	0.34	U	ug/L	1	0.34	1.0	5	EPA 8260B	07/15/10 10:59	JKG	
trans-1,3-Dichloropropene [10061-02-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
trans-1,4-Dichloro-2-butene [110-57-6] ^	0.54	U	ug/L	1	0.54	1.0	100	EPA 8260B	07/15/10 10:59	JKG	
Trichloroethene [79-01-6] ^	0.38	U	ug/L	1	0.38	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
Trichlorofluoromethane [75-69-4] ^	0.28	U	ug/L	1	0.28	1.0	1	EPA 8260B	07/15/10 10:59	JKG	
Vinyl acetate [108-05-4] ^	0.98	U	ug/L	1	0.98	5.0	50	EPA 8260B	07/15/10 10:59	JKG	
Vinyl chloride [75-01-4] ^	0.30	U	ug/L	1	0.30	1.0	1	EPA 8260B	07/15/10 10:59	JKG	

www.encolabs.com

Description: 2803-TripBlank
Matrix: Water
Project: Dare County C&D

Lab Sample ID: C007931-03
Sampled: 07/08/10 10:30
Sampled By: ENCO

Received: 07/12/10 10:30
Work Order: C007931

Volatile Organic Compounds by GCMS

^ - ENCO Cary certified analyte [NC 591]

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Xylenes (Total) [1330-20-7] ^	0.40	U	ug/L	1	0.40	1.0	5	EPA 8260B	07/15/10 10:59	JKG	

Surrogates	*Results*	*DF*	*Spike Lvl*	*% Rec*	*% Rec Limits*	*Batch*	*Method*	*Analyzed*	*By*	Notes
4-Bromofluorobenzene	*40*	*1*	*50.0*	*81 %*	*51-122*	*0G14044*	*EPA 8260B*	*07/15/10 10:59*	*JKG*	
Dibromofluoromethane	*42*	*1*	*50.0*	*83 %*	*68-117*	*0G14044*	*EPA 8260B*	*07/15/10 10:59*	*JKG*	
Toluene-d8	*41*	*1*	*50.0*	*81 %*	*69-110*	*0G14044*	*EPA 8260B*	*07/15/10 10:59*	*JKG*	

www.encolabs.com

Description: 2803-TripBlank
Matrix: Water
Project: Dare County C&D

Lab Sample ID: C007931-03
Sampled: 07/08/10 10:30
Sampled By: ENCO

Received: 07/12/10 10:30
Work Order: C007931

Tentatively Identified Compounds by Volatile GCMS

Analyte [CAS Number]	Results	Flag	Units	DF	MDL	MRL	NC SWSL	Method	Analyzed	By	Notes
Tentatively Identified Compounds [NA]	0.0		ug/L	1				EPA 8260B	07/15/10 10:59	JKG	

This report relates only to the sample as received by the laboratory, and may only be reproduced in full.

QUALITY CONTROL

Volatile Organic Compounds by GCMS - Quality Control

Batch 0G14044 - EPA 5030B_MS

Blank (0G14044-BLK1) Prepared: 07/14/2010 15:15 Analyzed: 07/15/2010 05:33

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1,1,2-Tetrachloroethane	0.40	U	1.0	ug/L							
1,1,1-Trichloroethane	0.27	U	1.0	ug/L							
1,1,2,2-Tetrachloroethane	0.33	U	1.0	ug/L							
1,1,2-Trichloroethane	0.37	U	1.0	ug/L							
1,1-Dichloroethane	0.33	U	1.0	ug/L							
1,1-Dichloroethene	0.24	U	1.0	ug/L							
1,2,3-Trichloropropane	0.55	U	1.0	ug/L							
1,2-Dibromo-3-chloropropane	0.48	U	1.0	ug/L							
1,2-Dibromoethane	0.42	U	1.0	ug/L							
1,2-Dichlorobenzene	0.27	U	1.0	ug/L							
1,2-Dichloroethane	0.65	U	1.0	ug/L							
1,2-Dichloropropane	0.20	U	1.0	ug/L							
1,4-Dichlorobenzene	0.38	U	1.0	ug/L							
2-Butanone	1.0	U	5.0	ug/L							
2-Hexanone	0.69	U	5.0	ug/L							
4-Methyl-2-pentanone	1.1	U	5.0	ug/L							
Acetone	1.5	U	5.0	ug/L							
Acrylonitrile	2.1	U	10	ug/L							
Benzene	0.20	U	1.0	ug/L							
Bromochloromethane	0.42	U	1.0	ug/L							
Bromodichloromethane	0.37	U	1.0	ug/L							
Bromoform	0.71	U	1.0	ug/L							
Bromomethane	0.49	U	1.0	ug/L							
Carbon disulfide	0.54	U	5.0	ug/L							
Carbon tetrachloride	0.38	U	1.0	ug/L							
Chlorobenzene	0.27	U	1.0	ug/L							
Chloroethane	0.30	U	1.0	ug/L							
Chloroform	0.20	U	1.0	ug/L							
Chloromethane	0.34	U	1.0	ug/L							
cis-1,2-Dichloroethene	0.36	U	1.0	ug/L							
cis-1,3-Dichloropropene	0.28	U	1.0	ug/L							
Dibromochloromethane	0.32	U	1.0	ug/L							
Dibromomethane	0.37	U	1.0	ug/L							
Ethylbenzene	0.20	U	1.0	ug/L							
Iodomethane	0.52	U	5.0	ug/L							
Methylene chloride	0.53	U	1.0	ug/L							
Styrene	0.26	U	1.0	ug/L							
Tetrachloroethene	0.36	U	1.0	ug/L							
Toluene	0.27	U	1.0	ug/L							
trans-1,2-Dichloroethene	0.34	U	1.0	ug/L							
trans-1,3-Dichloropropene	0.38	U	1.0	ug/L							
trans-1,4-Dichloro-2-butene	0.54	U	1.0	ug/L							
Trichloroethene	0.38	U	1.0	ug/L							
Trichlorofluoromethane	0.28	U	1.0	ug/L							
Vinyl acetate	0.98	U	5.0	ug/L							
Vinyl chloride	0.30	U	1.0	ug/L							
Xylenes (Total)	0.40	U	1.0	ug/L							
Surrogate: 4-Bromofluorobenzene	*40*			*ug/L*	*50.0*		*80*	*51-122*			

QUALITY CONTROL

Volatile Organic Compounds by GCMS - Quality Control

Batch 0G14044 - EPA 5030B_MS

Blank (0G14044-BLK1) Continued Prepared: 07/14/2010 15:15 Analyzed: 07/15/2010 05:33

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Surrogate: Dibromofluoromethane	*41*			*ug/L*	*50.0*		*83*	*68-117*			
Surrogate: Toluene-d8	*41*			*ug/L*	*50.0*		*83*	*69-110*			

LCS (0G14044-BS1) Prepared: 07/14/2010 15:15 Analyzed: 07/15/2010 06:03

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	21		1.0	ug/L	20.0		106	75-133			
Benzene	21		1.0	ug/L	20.0		104	81-134			
Chlorobenzene	20		1.0	ug/L	20.0		100	83-117			
Toluene	20		1.0	ug/L	20.0		102	71-118			
Trichloroethene	18		1.0	ug/L	20.0		92	75-115			
Surrogate: 4-Bromofluorobenzene	*42*			*ug/L*	*50.0*		*84*	*51-122*			
Surrogate: Dibromofluoromethane	*41*			*ug/L*	*50.0*		*82*	*68-117*			
Surrogate: Toluene-d8	*40*			*ug/L*	*50.0*		*81*	*69-110*			

Matrix Spike (0G14044-MS1) Prepared: 07/14/2010 15:15 Analyzed: 07/15/2010 06:32

Source: C008379-06

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	21		1.0	ug/L	20.0	0.24 U	106	75-133			
Benzene	21		1.0	ug/L	20.0	0.20 U	103	81-134			
Chlorobenzene	20		1.0	ug/L	20.0	0.27 U	101	83-117			
Toluene	21		1.0	ug/L	20.0	0.27 U	104	71-118			
Trichloroethene	19		1.0	ug/L	20.0	0.38 U	96	75-115			
Surrogate: 4-Bromofluorobenzene	*42*			*ug/L*	*50.0*		*84*	*51-122*			
Surrogate: Dibromofluoromethane	*41*			*ug/L*	*50.0*		*83*	*68-117*			
Surrogate: Toluene-d8	*41*			*ug/L*	*50.0*		*81*	*69-110*			

Matrix Spike Dup (0G14044-MSD1) Prepared: 07/14/2010 15:15 Analyzed: 07/15/2010 07:02

Source: C008379-06

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
1,1-Dichloroethene	21		1.0	ug/L	20.0	0.24 U	104	75-133	2	20	
Benzene	20		1.0	ug/L	20.0	0.20 U	101	81-134	2	17	
Chlorobenzene	20		1.0	ug/L	20.0	0.27 U	99	83-117	2	16	
Toluene	20		1.0	ug/L	20.0	0.27 U	101	71-118	3	17	
Trichloroethene	19		1.0	ug/L	20.0	0.38 U	93	75-115	3	18	
Surrogate: 4-Bromofluorobenzene	*42*			*ug/L*	*50.0*		*84*	*51-122*			
Surrogate: Dibromofluoromethane	*41*			*ug/L*	*50.0*		*82*	*68-117*			
Surrogate: Toluene-d8	*41*			*ug/L*	*50.0*		*81*	*69-110*			

Tentatively Identified Compounds by Volatile GCMS - Quality Control

Batch 0G14044 - EPA 5030B_MS

Blank (0G14044-BLK1) Prepared: 07/14/2010 15:15 Analyzed: 07/15/2010 05:33

QUALITY CONTROL

Tentatively Identified Compounds by Volatile GCMS - Quality Control

Batch 0G14044 - EPA 5030B_MS

Blank (0G14044-BLK1) Continued Prepared: 07/14/2010 15:15 Analyzed: 07/15/2010 05:33

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Tentatively Identified Compounds	**0.0**	**U**		ug/L							

Metals by EPA 6000/7000 Series Methods - Quality Control

Batch 0G14034 - EPA 245.1

Blank (0G14034-BLK1) Prepared: 07/14/2010 10:48 Analyzed: 07/14/2010 15:52

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Mercury	0.170	U	0.200	ug/L							

LCS (0G14034-BS1) Prepared: 07/14/2010 10:48 Analyzed: 07/14/2010 15:55

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Mercury	5.27		0.200	ug/L	5.00		105	85-115			

Matrix Spike (0G14034-MS1) Prepared: 07/14/2010 10:48 Analyzed: 07/14/2010 16:01

Source: C007931-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Mercury	5.75		0.200	ug/L	5.00	0.170 U	115	85-115			

Matrix Spike Dup (0G14034-MSD1) Prepared: 07/14/2010 10:48 Analyzed: 07/14/2010 16:04

Source: C007931-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Mercury	5.75		0.200	ug/L	5.00	0.170 U	115	85-115	0.05	15	

Post Spike (0G14034-PS1) Prepared: 07/14/2010 10:48 Analyzed: 07/14/2010 16:07

Source: C007931-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Mercury	5.70		0.200	ug/L	5.00	-0.00520	114	75-125			

Metals (total recoverable) by EPA 6000/7000 Series Methods - Quality Control

Batch 0G14037 - EPA 3005A

Blank (0G14037-BLK1) Prepared: 07/14/2010 13:51 Analyzed: 07/19/2010 10:21

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	0.220	U	2.00	ug/L							
Selenium	0.830	U	1.00	ug/L							
Thallium	0.110	U	1.00	ug/L							

LCS (0G14037-BS1) Prepared: 07/14/2010 13:51 Analyzed: 07/19/2010 10:24

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

QUALITY CONTROL

Metals (total recoverable) by EPA 6000/7000 Series Methods - Quality Control

Batch 0G14037 - EPA 3005A

LCS (0G14037-BS1) Continued Prepared: 07/14/2010 13:51 Analyzed: 07/19/2010 10:24

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	26.2		2.00	ug/L	25.0		105	80-120			
Selenium	26.0		1.00	ug/L	25.0		104	80-120			
Thallium	27.1		1.00	ug/L	25.0		109	80-120			

Matrix Spike (0G14037-MS1) Prepared: 07/14/2010 13:51 Analyzed: 07/19/2010 10:31

Source: C007931-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	21.7	JD	40.0	ug/L	25.0	4.40 U	87	75-125			
Selenium	61.0	D	20.0	ug/L	25.0	35.6	101	75-125			
Thallium	36.0	D	20.0	ug/L	25.0	12.0	96	75-125			

Matrix Spike Dup (0G14037-MSD1) Prepared: 07/14/2010 13:51 Analyzed: 07/19/2010 10:35

Source: C007931-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	21.1	JD	40.0	ug/L	25.0	4.40 U	85	75-125	3	20	
Selenium	65.5	D	20.0	ug/L	25.0	35.6	120	75-125	7	20	
Thallium	33.4	D	20.0	ug/L	25.0	12.0	86	75-125	7	20	

Post Spike (0G14037-PS1) Prepared: 07/14/2010 13:51 Analyzed: 07/19/2010 10:39

Source: C007931-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Antimony	27.1		2.00	ug/L	25.0	0.400	107	80-120			
Selenium	30.6		1.00	ug/L	25.0	35.6	NR	80-120			QM-08
Thallium	27.5		1.00	ug/L	25.0	12.0	62	80-120			QM-08

Batch 0G14038 - EPA 3005A

Blank (0G14038-BLK1) Prepared: 07/14/2010 12:47 Analyzed: 07/15/2010 11:03

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	2.80	U	10.0	ug/L							
Barium	1.00	U	10.0	ug/L							
Beryllium	0.100	U	1.00	ug/L							
Cadmium	0.360	U	1.00	ug/L							
Chromium	1.00	U	10.0	ug/L							
Cobalt	1.10	U	10.0	ug/L							
Copper	1.60	U	10.0	ug/L							
Iron	22.0	U	50.0	ug/L							
Lead	1.90	U	10.0	ug/L							
Manganese	1.10	U	10.0	ug/L							
Nickel	1.80	U	10.0	ug/L							
Silver	1.90	U	10.0	ug/L							
Vanadium	1.40	U	10.0	ug/L							
Zinc	3.80	U	10.0	ug/L							

QUALITY CONTROL

Metals (total recoverable) by EPA 6000/7000 Series Methods - Quality Control

Batch 0G14038 - EPA 3005A

LCS (0G14038-BS1) Prepared: 07/14/2010 12:47 Analyzed: 07/15/2010 11:07

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	545		10.0	ug/L	500		109	80-120			
Barium	529		10.0	ug/L	500		106	80-120			
Beryllium	276		1.00	ug/L	250		110	80-120			
Cadmium	266		1.00	ug/L	250		106	80-120			
Chromium	524		10.0	ug/L	500		105	80-120			
Cobalt	544		10.0	ug/L	500		109	80-120			
Copper	264		10.0	ug/L	250		105	80-120			
Iron	5190		50.0	ug/L	5000		104	80-120			
Lead	548		10.0	ug/L	500		110	80-120			
Manganese	260		10.0	ug/L	250		104	80-120			
Nickel	531		10.0	ug/L	500		106	80-120			
Silver	264		10.0	ug/L	250		106	80-120			
Vanadium	257		10.0	ug/L	250		103	80-120			
Zinc	537		10.0	ug/L	500		107	80-120			

Matrix Spike (0G14038-MS1) Prepared: 07/14/2010 12:47 Analyzed: 07/15/2010 11:12

Source: C008008-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	539		10.0	ug/L	500	4.17	107	75-125			
Barium	585		10.0	ug/L	500	54.2	106	75-125			
Beryllium	274		1.00	ug/L	250	0.723	109	75-125			
Cadmium	263		1.00	ug/L	250	0.360 U	105	75-125			
Chromium	521		10.0	ug/L	500	1.00 U	104	75-125			
Cobalt	558		10.0	ug/L	500	17.6	108	75-125			
Copper	265		10.0	ug/L	250	1.60 U	106	75-125			
Iron	5310		50.0	ug/L	5000	133	104	75-125			
Lead	539		10.0	ug/L	500	1.90 U	108	75-125			
Manganese	546		10.0	ug/L	250	277	108	75-125			
Nickel	532		10.0	ug/L	500	7.87	105	75-125			
Silver	263		10.0	ug/L	250	1.90 U	105	75-125			
Vanadium	255		10.0	ug/L	250	1.40 U	102	75-125			
Zinc	557		10.0	ug/L	500	21.7	107	75-125			

Matrix Spike Dup (0G14038-MSD1) Prepared: 07/14/2010 12:47 Analyzed: 07/15/2010 11:24

Source: C008008-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	532		10.0	ug/L	500	4.17	105	75-125	1	20	
Barium	576		10.0	ug/L	500	54.2	104	75-125	1	20	
Beryllium	271		1.00	ug/L	250	0.723	108	75-125	1	20	
Cadmium	260		1.00	ug/L	250	0.360 U	104	75-125	1	20	
Chromium	512		10.0	ug/L	500	1.00 U	102	75-125	2	20	
Cobalt	549		10.0	ug/L	500	17.6	106	75-125	2	20	
Copper	260		10.0	ug/L	250	1.60 U	104	75-125	2	20	
Iron	5220		50.0	ug/L	5000	133	102	75-125	2	20	
Lead	534		10.0	ug/L	500	1.90 U	107	75-125	0.9	20	

QUALITY CONTROL

Metals (total recoverable) by EPA 6000/7000 Series Methods - Quality Control

Batch 0G14038 - EPA 3005A

Matrix Spike Dup (0G14038-MSD1) Continued Prepared: 07/14/2010 12:47 Analyzed: 07/15/2010 11:24

Source: C008008-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Manganese	538		10.0	ug/L	250	277	104	75-125	1	20	
Nickel	523		10.0	ug/L	500	7.87	103	75-125	2	20	
Silver	257		10.0	ug/L	250	1.90 U	103	75-125	2	20	
Vanadium	252		10.0	ug/L	250	1.40 U	101	75-125	1	20	
Zinc	551		10.0	ug/L	500	21.7	106	75-125	1	20	

Post Spike (0G14038-PS1) Prepared: 07/14/2010 12:47 Analyzed: 07/15/2010 11:26

Source: C008008-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Arsenic	1.08		0.0100	mg/L	1.00	0.00417	107	80-120			
Barium	1.13		0.0100	mg/L	1.00	0.0542	107	80-120			
Beryllium	0.546		0.00100	mg/L	0.500	0.000723	109	80-120			
Cadmium	0.536		0.00100	mg/L	0.500	0.000241	107	80-120			
Chromium	1.07		0.0100	mg/L	1.00	0.000259	107	80-120			
Cobalt	1.07		0.0100	mg/L	1.00	0.0176	105	80-120			
Copper	0.545		0.0100	mg/L	0.500	0.00127	109	80-120			
Iron	10.6		0.0500	mg/L	10.0	0.133	105	80-120			
Lead	1.07		0.0100	mg/L	1.00	-0.000387	107	80-120			
Manganese	0.824		0.0100	mg/L	0.500	0.277	109	80-120			
Nickel	1.06		0.0100	mg/L	1.00	0.00787	105	80-120			
Silver	0.534		0.0100	mg/L	0.500	0.000354	107	80-120			
Vanadium	0.524		0.0100	mg/L	0.500	0.000212	105	80-120			
Zinc	1.10		0.0100	mg/L	1.00	0.0217	108	80-120			

Classical Chemistry Parameters - Quality Control

Batch 0G14001 - NO PREP

Blank (0G14001-BLK1) Prepared: 07/14/2010 06:46 Analyzed: 07/14/2010 07:31

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Alkalinity	8000	U	15000	ug/L							

LCS (0G14001-BS1) Prepared: 07/14/2010 06:46 Analyzed: 07/14/2010 07:32

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Alkalinity	92		15	mg/L	100		92	80-120			

Matrix Spike (0G14001-MS1) Prepared: 07/14/2010 06:46 Analyzed: 07/14/2010 07:40

Source: C007931-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Alkalinity	130		15	mg/L	51.4	97	70	80-120			QM-05

Matrix Spike Dup (0G14001-MSD1) Prepared: 07/14/2010 06:46 Analyzed: 07/14/2010 07:40

QUALITY CONTROL

Classical Chemistry Parameters - Quality Control

Batch 0G14001 - NO PREP

Matrix Spike Dup (0G14001-MSD1) Continued Prepared: 07/14/2010 06:46 Analyzed: 07/14/2010 07:40

Source: C007931-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Alkalinity	140		15	mg/L	51.4	97	83	80-120	5	25	

Batch 0G14023 - NO PREP

Blank (0G14023-BLK1) Prepared & Analyzed: 07/14/2010 10:26

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Dissolved Solids	10000	U	10000	ug/L							

LCS (0G14023-BS1) Prepared & Analyzed: 07/14/2010 10:26

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Dissolved Solids	300		10	mg/L	300		99	90-110			

Duplicate (0G14023-DUP1) Prepared & Analyzed: 07/14/2010 10:26

Source: C007708-01

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Total Dissolved Solids	470000		10000	ug/L		440000			5	10	

Batch 0G19001 - NO PREP

Blank (0G19001-BLK1) Prepared: 07/19/2010 07:27 Analyzed: 07/19/2010 18:41

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chloride	18	U	5000	ug/L							
Sulfate as SO4	120	U	5000	ug/L							

LCS (0G19001-BS1) Prepared: 07/19/2010 07:27 Analyzed: 07/19/2010 19:00

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chloride	49		5.0	mg/L	50.0		97	90-110			
Sulfate as SO4	47		5.0	mg/L	50.0		94	90-110			

Matrix Spike (0G19001-MS1) Prepared: 07/19/2010 07:27 Analyzed: 07/19/2010 19:19

Source: C006510-02

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chloride	47		5.0	mg/L	20.0	26	102	80-120			
Sulfate as SO4	38		5.0	mg/L	20.0	19	93	80-120			

Matrix Spike Dup (0G19001-MSD1) Prepared: 07/19/2010 07:27 Analyzed: 07/19/2010 19:37

Source: C006510-02

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes

QUALITY CONTROL

Classical Chemistry Parameters - Quality Control

Batch 0G19001 - NO PREP

Matrix Spike Dup (0G19001-MSD1) Continued Prepared: 07/19/2010 07:27 Analyzed: 07/19/2010 19:37

Source: C006510-02

Analyte	Result	Flag	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Chloride	47		5.0	mg/L	20.0	26	103	80-120	0.3	15	
Sulfate as SO4	38		5.0	mg/L	20.0	19	95	80-120	1	15	

FLAGS/NOTES AND DEFINITIONS

B	The analyte was detected in the associated method blank.
D	The sample was analyzed at dilution.
J	The reported value is between the laboratory method detection limit (MDL) and the laboratory method reporting limit (MRL), adjusted for actual sample preparation data and moisture content, where applicable.
U	The analyte was analyzed for but not detected to the level shown, adjusted for actual sample preparation data and moisture content, where applicable.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate.
MRL	Method Reporting Limit. The MRL is roughly equivalent to the practical quantitation limit (PQL) and is based on the low point of the calibration curve, when applicable, sample preparation factor, dilution factor, and, in the case of soil samples, moisture content.
QM-05	The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The LCS and/or LCSD were within acceptance limits showing that the laboratory is in control and the data is acceptable.
QM-08	Post-digestion spike did not meet method requirements due to confirmed matrix effects (dilution test).

ENVIRONMENTAL CONSERVATION LABORATORIES CHAIN-OF-CUSTODY RECORD

10775 Central Port Dr.
Orlando, FL 32824
(407) 826-5314 Fax (407) 850-6945

4810 Executive Park Court, Suite 211
Jacksonville, FL 32216-6069
(904) 296-3007 Fax (904) 296-6210

102-A Woodwinds Industrial Ct.
Cary, NC 27511
(919) 467-3090 Fax (919) 467-3515

Page 1 of 1

Client Name: CDM (CD004)	Project Number: [none]
Address: 5400 GLENWOOD AVE SUITE 300	Project Name/Desc: Dare County C&D
City/ST/Zip: RALEIGH, NC 27612-	PO # / Billing Info:
Tel: 325-3566 Fax: ()-	Reporting Contact: Dan Forbes
Sampler(s) Name, Affiliation (Print): Aaron Weisgerning CDM	Billing Contact: Accounts Payable
Sampler(s) Signature:	Facility # (if required):

Requested Analyses

Requested Turnaround Times

Note : Rush requests subject to acceptance by the facility

X Standard

___ Expedited

Due __/__/__

Lab Workorder: C007931

Preservation (See Codes) (Combine as necessary)

Item #	Sample ID (Field Identification)	Collection Date	Collection Time	Comp / Grab	Matrix (see codes)	Total # of Containers	8260B Appendix 1	Alkalinity 310.2 Chloride 300, TDS SM2540C	Fe,Mn	Hg	Sulfate 300						Sample Comments
	2803-GW16	7-8-10	1030	G	GW	5	X	X	X	X	X						report results according
	2803-GW17	7-8-10	1115	G	GW	5	X	X	X	X	X						to SWS guidelines
	Trip Blank	—	—	—	WA	2	X										provide EDD
																	report "J" values
						12	<-- Total # of Containers										

Sample Kit Prepared By: JK	Date/Time: 6-29-10	Relinquished By:	Date/Time: 7/12/10 1145	Received By:	Date/Time: 7/12 9:45
Comments:		Relinquished By:	Date/Time:	Received By:	Date/Time:
		Relinquished By:	Date/Time:	Received By:	Date/Time: 7/12 1030
		Cooler #'s & Temps on Receipt: Green 5.1°C		Condition Upon Receipt: X Acceptable ___ Unacceptable	

Matrix : GW-Groundwater SO-Soil SE-Sediment SW-Surface Water WW-Wastewater A-Air O-Other (detail in comments)

Preservation: I-Ice H-HCl N-HNO3 S-H2SO4 NO-NaOH O-Other (detail in comments)

Note : All samples submitted to ENCO Labs are in accordance with the terms and conditions listed on the reverse of this form, unless prior written agreements exist

www.encolabs.com

Landfill Gas Monitoring Log Sheets

METHANE MONITORING LOG FORM

Dare County C&D Landfill
Dare County, North Carolina

Technician Name: Aaron Weispfenning

Date: (mo/day/year) 7/9/10

General Weather Conditions: Sunny

Temperature: 85°F

Barometric Condition Pressure: (mb) 1011

MONITORING INSTRUCTIONS

1. Measure methane levels at all twelve methane monitoring wells located around the landfill perimeter. The landfill gas readings must not exceed 100% of the methane L.E.L. If methane measurements exceed 100% of the L.E.L., contact the landfill supervisor.

2. Complete the entire data sheet located on the next page.

3. If methane levels exceed the above mentioned levels at any monitoring location, report the measurements to the Environmental Consultant.

4. File this methane monitoring log sheet in the landfill office in the appropriate record keeping section with other landfill records.

METHANE MONITORING DATA SHEET (next page)

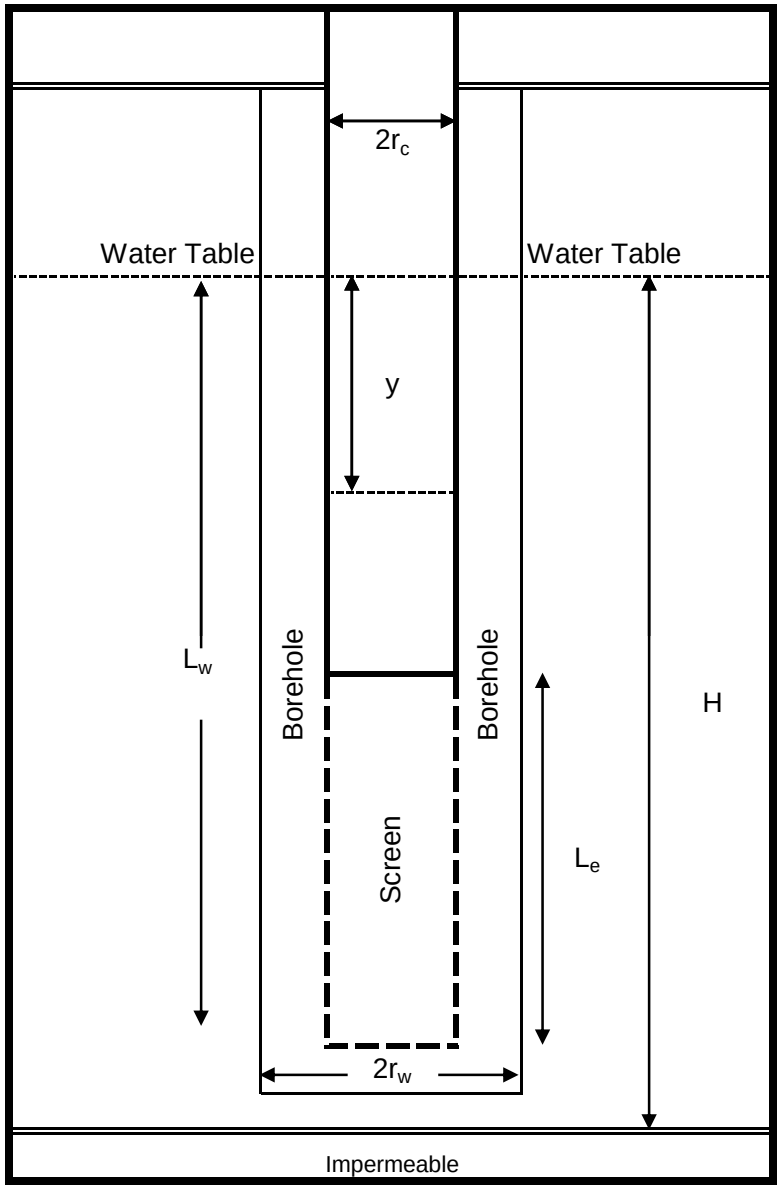
Monitoring Locations	% L.E.L. Reading	Within Compliance		Landfill Supervisor Contacted	
		YES	NO	YES	NO
Methane Well -1	0	X			X
Methane Well - 2	0	X			X
Methane Well - 3	0	X			X
Methane Well - 4	0	X			X
Methane Well - 5	0	X			X
Methane Well - 6	0	X			X
Methane Well - 7	0	X			X
Methane Well - 8	0	X			X
Methane Well - 9	0	X			X
Methane Well - 10	0	X			X
Methane Well - 11	17	X			X
Methane Well - 12	0	X			X

Comments and Observations:

M-11 CH_4 = 0.9% CO_2 = 4.9% O_2 = 18.4%

Landfill Supervisor Actions Taken:

Slug Test Raw Data and Calculations



Input Data

Term	Units	
$2r_c$	Inches	2
$2r_W$	Inches	3
L_w	Feet	10.68
L_e	Feet	12.5
H*	Feet	30
y_t	Feet	2
t_0	Seconds	0
y_0	Feet	0.001
t	Seconds	56

Solutions

Hydraulic Conductivity in Feet/Second
1.16E-04
Hydraulic Conductivity in Feet/Minute
6.94E-03
Hydraulic Conductivity in Feet/Day
9.99E+00

* - Assumed value

Calculations

Term	Units		
L_e/r_W	Feet/Foot	100.00	$\ln(R_e/r_W)_{\text{partial penetration}}$ = 3.066
A	None	4.310	
B	None	0.709	$\ln(R_e/r_W)_{\text{full penetration}}$ = 3.066
C	None	4.041	3.476

General Equations

$$K = \frac{r_c^2 \ln(R_e/r_W)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t}$$

Where

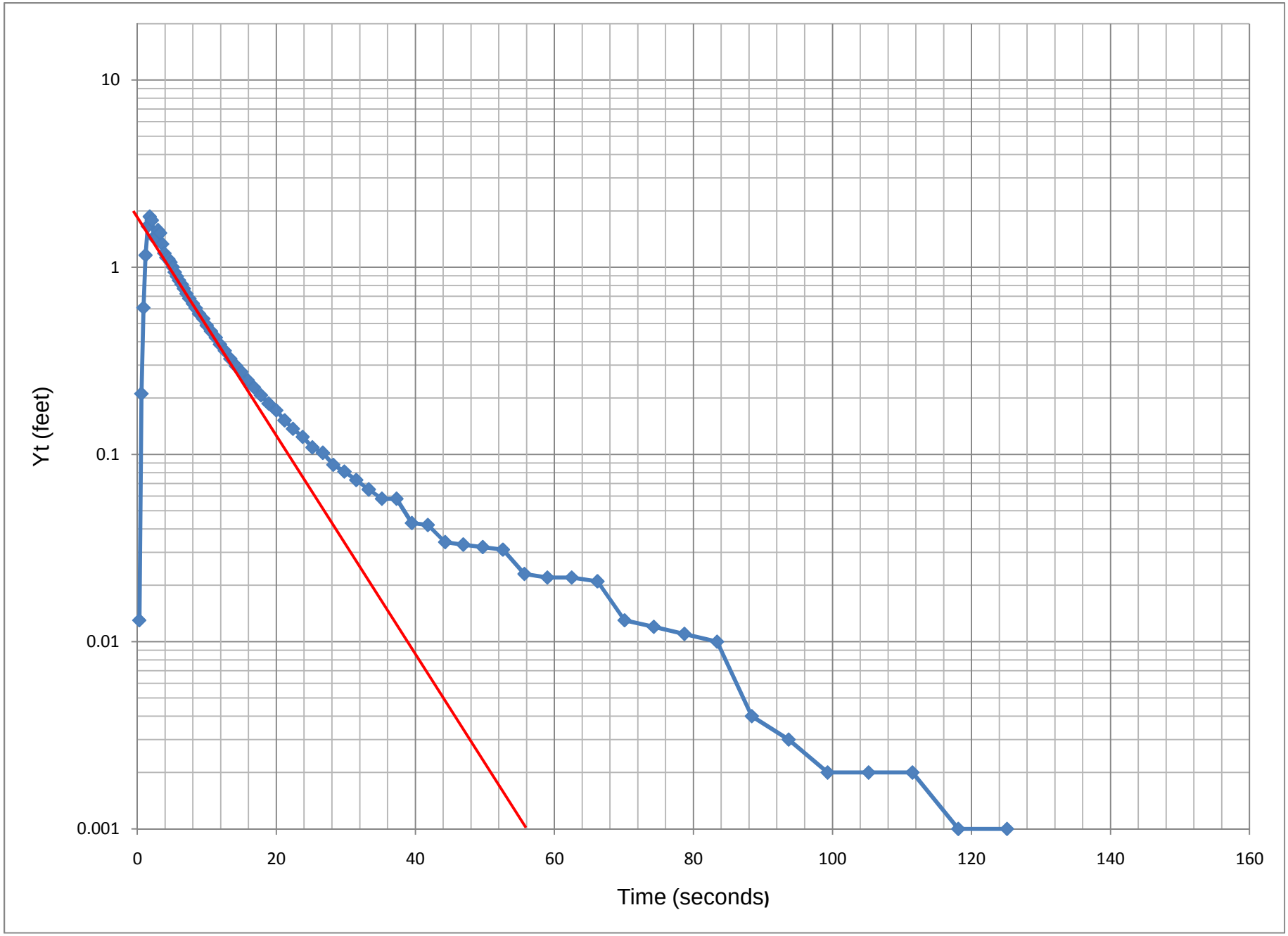
$$\ln(Re/r_W) = \left\{ \frac{1.1}{\ln(L_W/r_W)} + \frac{A + B \ln[(H - L_W)/r_W]}{L_e/r_W} \right\}^{-1}$$

For partial penetration or the equation below for full penetration

$$\ln(Re/r_W) = \left\{ \frac{1.1}{\ln(L_W/r_W)} + \frac{C}{L_e/r_W} \right\}^{-1}$$

CDM

GW-16 Fall
Cell No. 4 C&D Landfill Expansion
Dare County, North Carolina



CDM

GW-16 Fall
Cell No. 4 C&D Landfill Expansion
Dare County, North Carolina

In-Situ Inc. MiniTroll Pro

Report generated: 7/8/2010 14:52:15
Report from file: ...\SN07862 2010-07-08 133301 GW-16 Slug In.bin
Win-Situ® Version 4.57.5.0

Serial number: 7862
Firmware Version 3.09
Unit name:

Test name: GW-16 Slug In

Test defined on: 7/8/2010 13:23:54
Test started on: 7/8/2010 13:33:01
Test stopped on: 7/8/2010 14:28:30

Data gathered using Logarithmic testing
Maximum time between data points: 900.0 Seconds.
Number of data samples: 130

TOTAL DATA SAMPLES 130

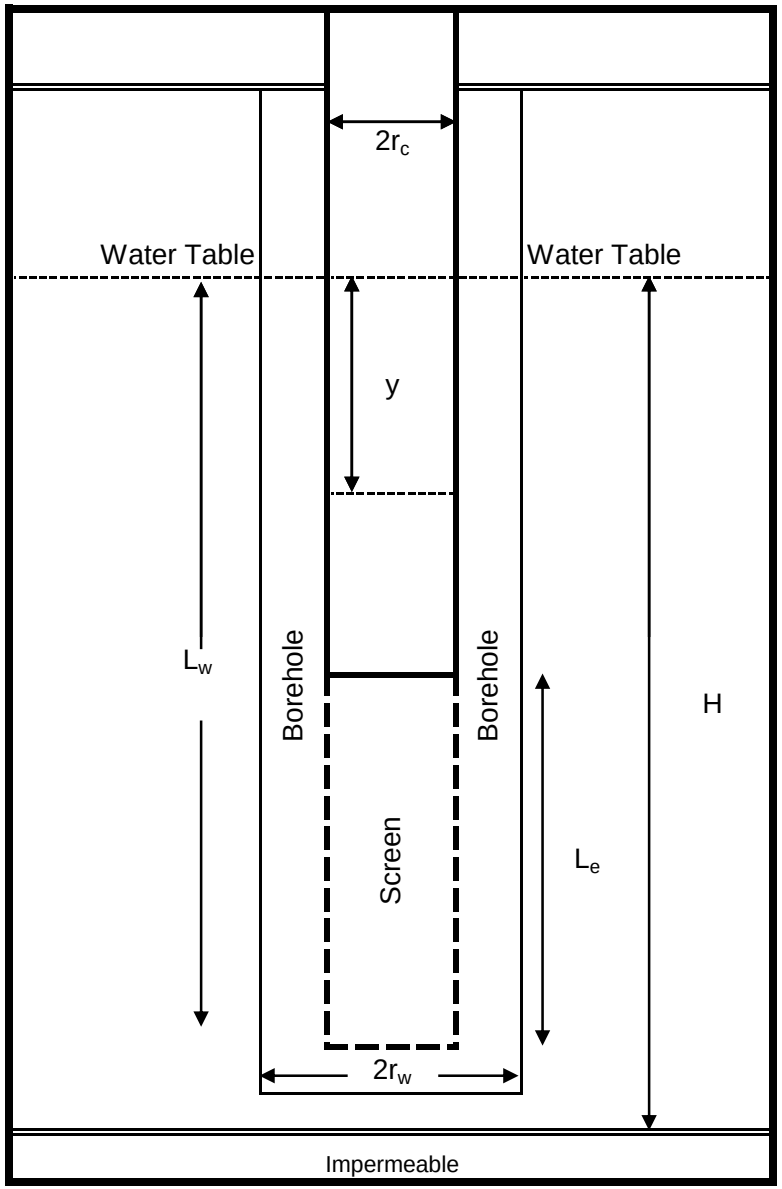
Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: GW-16
Sensor Range: 100 PSIG.
Sensor Offset: 0.000 psi
Specific gravity: 1
Mode: Surface
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 8.788 Feet H2O

Date	Time	ET (sec)	Chan[1] Temperature Fahrenheit	Chan[2] Pressure Feet H2O	Y_t (feet)
7/8/2010	13:33:01	0	63.36	0	0
7/8/2010	13:33:02	0.3	63.39	0.013	0.013
7/8/2010	13:33:02	0.6	63.39	0.211	0.211
7/8/2010	13:33:02	0.9	63.39	0.607	0.607
7/8/2010	13:33:03	1.2	63.41	1.159	1.159
7/8/2010	13:33:03	1.5	63.41	1.657	1.657
7/8/2010	13:33:03	1.8	63.41	1.862	1.862
7/8/2010	13:33:03	2.1	63.41	1.78	1.78
7/8/2010	13:33:04	2.4	63.41	1.446	1.446
7/8/2010	13:33:04	2.7	63.41	1.446	1.446
7/8/2010	13:33:04	3	63.41	1.575	1.575
7/8/2010	13:33:05	3.3	63.41	1.521	1.521
7/8/2010	13:33:05	3.6	63.41	1.33	1.33
7/8/2010	13:33:05	3.9	63.41	1.186	1.186
7/8/2010	13:33:06	4.2	63.41	1.125	1.125
7/8/2010	13:33:06	4.5	63.41	1.104	1.104
7/8/2010	13:33:06	4.8	63.41	1.063	1.063
7/8/2010	13:33:06	5.1	63.41	1.002	1.002
7/8/2010	13:33:07	5.4	63.41	0.94	0.94
7/8/2010	13:33:07	5.7	63.41	0.893	0.893
7/8/2010	13:33:07	6	63.43	0.851	0.851
7/8/2010	13:33:08	6.4	63.43	0.81	0.81

7/8/2010	13:33:08	6.7	63.43	0.769	0.769
7/8/2010	13:33:08	7.1	63.43	0.721	0.721
7/8/2010	13:33:09	7.5	63.43	0.68	0.68
7/8/2010	13:33:09	8	63.43	0.639	0.639
7/8/2010	13:33:10	8.4	63.43	0.605	0.605
7/8/2010	13:33:10	8.9	63.43	0.564	0.564
7/8/2010	13:33:11	9.5	63.43	0.53	0.53
7/8/2010	13:33:11	10	63.43	0.489	0.489
7/8/2010	13:33:12	10.6	63.43	0.455	0.455
7/8/2010	13:33:13	11.3	63.43	0.421	0.421
7/8/2010	13:33:13	11.9	63.43	0.387	0.387
7/8/2010	13:33:14	12.6	63.45	0.358	0.358
7/8/2010	13:33:15	13.4	63.45	0.324	0.324
7/8/2010	13:33:16	14.2	63.45	0.297	0.297
7/8/2010	13:33:16	15	63.45	0.276	0.276
7/8/2010	13:33:17	15.9	63.45	0.249	0.249
7/8/2010	13:33:18	16.8	63.48	0.228	0.228
7/8/2010	13:33:19	17.8	63.48	0.207	0.207
7/8/2010	13:33:20	18.9	63.48	0.187	0.187
7/8/2010	13:33:21	20	63.5	0.172	0.172
7/8/2010	13:33:23	21.2	63.5	0.152	0.152
7/8/2010	13:33:24	22.4	63.52	0.137	0.137
7/8/2010	13:33:25	23.8	63.52	0.124	0.124
7/8/2010	13:33:27	25.2	63.55	0.109	0.109
7/8/2010	13:33:28	26.7	63.55	0.102	0.102
7/8/2010	13:33:30	28.2	63.57	0.088	0.088
7/8/2010	13:33:31	29.8	63.57	0.081	0.081
7/8/2010	13:33:33	31.5	63.59	0.073	0.073
7/8/2010	13:33:35	33.3	63.61	0.065	0.065
7/8/2010	13:33:37	35.2	63.64	0.058	0.058
7/8/2010	13:33:39	37.3	63.64	0.058	0.058
7/8/2010	13:33:41	39.5	63.66	0.043	0.043
7/8/2010	13:33:43	41.8	63.68	0.042	0.042
7/8/2010	13:33:46	44.3	63.73	0.034	0.034
7/8/2010	13:33:48	46.9	63.75	0.033	0.033
7/8/2010	13:33:51	49.7	63.77	0.032	0.032
7/8/2010	13:33:54	52.6	63.8	0.031	0.031
7/8/2010	13:33:57	55.7	63.82	0.023	0.023
7/8/2010	13:34:00	59	63.84	0.022	0.022
7/8/2010	13:34:04	62.5	63.87	0.022	0.022
7/8/2010	13:34:08	66.2	63.89	0.021	0.021
7/8/2010	13:34:11	70.1	63.91	0.013	0.013
7/8/2010	13:34:16	74.3	63.93	0.012	0.012
7/8/2010	13:34:20	78.7	63.96	0.011	0.011
7/8/2010	13:34:25	83.4	63.98	0.01	0.01
7/8/2010	13:34:30	88.4	63.98	0.004	0.004
7/8/2010	13:34:35	93.7	64	0.003	0.003
7/8/2010	13:34:41	99.3	64.03	0.002	0.002
7/8/2010	13:34:47	105.2	64.03	0.002	0.002
7/8/2010	13:34:53	111.5	64.03	0.002	0.002
7/8/2010	13:34:59	118.1	64.05	0.001	0.001
7/8/2010	13:35:06	125.1	64.05	0.001	0.001
7/8/2010	13:35:14	132.6	64.07	0	0
7/8/2010	13:35:22	140.5	64.07	0	0
7/8/2010	13:35:30	148.9	64.07	0	0
7/8/2010	13:35:39	157.8	64.07	-0.007	-0.007
7/8/2010	13:35:49	167.2	64.09	-0.001	-0.001
7/8/2010	13:35:59	177.2	64.09	-0.001	-0.001
7/8/2010	13:36:09	187.8	64.09	-0.001	-0.001
7/8/2010	13:36:20	199	64.09	-0.001	-0.001
7/8/2010	13:36:32	210.9	64.09	-0.001	-0.001
7/8/2010	13:36:45	223.5	64.07	-0.007	-0.007
7/8/2010	13:36:58	236.8	64.09	-0.001	-0.001
7/8/2010	13:37:12	250.9	64.07	-0.007	-0.007
7/8/2010	13:37:27	265.8	64.07	-0.007	-0.007
7/8/2010	13:37:43	281.6	64.07	-0.007	-0.007
7/8/2010	13:38:00	298.4	64.07	-0.007	-0.007
7/8/2010	13:38:18	316.2	64.05	-0.006	-0.006
7/8/2010	13:38:36	335	64.05	-0.006	-0.006

7/8/2010	13:38:56	354.9	64.05	0.001	0.001
7/8/2010	13:39:17	376	64.03	-0.005	-0.005
7/8/2010	13:39:40	398.4	64.03	-0.005	-0.005
7/8/2010	13:40:03	422.1	64.03	-0.005	-0.005
7/8/2010	13:40:29	447.2	64	-0.011	-0.011
7/8/2010	13:40:55	473.8	64	-0.004	-0.004
7/8/2010	13:41:23	502	63.98	-0.01	-0.01
7/8/2010	13:41:53	531.9	63.98	-0.003	-0.003
7/8/2010	13:42:25	563.5	63.96	-0.009	-0.009
7/8/2010	13:42:58	597	63.96	-0.009	-0.009
7/8/2010	13:43:34	632.5	63.93	-0.008	-0.008
7/8/2010	13:44:11	670.1	63.91	-0.007	-0.007
7/8/2010	13:44:51	709.9	63.91	-0.007	-0.007
7/8/2010	13:45:33	752.1	63.89	-0.007	-0.007
7/8/2010	13:46:18	796.8	63.87	-0.013	-0.013
7/8/2010	13:47:06	844.2	63.87	-0.013	-0.013
7/8/2010	13:47:56	894.4	63.84	-0.012	-0.012
7/8/2010	13:48:49	947.5	63.82	-0.011	-0.011
7/8/2010	13:49:45	1003.8	63.8	-0.01	-0.01
7/8/2010	13:50:45	1063.4	63.77	-0.009	-0.009
7/8/2010	13:51:48	1126.6	63.77	-0.016	-0.016
7/8/2010	13:52:55	1193.5	63.75	-0.015	-0.015
7/8/2010	13:54:06	1264.4	63.73	-0.014	-0.014
7/8/2010	13:55:21	1339.5	63.71	-0.013	-0.013
7/8/2010	13:56:40	1419	63.68	-0.012	-0.012
7/8/2010	13:58:05	1503.3	63.68	-0.012	-0.012
7/8/2010	13:59:34	1592.6	63.66	0.002	0.002
7/8/2010	14:01:08	1687.1	63.64	-0.017	-0.017
7/8/2010	14:02:49	1787.2	63.61	-0.017	-0.017
7/8/2010	14:04:35	1893.3	63.59	-0.016	-0.016
7/8/2010	14:06:27	2005.7	63.59	-0.016	-0.016
7/8/2010	14:08:26	2124.7	63.57	-0.022	-0.022
7/8/2010	14:10:32	2250.8	63.55	-0.014	-0.014
7/8/2010	14:12:46	2384.4	63.55	-0.014	-0.014
7/8/2010	14:15:07	2525.9	63.52	-0.013	-0.013
7/8/2010	14:17:37	2675.8	63.5	-0.019	-0.019
7/8/2010	14:20:16	2834.6	63.5	-0.019	-0.019
7/8/2010	14:23:04	3002.8	63.48	-0.011	-0.011
7/8/2010	14:26:02	3180.9	63.45	-0.017	-0.017



Input Data

Term	Units	
$2r_c$	Inches	2
$2r_W$	Inches	3
L_w	Feet	10.68
L_e	Feet	12.5
H*	Feet	30
y_t	Feet	1.4
t_0	Seconds	0
y_o	Feet	0.001
t	Seconds	70

Solutions

Hydraulic Conductivity in Feet/Second
8.81E-05
Hydraulic Conductivity in Feet/Minute
5.29E-03
Hydraulic Conductivity in Feet/Day
7.62E+00

* - Assumed value

Calculations

Term	Units		
L_e/r_W	Feet/Foot	100.00	$\ln(R_e/r_W)_{\text{partial penetration}}$ = 3.066
A	None	4.310	$\ln(R_e/r_W)_{\text{full penetration}}$ = 3.066
B	None	0.709	
C	None	4.041	

General Equations

$$K = \frac{r_c^2 \ln(R_e/r_W)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t}$$

Where

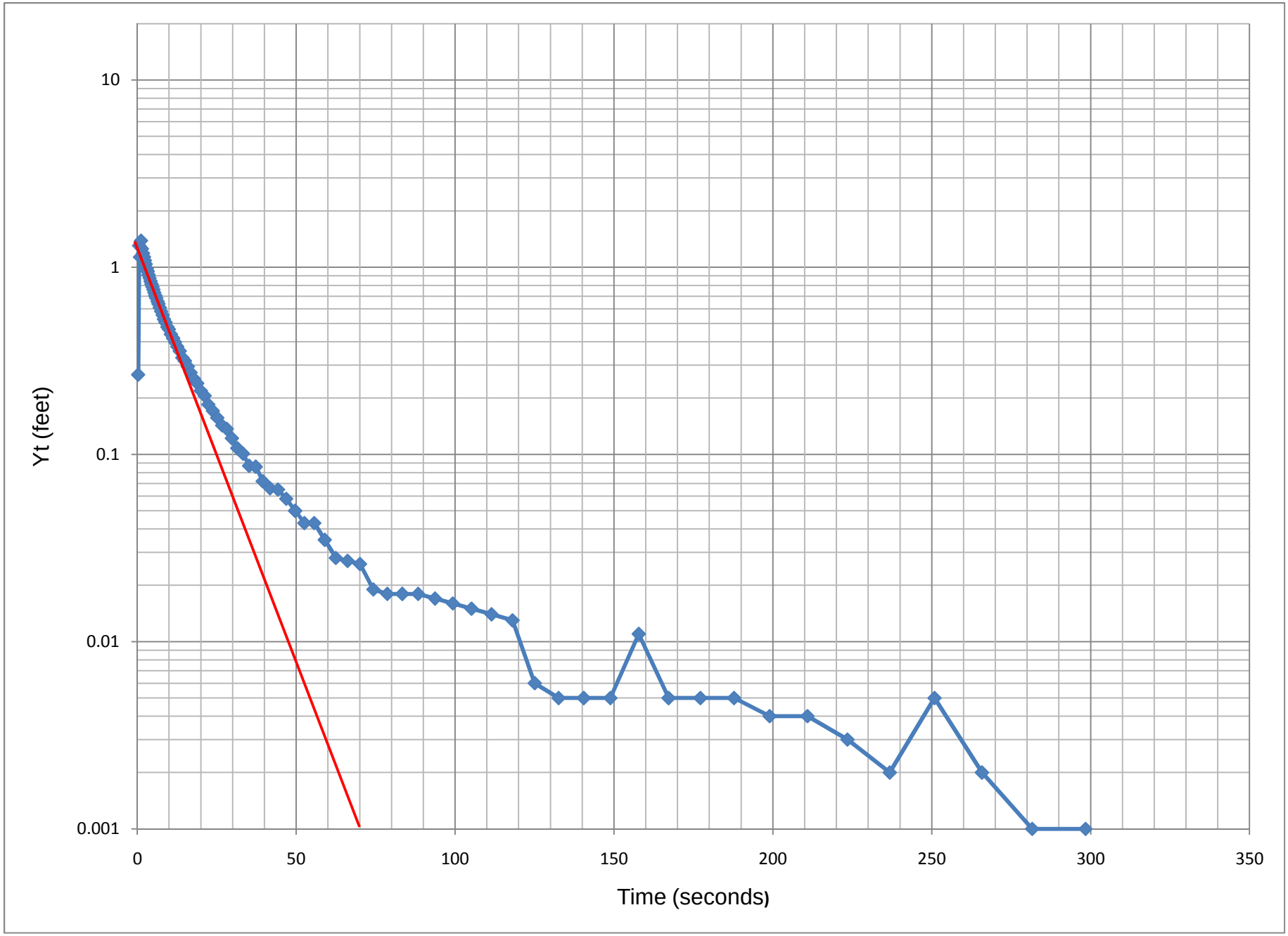
$$\ln(Re/r_W) = \left\{ \frac{1.1}{\ln(L_W/r_W)} + \frac{A + B \ln[(H - L_W)/r_W]}{L_e/r_W} \right\}^{-1}$$

For partial penetration or the equation below for full penetration

$$\ln(Re/r_W) = \left\{ \frac{1.1}{\ln(L_W/r_W)} + \frac{C}{L_e/r_W} \right\}^{-1}$$

CDM

GW-16 Recovery
Cell No. 4 C&D Landfill Expansion
Dare County, North Carolina



CDM

GW-16 Recovery
Cell No. 4 C&D Landfill Expansion
Dare County, North Carolina

In-Situ Inc. MiniTroll Pro

Report generated: 7/8/2010 14:54:07
Report from file: ...\SN07862 2010-07-08 143011 GW-16 Slug Out.bin
Win-Situ® Version 4.57.5.0

Serial number: 7862
Firmware Version 3.09
Unit name:

Test name: GW-16 Slug Out

Test defined on: 7/8/2010 14:29:01
Test started on: 7/8/2010 14:30:11
Test stopped on: 7/8/2010 14:51:21

Data gathered using Logarithmic testing
Maximum time between data points: 900.0 Seconds.
Number of data samples: 114

TOTAL DATA SAMPLES 114

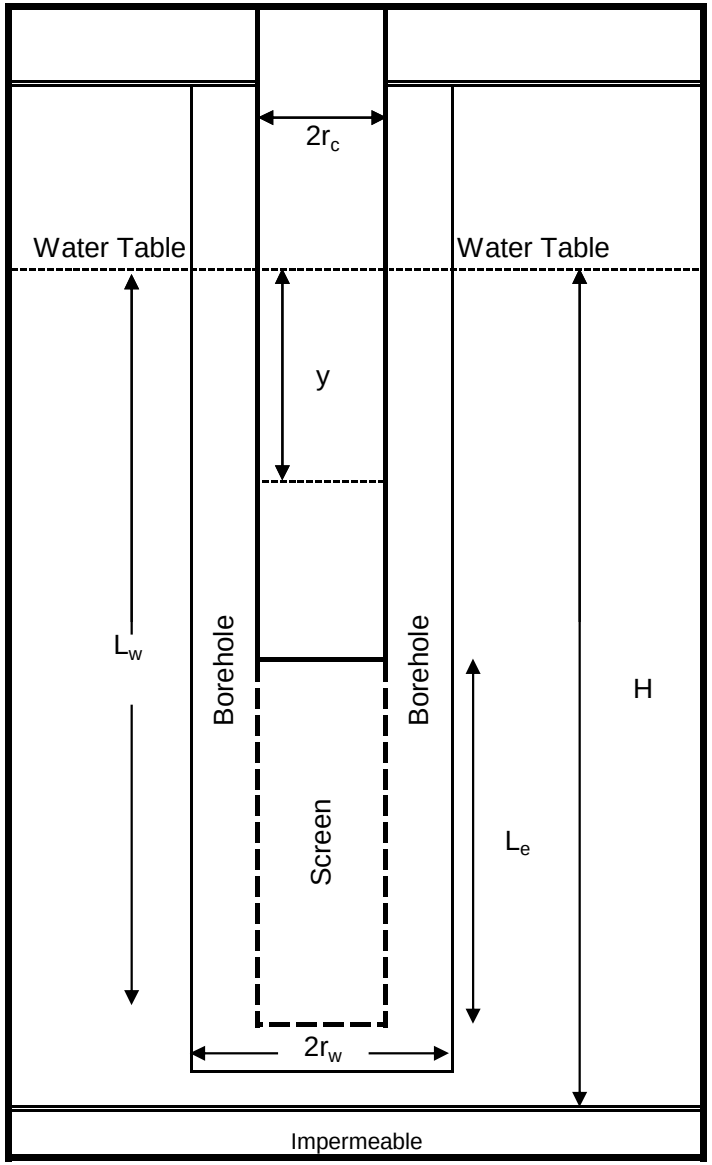
Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: GW-16
Sensor Range: 100 PSIG.
Sensor Offset: 0.000 psi
Specific gravity: 1
Mode: Surface
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 8.772 Feet H2O

Date	Time	ET (sec)	Chan[1] Temperatur Fahrenheit	Chan[2] Pressure Feet H2O	Y_t (feet)
7/8/2010	14:30:11	0	63.43	0	0
7/8/2010	14:30:11	0.3	63.45	0.267	0.267
7/8/2010	14:30:12	0.6	63.45	1.305	1.305
7/8/2010	14:30:12	0.9	63.45	1.134	1.134
7/8/2010	14:30:12	1.2	63.45	1.387	1.387
7/8/2010	14:30:13	1.5	63.45	1.257	1.257
7/8/2010	14:30:13	1.8	63.45	1.189	1.189
7/8/2010	14:30:13	2.1	63.48	1.135	1.135
7/8/2010	14:30:14	2.4	63.48	1.087	1.087
7/8/2010	14:30:14	2.7	63.48	1.04	1.04
7/8/2010	14:30:14	3	63.48	0.985	0.985
7/8/2010	14:30:14	3.3	63.48	0.951	0.951
7/8/2010	14:30:15	3.6	63.48	0.91	0.91
7/8/2010	14:30:15	3.9	63.48	0.876	0.876
7/8/2010	14:30:15	4.2	63.48	0.842	0.842
7/8/2010	14:30:16	4.5	63.48	0.814	0.814
7/8/2010	14:30:16	4.8	63.48	0.787	0.787

7/8/2010	14:30:16	5.1	63.48	0.76	0.76
7/8/2010	14:30:17	5.4	63.48	0.732	0.732
7/8/2010	14:30:17	5.7	63.48	0.705	0.705
7/8/2010	14:30:17	6	63.48	0.685	0.685
7/8/2010	14:30:18	6.4	63.48	0.657	0.657
7/8/2010	14:30:18	6.7	63.48	0.637	0.637
7/8/2010	14:30:18	7.1	63.48	0.609	0.609
7/8/2010	14:30:19	7.5	63.48	0.582	0.582
7/8/2010	14:30:19	8	63.5	0.556	0.556
7/8/2010	14:30:20	8.4	63.48	0.528	0.528
7/8/2010	14:30:20	8.9	63.5	0.508	0.508
7/8/2010	14:30:21	9.5	63.48	0.48	0.48
7/8/2010	14:30:21	10	63.48	0.466	0.466
7/8/2010	14:30:22	10.6	63.48	0.439	0.439
7/8/2010	14:30:22	11.3	63.48	0.418	0.418
7/8/2010	14:30:23	11.9	63.48	0.398	0.398
7/8/2010	14:30:24	12.6	63.48	0.377	0.377
7/8/2010	14:30:25	13.4	63.48	0.357	0.357
7/8/2010	14:30:25	14.2	63.48	0.329	0.329
7/8/2010	14:30:26	15	63.48	0.316	0.316
7/8/2010	14:30:27	15.9	63.48	0.295	0.295
7/8/2010	14:30:28	16.8	63.45	0.274	0.274
7/8/2010	14:30:29	17.8	63.45	0.254	0.254
7/8/2010	14:30:30	18.9	63.45	0.24	0.24
7/8/2010	14:30:31	20	63.45	0.219	0.219
7/8/2010	14:30:32	21.2	63.45	0.206	0.206
7/8/2010	14:30:34	22.4	63.45	0.185	0.185
7/8/2010	14:30:35	23.8	63.43	0.171	0.171
7/8/2010	14:30:36	25.2	63.43	0.157	0.157
7/8/2010	14:30:38	26.7	63.43	0.143	0.143
7/8/2010	14:30:39	28.2	63.43	0.137	0.137
7/8/2010	14:30:41	29.8	63.41	0.122	0.122
7/8/2010	14:30:43	31.5	63.41	0.108	0.108
7/8/2010	14:30:44	33.3	63.39	0.101	0.101
7/8/2010	14:30:46	35.2	63.39	0.087	0.087
7/8/2010	14:30:48	37.3	63.36	0.086	0.086
7/8/2010	14:30:51	39.5	63.36	0.072	0.072
7/8/2010	14:30:53	41.8	63.36	0.066	0.066
7/8/2010	14:30:55	44.3	63.34	0.065	0.065
7/8/2010	14:30:58	46.9	63.34	0.058	0.058
7/8/2010	14:31:01	49.7	63.32	0.05	0.05
7/8/2010	14:31:04	52.6	63.29	0.043	0.043
7/8/2010	14:31:07	55.7	63.29	0.043	0.043
7/8/2010	14:31:10	59	63.27	0.035	0.035
7/8/2010	14:31:14	62.5	63.27	0.028	0.028
7/8/2010	14:31:17	66.2	63.25	0.027	0.027
7/8/2010	14:31:21	70.1	63.23	0.026	0.026
7/8/2010	14:31:25	74.3	63.23	0.019	0.019
7/8/2010	14:31:30	78.7	63.2	0.018	0.018
7/8/2010	14:31:35	83.4	63.18	0.018	0.018
7/8/2010	14:31:40	88.4	63.18	0.018	0.018
7/8/2010	14:31:45	93.7	63.16	0.017	0.017
7/8/2010	14:31:50	99.3	63.13	0.016	0.016
7/8/2010	14:31:56	105.2	63.11	0.015	0.015
7/8/2010	14:32:03	111.5	63.09	0.014	0.014
7/8/2010	14:32:09	118.1	63.07	0.013	0.013
7/8/2010	14:32:16	125.1	63.07	0.006	0.006
7/8/2010	14:32:24	132.6	63.04	0.005	0.005
7/8/2010	14:32:32	140.5	63.04	0.005	0.005
7/8/2010	14:32:40	148.9	63.04	0.005	0.005
7/8/2010	14:32:49	157.8	63.02	0.011	0.011
7/8/2010	14:32:58	167.2	63.02	0.005	0.005

7/8/2010	14:33:08	177.2	63.02	0.005	0.005
7/8/2010	14:33:19	187.8	63.02	0.005	0.005
7/8/2010	14:33:30	199	63	0.004	0.004
7/8/2010	14:33:42	210.9	63	0.004	0.004
7/8/2010	14:33:55	223.5	63	0.003	0.003
7/8/2010	14:34:08	236.8	63.02	0.002	0.002
7/8/2010	14:34:22	250.9	63.02	0.005	0.005
7/8/2010	14:34:37	265.8	63.02	0.002	0.002
7/8/2010	14:34:53	281.6	63.04	0.001	0.001
7/8/2010	14:35:10	298.4	63.04	0.001	0.001
7/8/2010	14:35:27	316.2	63.07	0	0
7/8/2010	14:35:46	335	63.07	0	0
7/8/2010	14:36:06	354.9	63.09	0	0
7/8/2010	14:36:27	376	63.09	0	0
7/8/2010	14:36:50	398.4	63.09	0	0
7/8/2010	14:37:13	422.1	63.09	0	0
7/8/2010	14:37:38	447.2	63.09	-0.007	-0.007
7/8/2010	14:38:05	473.8	63.07	-0.013	-0.013
7/8/2010	14:38:33	502	63.04	-0.012	-0.012
7/8/2010	14:39:03	531.9	63.02	-0.005	-0.005
7/8/2010	14:39:35	563.5	63	-0.004	-0.004
7/8/2010	14:40:08	597	62.97	0.004	0.004
7/8/2010	14:40:44	632.5	62.95	-0.002	-0.002
7/8/2010	14:41:21	670.1	62.93	-0.001	-0.001
7/8/2010	14:42:01	709.9	62.95	-0.002	-0.002
7/8/2010	14:42:43	752.1	62.93	-0.001	-0.001
7/8/2010	14:43:28	796.8	62.93	-0.001	-0.001
7/8/2010	14:44:15	844.2	62.91	0	0
7/8/2010	14:45:06	894.4	62.91	0	0
7/8/2010	14:45:59	947.5	62.93	-0.001	-0.001
7/8/2010	14:46:55	1003.8	62.91	0	0
7/8/2010	14:47:55	1063.4	62.88	0.014	0.014
7/8/2010	14:48:58	1126.6	62.88	0.014	0.014
7/8/2010	14:50:05	1193.5	62.88	0.008	0.008
7/8/2010	14:51:16	1264.4	62.88	0.008	0.008



Input Data

Term	Units	
$2r_c$	Inches	2
$2r_W$	Inches	3
L_w	Feet	8.06
L_e	Feet	10
H*	Feet	30
y_t	Feet	1.7
t_0	Seconds	0
y_o	Feet	0.001
t	Seconds	200

* - Assumed value

Solutions

Hydraulic Conductivity in Feet/Second
3.66E-05
Hydraulic Conductivity in Feet/Minute
2.20E-03
Hydraulic Conductivity in Feet/Day
3.17E+00

Calculations

Term	Units		
L_e/r_W	Feet/Foot	80.00	$\ln(R_e/r_W)_{\text{partial penetration}}$ = 2.837
A	None	3.852	$\ln(R_e/r_W)_{\text{full penetration}}$ = 2.837
B	None	0.624	
C	None	3.465	3.254

General Equations

$$K = \frac{r_c^2 \ln(R_e/r_W)}{2L_e} \quad \frac{1}{t} \ln \frac{y_0}{y_t}$$

Where

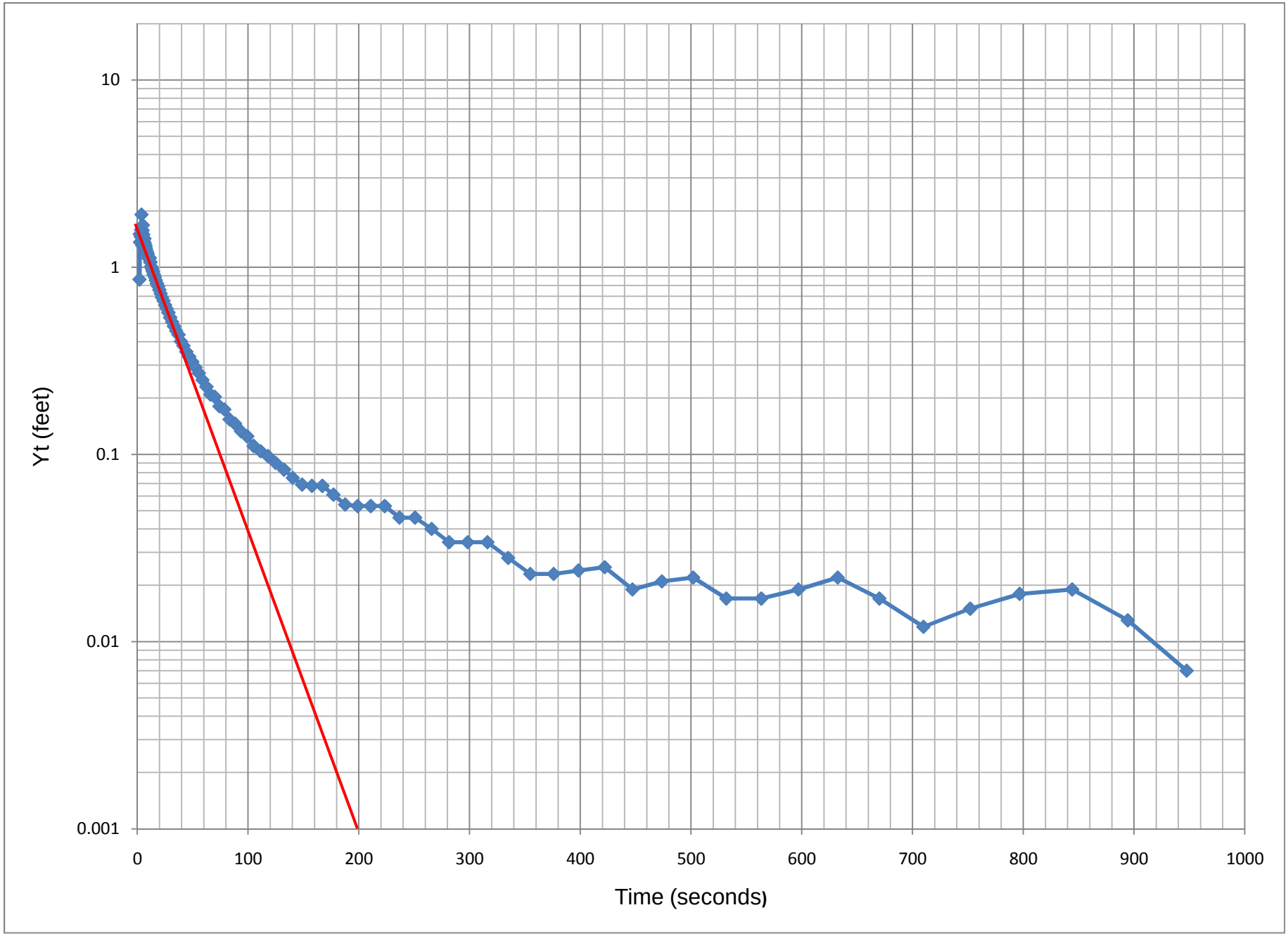
$$\ln(Re/r_W) = \left\{ \frac{1.1}{\ln(L_W/r_W)} + \frac{A + B \ln[(H - L_W)/r_W]}{L_e/r_W} \right\}^{-1}$$

For partial penetration or the equation below for full penetration

$$\ln(Re/r_W) = \left\{ \frac{1.1}{\ln(L_W/r_W)} + \frac{C}{L_e/r_W} \right\}^{-1}$$

CDM

GW-17 Fall
Cell No. 4 C&D Landfill Expansion
Dare County, North Carolina



CDM

GW-17 Fall
Cell No. 4 C&D Landfill Expansion
Dare County, North Carolina

In-Situ Inc. MiniTroll Pro

Report generated: 7/8/2010 16:26:14
Report from file: ...\SN07862 2010-07-08 153839 GW-17 Slug In.bin
Win-Situ® Version 4.57.5.0

Serial number: 7862
Firmware Version 3.09
Unit name:

Test name: GW-17 Slug In

Test defined on: 7/8/2010 15:37:00
Test started on: 7/8/2010 15:38:39
Test stopped on: 7/8/2010 16:04:43

Data gathered using Logarithmic testing
Maximum time between data points: 900.0 Seconds.
Number of data samples: 117

TOTAL DATA SAMPLES 117

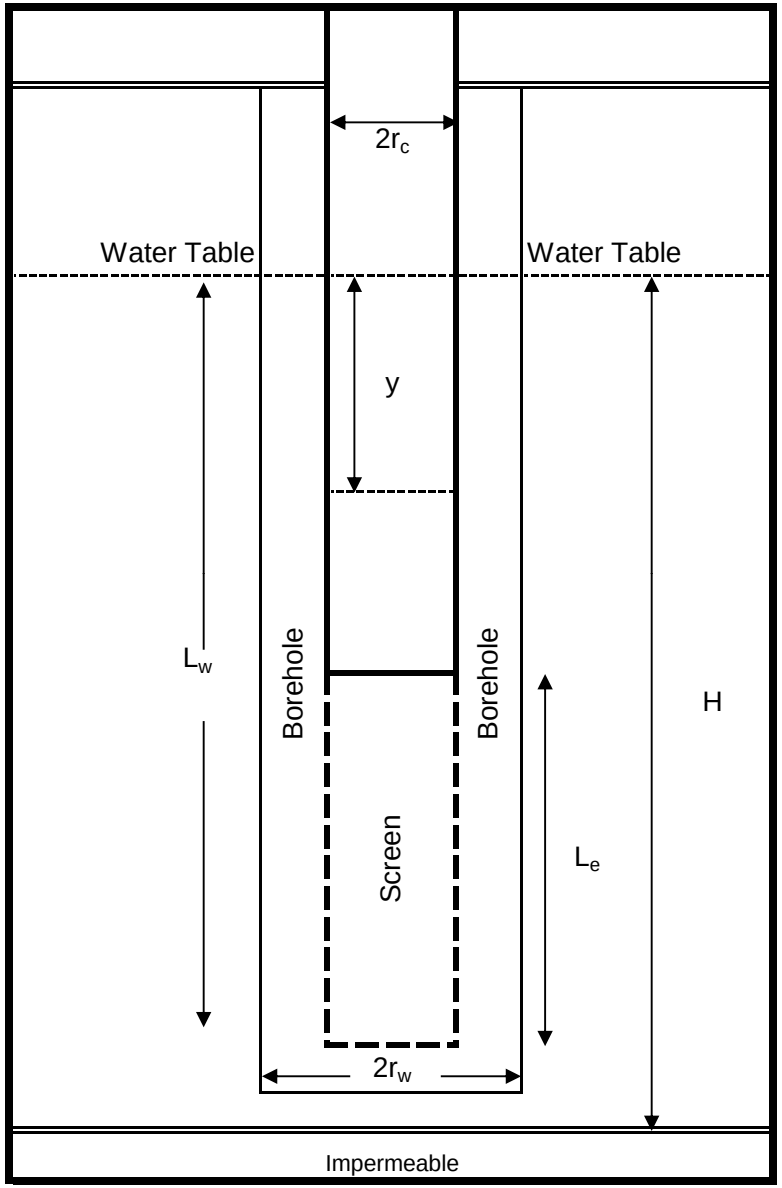
Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: GW-17
Sensor Range: 100 PSIG.
Sensor Offset: 0.000 psi
Specific gravity: 1
Mode: Surface
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 5.449 Feet H2O

Date	Time	ET (sec)	Chan[1] Temperature Fahrenheit	Chan[2] Pressure Feet H2O	Y_t (feet)
7/8/2010	15:38:39	0	66.42	0	-0.032
7/8/2010	15:38:40	0.3	66.42	0.014	-0.018
7/8/2010	15:38:40	0.6	66.42	0.02	-0.012
7/8/2010	15:38:40	0.9	66.44	0.02	-0.012
7/8/2010	15:38:41	1.2	66.44	0.026	-0.006
7/8/2010	15:38:41	1.5	66.44	0.033	0.001
7/8/2010	15:38:41	1.8	66.44	0.047	0.015
7/8/2010	15:38:41	2.1	66.44	0.893	0.861
7/8/2010	15:38:42	2.4	66.44	1.535	1.503
7/8/2010	15:38:42	2.7	66.44	1.398	1.366
7/8/2010	15:38:42	3	66.44	1.391	1.359
7/8/2010	15:38:43	3.3	66.44	1.487	1.455
7/8/2010	15:38:43	3.6	66.44	1.616	1.584
7/8/2010	15:38:43	3.9	66.44	1.944	1.912
7/8/2010	15:38:44	4.2	66.47	1.561	1.529

7/8/2010	15:38:44	4.5	66.44	1.337	1.305
7/8/2010	15:38:44	4.8	66.47	1.609	1.577
7/8/2010	15:38:44	5.1	66.47	1.711	1.679
7/8/2010	15:38:45	5.4	66.47	1.527	1.495
7/8/2010	15:38:45	5.7	66.47	1.411	1.379
7/8/2010	15:38:45	6	66.47	1.445	1.413
7/8/2010	15:38:46	6.4	66.47	1.459	1.427
7/8/2010	15:38:46	6.7	66.47	1.384	1.352
7/8/2010	15:38:46	7.1	66.47	1.349	1.317
7/8/2010	15:38:47	7.5	66.47	1.336	1.304
7/8/2010	15:38:47	8	66.47	1.295	1.263
7/8/2010	15:38:48	8.4	66.47	1.261	1.229
7/8/2010	15:38:48	8.9	66.47	1.233	1.201
7/8/2010	15:38:49	9.5	66.47	1.206	1.174
7/8/2010	15:38:49	10	66.47	1.158	1.126
7/8/2010	15:38:50	10.6	66.47	1.145	1.113
7/8/2010	15:38:51	11.3	66.47	1.152	1.12
7/8/2010	15:38:51	11.9	66.47	1.097	1.065
7/8/2010	15:38:52	12.6	66.47	1.042	1.01
7/8/2010	15:38:53	13.4	66.47	1.015	0.983
7/8/2010	15:38:54	14.2	66.47	0.981	0.949
7/8/2010	15:38:54	15	66.47	0.947	0.915
7/8/2010	15:38:55	15.9	66.47	0.92	0.888
7/8/2010	15:38:56	16.8	66.47	0.885	0.853
7/8/2010	15:38:57	17.8	66.47	0.851	0.819
7/8/2010	15:38:58	18.9	66.47	0.824	0.792
7/8/2010	15:38:59	20	66.47	0.79	0.758
7/8/2010	15:39:01	21.2	66.47	0.756	0.724
7/8/2010	15:39:02	22.4	66.47	0.722	0.69
7/8/2010	15:39:03	23.8	66.47	0.694	0.662
7/8/2010	15:39:05	25.2	66.47	0.66	0.628
7/8/2010	15:39:06	26.7	66.47	0.633	0.601
7/8/2010	15:39:08	28.2	66.49	0.605	0.573
7/8/2010	15:39:09	29.8	66.49	0.571	0.539
7/8/2010	15:39:11	31.5	66.49	0.543	0.511
7/8/2010	15:39:13	33.3	66.49	0.516	0.484
7/8/2010	15:39:15	35.2	66.49	0.489	0.457
7/8/2010	15:39:17	37.3	66.49	0.468	0.436
7/8/2010	15:39:19	39.5	66.49	0.434	0.402
7/8/2010	15:39:21	41.8	66.51	0.413	0.381
7/8/2010	15:39:24	44.3	66.51	0.386	0.354
7/8/2010	15:39:26	46.9	66.51	0.365	0.333
7/8/2010	15:39:29	49.7	66.51	0.345	0.313
7/8/2010	15:39:32	52.6	66.51	0.324	0.292
7/8/2010	15:39:35	55.7	66.51	0.304	0.272
7/8/2010	15:39:38	59	66.54	0.282	0.25
7/8/2010	15:39:42	62.5	66.54	0.262	0.23
7/8/2010	15:39:46	66.2	66.54	0.241	0.209
7/8/2010	15:39:49	70.1	66.54	0.235	0.203
7/8/2010	15:39:54	74.3	66.56	0.213	0.181
7/8/2010	15:39:58	78.7	66.56	0.206	0.174
7/8/2010	15:40:03	83.4	66.56	0.186	0.154
7/8/2010	15:40:08	88.4	66.58	0.178	0.146
7/8/2010	15:40:13	93.7	66.58	0.165	0.133
7/8/2010	15:40:19	99.3	66.6	0.157	0.125
7/8/2010	15:40:25	105.2	66.6	0.143	0.111
7/8/2010	15:40:31	111.5	66.6	0.136	0.104
7/8/2010	15:40:37	118.1	66.6	0.13	0.098

7/8/2010	15:40:44	125.1	66.63	0.122	0.09
7/8/2010	15:40:52	132.6	66.63	0.115	0.083
7/8/2010	15:41:00	140.5	66.65	0.107	0.075
7/8/2010	15:41:08	148.9	66.65	0.101	0.069
7/8/2010	15:41:17	157.8	66.67	0.1	0.068
7/8/2010	15:41:27	167.2	66.67	0.1	0.068
7/8/2010	15:41:37	177.2	66.67	0.093	0.061
7/8/2010	15:41:47	187.8	66.67	0.086	0.054
7/8/2010	15:41:58	199	66.7	0.085	0.053
7/8/2010	15:42:10	210.9	66.7	0.085	0.053
7/8/2010	15:42:23	223.5	66.7	0.085	0.053
7/8/2010	15:42:36	236.8	66.7	0.078	0.046
7/8/2010	15:42:50	250.9	66.7	0.078	0.046
7/8/2010	15:43:05	265.8	66.67	0.072	0.04
7/8/2010	15:43:21	281.6	66.67	0.066	0.034
7/8/2010	15:43:38	298.4	66.65	0.066	0.034
7/8/2010	15:43:56	316.2	66.65	0.066	0.034
7/8/2010	15:44:14	335	66.63	0.06	0.028
7/8/2010	15:44:34	354.9	66.6	0.055	0.023
7/8/2010	15:44:55	376	66.58	0.055	0.023
7/8/2010	15:45:18	398.4	66.56	0.056	0.024
7/8/2010	15:45:41	422.1	66.54	0.057	0.025
7/8/2010	15:46:07	447.2	66.51	0.051	0.019
7/8/2010	15:46:33	473.8	66.47	0.053	0.021
7/8/2010	15:47:01	502	66.44	0.054	0.022
7/8/2010	15:47:31	531.9	66.4	0.049	0.017
7/8/2010	15:48:03	563.5	66.38	0.049	0.017
7/8/2010	15:48:36	597	66.33	0.051	0.019
7/8/2010	15:49:12	632.5	66.26	0.054	0.022
7/8/2010	15:49:49	670.1	66.22	0.049	0.017
7/8/2010	15:50:29	709.9	66.15	0.044	0.012
7/8/2010	15:51:11	752.1	66.08	0.047	0.015
7/8/2010	15:51:56	796.8	66.01	0.05	0.018
7/8/2010	15:52:44	844.2	65.97	0.051	0.019
7/8/2010	15:53:34	894.4	65.97	0.045	0.013
7/8/2010	15:54:27	947.5	65.94	0.039	0.007
7/8/2010	15:55:23	1003.8	65.92	0.033	0.001
7/8/2010	15:56:23	1063.4	65.9	0.033	0.001
7/8/2010	15:57:26	1126.6	65.87	0.034	0.002
7/8/2010	15:58:33	1193.5	65.85	0.035	0.003
7/8/2010	15:59:44	1264.4	65.81	0.037	0.005
7/8/2010	16:00:59	1339.5	65.78	0.038	0.006
7/8/2010	16:02:18	1419	65.74	0.046	0.014
7/8/2010	16:03:43	1503.3	65.69	0.048	0.016



Input Data

Term	Units	
$2r_c$	Inches	2
$2r_W$	Inches	3
L_w	Feet	10.68
L_e	Feet	12.5
H*	Feet	30
y_0	Feet	0.5
t_0	Seconds	0
y_t	Feet	0.001
t	Seconds	200

Solutions

Hydraulic Conductivity in Feet/Second
2.65E-05
Hydraulic Conductivity in Feet/Minute
1.59E-03
Hydraulic Conductivity in Feet/Day
2.29E+00

* - Assumed value

Calculations

Term	Units		
L_e/r_W	Feet/Foot	100.00	$\ln(R_e/r_W)_{\text{partial penetration}}$ = 3.066
A	None	4.310	
B	None	0.709	$\ln(R_e/r_W)_{\text{full penetration}}$ = 3.066
C	None	4.041	

General Equations

$$K = \frac{r_c^2 \ln(R_e/r_W)}{2L_e} \frac{1}{t} \ln \frac{y_0}{y_t}$$

Where

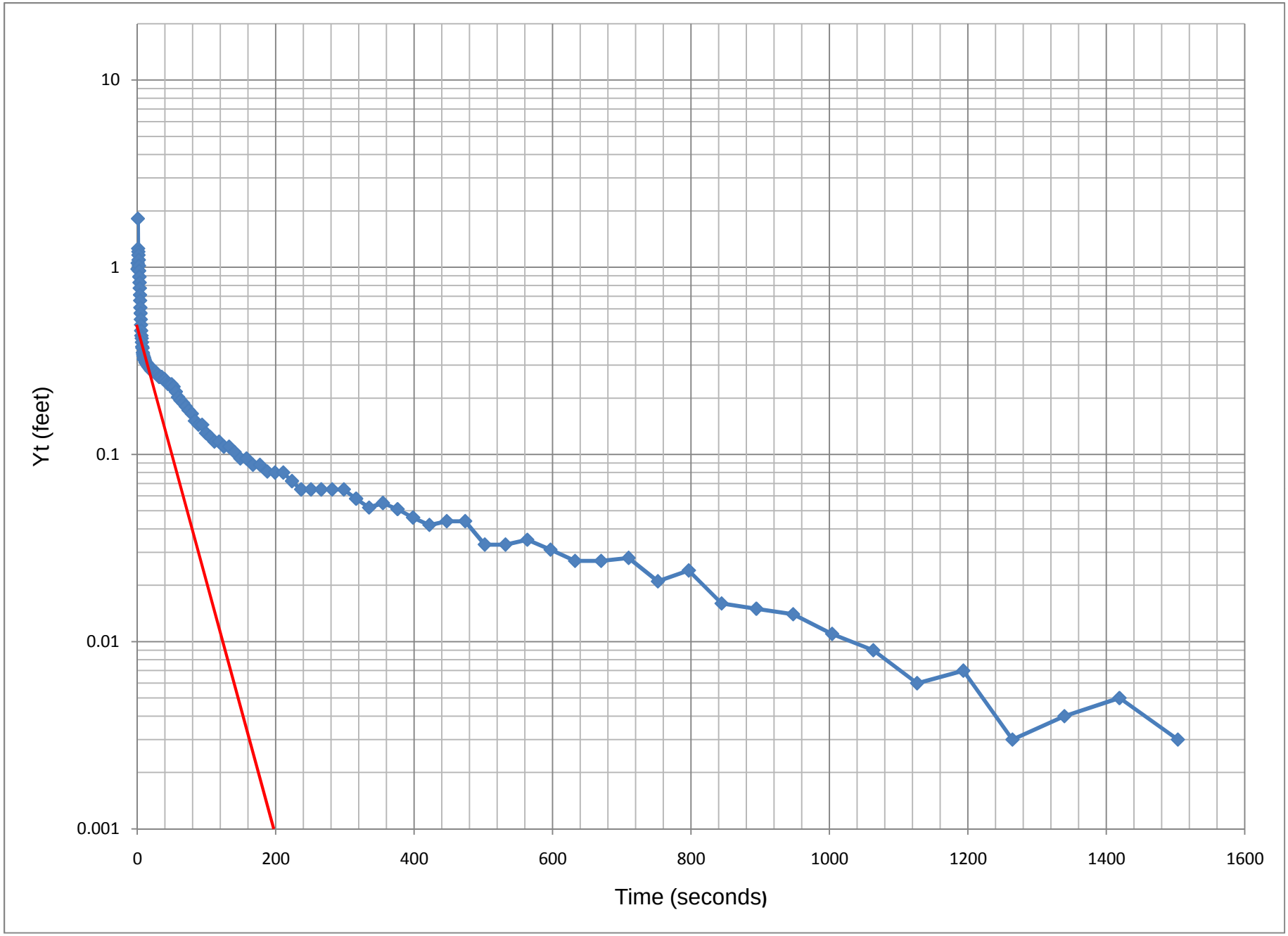
$$\ln(Re/r_W) = \left\{ \frac{1.1}{\ln(L_W/r_W)} + \frac{A + B \ln[(H - L_W)/r_W]}{L_e/r_W} \right\}^{-1}$$

For partial penetration or the equation below for full penetration

$$\ln(Re/r_W) = \left\{ \frac{1.1}{\ln(L_W/r_W)} + \frac{C}{L_e/r_W} \right\}^{-1}$$

CDM

GW-17 Recovery
Cell No. 4 C&D Landfill Expansion
Dare County, North Carolina



CDM

GW-17 Recovery
Cell No. 4 C&D Landfill Expansion
Dare County, North Carolina

In-Situ Inc. MiniTroll Pro

Report generated: 7/8/2010 16:32:53
Report from file: ...\SN07862 2010-07-08 160638 GW-17 Slug Out.bin
Win-Situ® Version 4.57.5.0

Serial number: 7862
Firmware Version 3.09
Unit name:

Test name: GW-17 Slug Out

Test defined on: 7/8/2010 16:05:27
Test started on: 7/8/2010 16:06:38
Test stopped on: 7/8/2010 16:33:08

Data gathered using Logarithmic testing
Maximum time between data points: 900.0 Seconds.
Number of data samples: 117

TOTAL DATA SAMPLES 117

Channel number [1]
Measurement type: Temperature
Channel name:

Channel number [2]
Measurement type: Pressure
Channel name: GW-17
Sensor Range: 100 PSIG.
Sensor Offset: 0.000 psi
Specific gravity: 1
Mode: Surface
User-defined reference: 0 Feet H2O
Referenced on: test start
Pressure head at reference: 5.507 Feet H2O

Date	Time	ET (sec)	Chan[1] Temperatu Fahrenheit	Chan[2] Pressure Feet H2O	Y_t (feet)
7/8/2010	16:06:38	0	65.62	0	-0.035
7/8/2010	16:06:38	0.3	65.65	1.011	0.976
7/8/2010	16:06:38	0.6	65.65	1.086	1.051
7/8/2010	16:06:39	0.9	65.65	1.85	1.815
7/8/2010	16:06:39	1.2	65.67	1.292	1.257
7/8/2010	16:06:39	1.5	65.67	1.244	1.209
7/8/2010	16:06:40	1.8	65.67	1.196	1.161
7/8/2010	16:06:40	2.1	65.67	1.128	1.093
7/8/2010	16:06:40	2.4	65.67	1.053	1.018
7/8/2010	16:06:40	2.7	65.67	0.991	0.956
7/8/2010	16:06:41	3	65.67	0.923	0.888
7/8/2010	16:06:41	3.3	65.67	0.862	0.827
7/8/2010	16:06:41	3.6	65.67	0.807	0.772
7/8/2010	16:06:42	3.9	65.67	0.746	0.711
7/8/2010	16:06:42	4.2	65.67	0.698	0.663
7/8/2010	16:06:42	4.5	65.67	0.643	0.608
7/8/2010	16:06:43	4.8	65.67	0.602	0.567

7/8/2010	16:06:43	5.1	65.67	0.561	0.526
7/8/2010	16:06:43	5.4	65.67	0.527	0.492
7/8/2010	16:06:43	5.7	65.67	0.493	0.458
7/8/2010	16:06:44	6	65.67	0.466	0.431
7/8/2010	16:06:44	6.4	65.67	0.452	0.417
7/8/2010	16:06:45	6.7	65.67	0.432	0.397
7/8/2010	16:06:45	7.1	65.67	0.411	0.376
7/8/2010	16:06:45	7.5	65.69	0.405	0.37
7/8/2010	16:06:46	8	65.69	0.385	0.35
7/8/2010	16:06:46	8.4	65.69	0.378	0.343
7/8/2010	16:06:47	8.9	65.69	0.371	0.336
7/8/2010	16:06:47	9.5	65.69	0.357	0.322
7/8/2010	16:06:48	10	65.69	0.364	0.329
7/8/2010	16:06:48	10.6	65.69	0.357	0.322
7/8/2010	16:06:49	11.3	65.69	0.351	0.316
7/8/2010	16:06:50	11.9	65.69	0.344	0.309
7/8/2010	16:06:50	12.6	65.67	0.343	0.308
7/8/2010	16:06:51	13.4	65.67	0.343	0.308
7/8/2010	16:06:52	14.2	65.67	0.336	0.301
7/8/2010	16:06:53	15	65.67	0.336	0.301
7/8/2010	16:06:54	15.9	65.67	0.329	0.294
7/8/2010	16:06:55	16.8	65.67	0.329	0.294
7/8/2010	16:06:56	17.8	65.67	0.323	0.288
7/8/2010	16:06:57	18.9	65.67	0.323	0.288
7/8/2010	16:06:58	20	65.67	0.316	0.281
7/8/2010	16:06:59	21.2	65.67	0.316	0.281
7/8/2010	16:07:00	22.4	65.67	0.316	0.281
7/8/2010	16:07:02	23.8	65.67	0.316	0.281
7/8/2010	16:07:03	25.2	65.67	0.309	0.274
7/8/2010	16:07:04	26.7	65.67	0.309	0.274
7/8/2010	16:07:06	28.2	65.67	0.302	0.267
7/8/2010	16:07:08	29.8	65.65	0.301	0.266
7/8/2010	16:07:09	31.5	65.65	0.294	0.259
7/8/2010	16:07:11	33.3	65.65	0.294	0.259
7/8/2010	16:07:13	35.2	65.65	0.294	0.259
7/8/2010	16:07:15	37.3	65.65	0.288	0.253
7/8/2010	16:07:17	39.5	65.62	0.287	0.252
7/8/2010	16:07:20	41.8	65.62	0.28	0.245
7/8/2010	16:07:22	44.3	65.62	0.273	0.238
7/8/2010	16:07:25	46.9	65.6	0.272	0.237
7/8/2010	16:07:27	49.7	65.6	0.272	0.237
7/8/2010	16:07:30	52.6	65.6	0.265	0.23
7/8/2010	16:07:33	55.7	65.58	0.251	0.216
7/8/2010	16:07:37	59	65.58	0.237	0.202
7/8/2010	16:07:40	62.5	65.55	0.229	0.194
7/8/2010	16:07:44	66.2	65.55	0.223	0.188
7/8/2010	16:07:48	70.1	65.53	0.215	0.18
7/8/2010	16:07:52	74.3	65.51	0.207	0.172
7/8/2010	16:07:56	78.7	65.51	0.2	0.165
7/8/2010	16:08:01	83.4	65.49	0.186	0.151
7/8/2010	16:08:06	88.4	65.49	0.179	0.144
7/8/2010	16:08:11	93.7	65.49	0.179	0.144
7/8/2010	16:08:17	99.3	65.49	0.165	0.13
7/8/2010	16:08:23	105.2	65.49	0.159	0.124
7/8/2010	16:08:29	111.5	65.49	0.152	0.117
7/8/2010	16:08:36	118.1	65.49	0.152	0.117
7/8/2010	16:08:43	125.1	65.49	0.145	0.11
7/8/2010	16:08:50	132.6	65.49	0.145	0.11
7/8/2010	16:08:58	140.5	65.49	0.138	0.103
7/8/2010	16:09:07	148.9	65.46	0.13	0.095
7/8/2010	16:09:16	157.8	65.46	0.13	0.095
7/8/2010	16:09:25	167.2	65.44	0.123	0.088

7/8/2010	16:09:35	177.2	65.44	0.123	0.088
7/8/2010	16:09:46	187.8	65.44	0.116	0.081
7/8/2010	16:09:57	199	65.42	0.115	0.08
7/8/2010	16:10:09	210.9	65.42	0.115	0.08
7/8/2010	16:10:21	223.5	65.4	0.107	0.072
7/8/2010	16:10:35	236.8	65.37	0.1	0.065
7/8/2010	16:10:49	250.9	65.37	0.1	0.065
7/8/2010	16:11:04	265.8	65.37	0.1	0.065
7/8/2010	16:11:19	281.6	65.37	0.1	0.065
7/8/2010	16:11:36	298.4	65.37	0.1	0.065
7/8/2010	16:11:54	316.2	65.37	0.093	0.058
7/8/2010	16:12:13	335	65.4	0.087	0.052
7/8/2010	16:12:33	354.9	65.46	0.09	0.055
7/8/2010	16:12:54	376	65.55	0.086	0.051
7/8/2010	16:13:16	398.4	65.6	0.081	0.046
7/8/2010	16:13:40	422.1	65.67	0.077	0.042
7/8/2010	16:14:05	447.2	65.71	0.079	0.044
7/8/2010	16:14:32	473.8	65.74	0.079	0.044
7/8/2010	16:15:00	502	65.81	0.068	0.033
7/8/2010	16:15:30	531.9	65.81	0.068	0.033
7/8/2010	16:16:01	563.5	65.85	0.07	0.035
7/8/2010	16:16:35	597	65.92	0.066	0.031
7/8/2010	16:17:10	632.5	66.01	0.062	0.027
7/8/2010	16:17:48	670.1	66.01	0.062	0.027
7/8/2010	16:18:28	709.9	66.03	0.063	0.028
7/8/2010	16:19:10	752.1	66.01	0.056	0.021
7/8/2010	16:19:55	796.8	66.01	0.059	0.024
7/8/2010	16:20:42	844.2	65.83	0.051	0.016
7/8/2010	16:21:32	894.4	65.92	0.05	0.015
7/8/2010	16:22:25	947.5	65.85	0.049	0.014
7/8/2010	16:23:22	1003.8	65.78	0.046	0.011
7/8/2010	16:24:21	1063.4	65.76	0.044	0.009
7/8/2010	16:25:24	1126.6	65.81	0.041	0.006
7/8/2010	16:26:31	1193.5	65.83	0.042	0.007
7/8/2010	16:27:42	1264.4	65.74	0.038	0.003
7/8/2010	16:28:57	1339.5	65.67	0.039	0.004
7/8/2010	16:30:17	1419	65.6	0.04	0.005
7/8/2010	16:31:41	1503.3	65.55	0.038	0.003

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 - Camp Dresser & McKee

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@cdm.com

Facility name:	Facility Address:	Facility Permit #	NC Landfill Rule: (.0500 or .1600)	Actual sampling dates (e.g., October 20-24, 2006)
Dare County C&D Landfill	1603 Cub Road Manns Harbor, North Carolina	28-03	.0500	July 8, 2010

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

Mathew F Colone — Digitally signed by Mathew F Colone DN: cn=Mathew F Colone, o=CDM, ou, email=colonemf@cdm.com, c=US Date: 2010.08.30 14:24:52 -04'00' — 8/30/2010

Signature — Date

Affix NC Licensed/ Professional Geologist Seal

NORTH CAROLINA CORPORATE SEAL 1851 CDM MATHEW F. COLONE

8/30/2010

CDM, 5400 Glenwood Avenue, Suite 300, Raleigh, North Carolina

Facility Representative Address

F-0412

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

Revised 6/2009