RICHARDSON SMITH GARDNER
& ASSOCIATES
ENGINEERING & GEOLOGICAL
SERVICES
NC LIC. NO. C-0828 (ENGINEERING)

June 30, 2010

Ms. Jaclynne Drummond
Hydrogeologist
NCDENR Division of Waste Management
Solid Waste Section
1646 Mail Service Center
Raleigh, North Carolina 27699-1646

RE: Request to Modify Groundwater Monitoring Network
Davidson County Closed Holly Grove Landfill
Lexington, North Carolina

Dear Ms. Drummond:

As you are aware, Richardson Smith Gardner and Associates, Inc. (RSG) on behalf of Davidson County, has been performing semi-annual groundwater monitoring at the Davidson County Holly Grove Landfill and adjacent Scarlett Landfill. This letter is sent to present an overview and evaluation of groundwater monitoring results for select wells at the site and to request a modification of the groundwater monitoring schedule/network based upon this evaluation.

Site History

The closed Davidson County Holly Grove Landfill (Permit 29-02) consists of two fill areas (Area 1 and Area II). Area I was operated from December 1982 through 1989. Area I was closed prior to 1991. Area II was likely opened in 1989 and operated until October 8, 1993. Partial closure of Area II occurred in 1993 and 1995 with final closure being completed prior to September 1997[1].

The Holly Grove landfill is located immediately adjacent to the Scarlett landfill which was owned and operated by Mr. Scarlett. This landfill was presumably operated from 1975 through December 1982. No records could be located indicating the actual opening and closing date of the Scarlett landfill. Many of the monitoring wells included in the Holly Grove Landfill monitoring network are located adjacent to the Scarlett Landfill due to the proximity of the two landfills.

Monitoring Well Network Installation

In 1998, G. N. Richardson and Associates, Inc (GNRA) performed a water quality assessment at the Holly Grove and Scarlett landfills. This assessment included the installation of 11 groundwater monitoring wells (8 shallow wells and 3 Type III

[1] Construction Quality Assurance Report Holly Grove Landfill Area II Closure, G. N. Richardson and Assocaites, Inc., September 1997

monitoring wells) around the Holly Grove and Scarlett landfills. A total of 15 wells have been monitored at this site on a semi-annual basis since that time. A potentiometric surface map depicting the well locations is included as **Figure 1**.

Groundwater Data Evaluation

During this most recent groundwater monitoring event, RSG personnel reviewed historical laboratory data to determine long term trends in the wells and evaluate the monitoring network as a whole. Our evaluation yielded the following results:

Monitoring Wells MW-3a and MW-5

Monitoring wells MW-3a and MW-5 located to the south and southwest of Area II, have not had detectable concentrations of Appendix I constituents above the Solid Waste Section Practical Quantitation Limits (SWSLs) in over five (5) years. These wells are installed in the bedrock aquifer at the site and MW-5 is located immediately adjacent to MW-14. Historical groundwater monitoring data for these wells are presented in **Table 1**. The boring logs for these wells are included in **Attachment A**. The lack of detectable concentrations of constituents in these wells for this period of time indicates that any groundwater impact from the waste mass is not migrating from the waste in the bedrock in these areas.

Monitoring Wells MW-1a and MW-6

Monitoring wells MW-1a and MW-6 are located to the east of Area I within 50 feet of the edge of waste and are immediately adjacent to each other. These are both constructed as bedrock monitoring wells, however, MW-6 encountered water significantly deeper within the bedrock. Historical groundwater monitoring data are presented in **Table 1**, and the boring logs for these wells are included in **Attachment A**. Although monitoring well MW-6 has detectable concentrations of certain constituents; these detections are consistently at concentrations below the 2L groundwater standard. Additionally, monitoring well MW-16 is located downgradient of the area that MW-1a and MW-6 monitor. MW-16 consistently indicates no impact to the aquifer.

Monitoring Well MW-10

Monitoring well MW-10 is located adjacent to the Scarlett Landfill (to the west) and has generally indicated non-detectable concentrations above the SWSL, with the exception of inorganic constituents detected above the 2L standard in April 2007 and two detections of chloroethane well below the 2L standard in 2008. Since that time, concentrations of chloroethane have returned to levels below the SWSL. Historical groundwater monitoring data for this well is presented in **Table 1**.

Monitoring Schedule/Network Recommendations

Historical monitoring data for wells MW-3a, MW-5, MW-6, and MW-10 are summarized in **Table 1**. Based upon these findings we request the following revisions be made to the groundwater monitoring network:

1. Removal of well MW-3a from the monitoring network due to lack of detected constituents in this area for over 5 years.

2. Removal of well MW-5 from the monitoring network. This well has consistently had no detectable concentrations of Appendix I constituents for over 5 years.

3. Removal of well MW-6 from the monitoring network due to its proximal location to the waste, lack of concentrations of constituents above the 2L groundwater standard and location of well MW-16 further downgradient from the waste in this area. Additionally, MW-1a will remain in the monitoring network and this well is located immediately adjacent to MW-6.

4. Reduction to annual monitoring for well MW-10 due to their consistent lack of detected impact from the landfill. Should concentrations of Appendix I constituents be detected above the 2L groundwater standard, these wells will return to semi-annual monitoring.

The proposed monitoring schedule for the site is summarized in the attached **Table 2**. If these modifications are approved, RSG will submit a revised Water Quality Monitoring Plan for the site that incorporates these changes.

If you have any questions, or require additional information please contact me at 919-828-0577 x 221 or by e-mail, below.

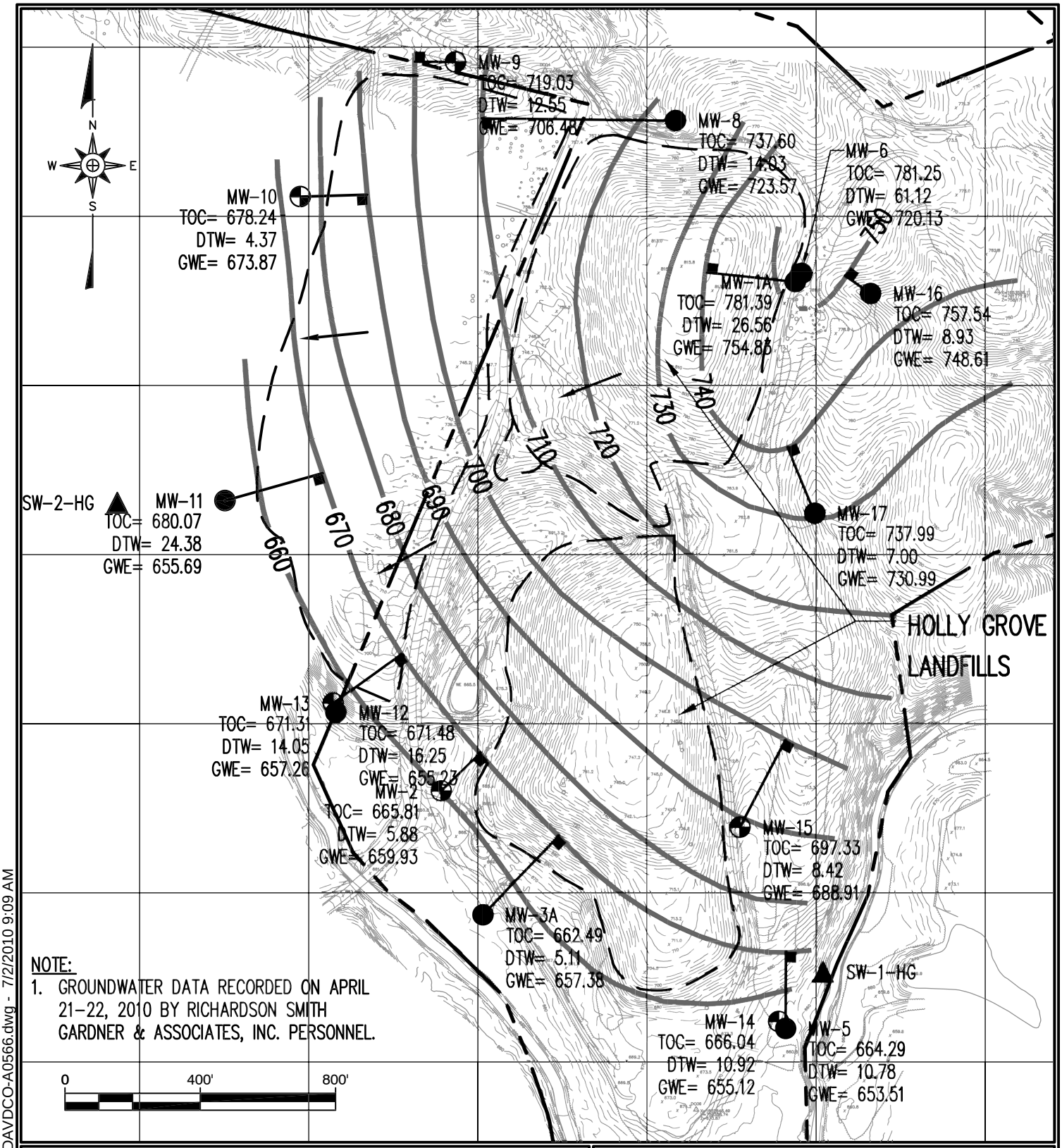
Sincerely,
Richardson Smith Gardner and Associates, Inc.

Joan A. Smyth, P.G.
Senior Hydrogeologist
joan@rsgengineers.com

cc: Charlie Brushwood – Davidson County

Attachments

Figures



NOTE:
1. GROUNDWATER DATA RECORDED ON APRIL 21-22, 2010 BY RICHARDSON SMITH GARDNER & ASSOCIATES, INC. PERSONNEL.

POTENTIOMETRIC SURFACE MAP
CLOSED HOLLY GROVE LANDFILL
DAVIDSON COUNTY, NC

RICHARDSON SMITH GARDNER & ASSOCIATES
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SCALE:	DRAWN BY:	CHECKED BY:	DATE:	PROJECT NO.	FIGURE NO.	FILE NAME
AS SHOWN	C.T.J.	J.A.S.	Jul. 2010	DAVDCO-4	1	DAVDCO-A0566

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Tables

RICHARDSON SMITH GARDNER & ASSOCIATES
ENGINEERING & GEOLOGICAL SERVICES
14 N. BOYLAN AVENUE
RALEIGH, NORTH CAROLINA 27603
NC. LIC. NO. C0828 (ENGINEERING)

By: JAS
Date: 6/14/2010

Table 1
Groundwater Monitoring Data
Holly Grove Landfill Davidson County, NC

		MW-3a												
Constituent	**2L/GWP**	**Apr-04**	**Oct-04**	**May-05**	**Oct-05**	**Apr-06**	**Oct-06**	**Apr-07**	**Oct-07**	**Apr-08**	**Oct-08**	**Apr-09**	**Oct-09**	**Apr-10**
1,1-dichloroethane	6	ND	ND	ND	ND	ND	ND	ND	3.1 J	ND	4.1 J	2.9 J	3.3 J	4.1J
1,1-dichloroethene	7	ND	ND	ND	ND	ND	ND	ND	ND	3.10J	ND	ND	ND	ND
1,2-dichlorobenzene	24	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethane	0.38	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3 J	ND	ND
acetone	6000	ND	ND	ND	ND	ND	ND	ND	ND	ND	2 J	1.3 J	ND	ND
benzene	1	ND	ND	ND	ND	ND	ND	ND	ND	0.20J	0.2 J	ND	0.2 J	ND
Carbon Disulfide	700	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bromomethane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
chlorobenzene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
chloroethane	2800	ND	ND	ND	ND	ND	ND	ND	0.5 J	0.60J	0.8 J	0.6 J	0.6 J	0.9J
chloromethane	2.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-dichloroethene	70	ND	ND	ND	ND	ND	ND	ND	0.2 J	0.30J	0.3 J	0.2 J	0.3 J	0.4J
ethylbenzene	550	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
methylene chloride	4.6	ND	ND	ND	ND	ND	ND	ND	0.3 J	0.30J	0.5 J	0.3 J	0.2 J	ND
tetrachloroethene	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
toluene	600	ND	ND	ND	ND	ND	ND	ND	0.2 J	0.20J	ND	ND	ND	ND
trans-1,2-dichloroethene	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trichloroethene	2.8	ND	ND	ND	ND	ND	ND	ND	0.2 J	0.20J	0.2 J	0.2 J	ND	ND
trichlorofluoromethane	2100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
vinly chloride	0.03	ND	ND	ND	ND	ND	ND	ND	ND	0.40J	0.5 J	ND	ND	ND
xylenes	530	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Antimony	1.4	ND	ND	ND	ND	ND	ND	ND	0.4 J	ND	ND	ND	ND	ND
Arsenic	10	ND	ND	ND	ND	ND	ND	ND	ND	0.2J	0.3 J	0.2 J	ND	ND
Barium	700	ND	ND	ND	ND	ND	ND	ND	28.5 J	16.6J	23.5 J	24.5 J	10.5 J	15.7J
Beryllium	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1 J	ND	ND	ND
Cadmium	1.75	ND	ND	ND	ND	ND	ND	ND	ND	0.1J	0.1 J	0.1 J	ND	0.1J
Cobalt	70	ND	ND	ND	ND	ND	ND	ND	1.1 J	0.2J	0.5 J	0.6 J	0.2 J	0.2J
Copper	1000	ND	ND	ND	ND	ND	ND	ND	3.4 J	0.6J	1.4 J	3 J	0.3 J	0.3J
Total Chromium	10	ND	ND	ND	ND	ND	ND	ND	0.6 J	ND	ND	0.2 J	ND	ND
Lead	15	ND	ND	ND	ND	ND	ND	ND	0.8 J	0.1J	0.8 J	0.3 J	0.2 J	0.1J
Nickel	100	ND	ND	ND	ND	ND	ND	ND	1.8 J	2.1J	1.5 J	1.6 J	0.6 J	1J
Selenium	20	ND	ND	ND	ND	ND	ND	ND	0.4 J	1.5J	0.7 J	0.4 J	ND	ND
Silver	17.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1 J	ND	ND
Thallium	28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	3.5	ND	ND	ND	ND	ND	ND	ND	3.5 J	1.5J	1.7 J	3.3 J	2.6 J	1.9J
Zinc	1050	ND	ND	ND	ND	ND	ND	**22**	6.5 J	2.3J	7.9 J	1.8 J	1 J	6.5J

Concentrations exceeding the 2L standard are highlighted in gray.

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ENGINEERING & GEOLOGICAL SERVICES
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NC. LIC. NO. C0828 (ENGINEERING)

By: JAS
Date: 6/14/2010

Table 1
Groundwater Monitoring Data
Holly Grove Landfill Davidson County, NC

		MW-5												
Constituent	**2L/GWP**	**Apr-04**	**Oct-04**	**May-05**	**Oct-05**	**Apr-06**	**Oct-06**	**Apr-07**	**Oct-07**	**Apr-08**	**Oct-08**	**Apr-09**	**Oct-09**	**Apr-10**
1,1-dichloroethane	6	ND	ND	ND	ND	ND	ND	ND	1.5 J	ND	3.3 J	0.2 J	1 J	1.5J
1,1-dichloroethene	7	ND	ND	ND	ND	ND	ND	ND	ND	0.50J	ND	ND	ND	ND
1,2-dichlorobenzene	24	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethane	0.38	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
acetone	6000	ND	ND	ND	ND	ND	ND	ND	1.3 J	ND	1.7 J	ND	28.1 J	ND
benzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	700	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bromomethane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.3 J	ND	ND
chlorobenzene	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
chloroethane	2800	ND	ND	ND	ND	ND	ND	ND	ND	0.60J	3.3 J	0.3 J	0.6 J	2.4J
chloromethane	2.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-dichloroethene	70	ND	ND	ND	ND	ND	ND	ND	0.2 J	0.20J	0.9 J	ND	0.2 J	0.7J
ethylbenzene	550	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
methylene chloride	4.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2 J	ND	ND	ND
tetrachloroethene	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
toluene	600	ND	ND	ND	ND	ND	ND	ND	0.2 J	ND	ND	ND	ND	ND
trans-1,2-dichloroethene	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trichloroethene	2.8	ND	ND	ND	ND	ND	ND	ND	0.2 J	ND	0.3 J	ND	ND	ND
trichlorofluoromethane	2100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.6 J	ND
vinly chloride	0.03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes	530	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Antimony	1.4	ND	ND	ND	ND	ND	ND	ND	0.1 J	ND	ND	ND	0.6 J	0.9J
Arsenic	10	ND	ND	ND	ND	ND	ND	ND	ND	0.1J	0.2 J	ND	ND	ND
Barium	700	ND	ND	ND	ND	ND	ND	ND	45.3 J	25.5J	46.9 J	26.4 J	57.2 J	38.4J
Beryllium	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1 J	0.1J
Cadmium	1.75	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1 J	ND	ND	0.1J
Cobalt	70	ND	ND	ND	ND	ND	ND	ND	1.4 J	0.2J	1.7 J	0.3 J	1.2 J	0.6J
Copper	1000	ND	ND	ND	ND	ND	ND	ND	3.9 J	1.1J	4.2 J	1.6 J	2.8 J	1.6J
Total Chromium	10	ND	ND	ND	ND	ND	ND	ND	0.8 J	ND	1.2 J	0.4 J	0.1 J	0.6J
Lead	15	ND	ND	ND	ND	ND	ND	ND	0.5 J	0.1J	0.5 J	ND	0.8 J	0.2J
Nickel	100	ND	ND	ND	ND	ND	ND	ND	2.6 J	1.2J	2.7 J	ND	4.8 J	1.8J
Selenium	20	ND	ND	ND	ND	ND	ND	ND	0.4 J	0.8J	0.2 J	ND	0.2 J	ND
Silver	17.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.1 J	0.1 J	0.1J
Thallium	28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	3.5	ND	ND	ND	ND	ND	ND	ND	4.5 J	1.2J	5.3 J	2.1 J	11.5 J	2.8J
Zinc	1050	ND	ND	ND	ND	ND	ND	12	6.5 J	3.8J	**26**	3.2 J	**11**	5.1J

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By: JAS
Date: 6/14/2010

Table 1
Groundwater Monitoring Data
Holly Grove Landfill Davidson County, NC

		MW-10												
Constituent	**2L/GWP**	**Apr-04**	**Oct-04**	**May-05**	**Oct-05**	**Apr-06**	**Oct-06**	**Apr-07**	**Oct-07**	**Apr-08**	**Oct-08**	**Apr-09**	**Oct-09**	**Apr-10**
1,1-dichloroethane	6	ND	ND	ND	ND	ND	ND	ND	0.2 J	ND	0.3 J	ND	0.2 J	ND
1,1-dichloroethene	7	ND	ND	ND	ND	ND	ND	ND	ND	0.20J	ND	ND	ND	ND
1,2-dichlorobenzene	24	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethane	0.38	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	6	ND	ND	ND	ND	ND	ND	ND	ND	0.90J	0.8 J	0.4 J	0.7 J	0.6J
acetone	6000	ND	ND	ND	ND	ND	ND	ND	1.5 J	2.40J	9.9 J	5.2 J	7.5 J	ND
benzene	1	ND	ND	ND	ND	ND	ND	ND	ND	0.90J	0.6 J	ND	ND	ND
Carbon Disulfide	700	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
bromomethane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
chlorobenzene	50	ND	ND	ND	ND	ND	ND	ND	0.4 J	**8.7**	**4.5**	0.9 J	0.8 J	1.1J
chloroethane	2800	ND	ND	ND	ND	ND	ND	ND	0.4 J	0.80J	1 J	0.3 J	ND	ND
chloromethane	2.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-dichloroethene	70	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ethylbenzene	550	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
methylene chloride	4.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2 J	ND	ND	ND
tetrachloroethene	0.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
toluene	600	ND	ND	ND	ND	ND	ND	ND	0.3 J	0.20J	ND	ND	ND	ND
trans-1,2-dichloroethene	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trichloroethene	2.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2 J	ND	ND
trichlorofluoromethane	2100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
vinly chloride	0.03	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes	530	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Antimony	1.4	ND	ND	ND	ND	ND	ND	ND	0.1 J	0.4J	0.2 J	0.3 J	0.3 J	0.3J
Arsenic	10	ND	ND	ND	ND	ND	ND	ND	2.5 J	5.3J	3.2 J	2.4 J	3.4 J	2.3J
Barium	700	ND	ND	ND	ND	ND	ND	**799**	**244**	**233**	**249**	**189**	**321**	**178**
Beryllium	4	ND	ND	ND	ND	ND	ND	1	ND	0.1J	0.1 J	0.1 J	0.1 J	0.1J
Cadmium	1.75	ND	ND	ND	ND	ND	ND	**2**	0.1 J	0.3J	0.5 J	0.3 J	0.5 J	0.3J
Cobalt	70	14	16	ND	ND	ND	ND	**16**	**14**	**13**	**12**	7.9 J	**11**	9.1J
Copper	1000	ND	ND	ND	ND	ND	ND	**87**	5.5 J	**21**	**17**	**11**	**21**	9.7J
Total Chromium	10	ND	ND	ND	ND	ND	ND	**20**	0.4 J	0.9J	1.7 J	1.7 J	3.1 J	2.2J
Lead	15	ND	ND	ND	ND	ND	ND	**18**	0.4 J	0.8J	0.8 J	1 J	1.6 J	2.1J
Nickel	100	ND	ND	ND	ND	ND	ND	ND	21.1 J	27.9J	26.8 J	19 J	23.8 J	24.3J
Selenium	20	ND	ND	ND	ND	ND	ND	ND	**11**	ND	**13**	6.6 J	**11**	1.5J
Silver	17.5	ND	ND	ND	ND	ND	ND	ND	ND	0.1J	ND	ND	0.1 J	0.1J
Thallium	28	ND	ND	ND	ND	ND	ND	ND	ND	0.1J	ND	ND	ND	ND
Vanadium	3.5	ND	ND	ND	ND	ND	ND	**92**	7.9 J	7.7J	10.6 J	9.9 J	22.3 J	10.7J
Zinc	1050	ND	ND	ND	ND	ND	ND	168	6 J	6.1J	6.1 J	6 J	**11**	9.1J

By: JAS
Date: 6/30/2010

Table 2
Proposed Monitoring Frequency
Holly Grove Landfill - Davidson County

Well	Monitoring Frequency
MW-1a	Semi-Annual
MW-2	Semi-Annual
MW-3A	Not Monitored
MW-4*	Semi-Annual
MW-5	Not Monitored
MW-6	Not Monitored
MW-8	Semi-Annual
MW-9	Semi-Annual
MW-10	Annual
MW-11	Semi-Annual
MW-12	Semi-Annual
MW-13	Semi-Annual
MW-14	Semi-Annual
MW-15	Semi-Annual
MW-16	Semi-Annual
MW-17	Semi-Annual

*MW-4 is the same well as Phase 1 MW-1.

Attachment A

Sheet 1 of 2

OWNER: Davidson County Solid Waste Dept.	BORING NUMBER MW-1A
PROJECT NAME Davidson County Landfill	ARCHITECT-ENGINEER
SITE LOCATION Holly Grove, NC	JOB. NO. 89-468-E

UNCONFINED COMPRESSIVE STRENGTH TONS/FT.^{2} (1, 2, 3, 4, 5)

PLASTIC LIMIT % X — WATER CONTENTS % ⊕ — LIQUID LIMIT % Δ (10, 20, 30, 40, 50)

● STANDARD PENETRATION BLOWS/FT. (10, 20, 30, 40, 50)

DEPTH IN FEET	SAMPLE NO.	SAMPLE TYPE	SAMPLE DEPTH FROM-TO	DESCRIPTION OF MATERIAL SURFACE ELEVATION
				SANDY SILT, tan, white, hard, (ML). NOTE: (Field description).
	1	ss	2.5 3.0	
5	2	ss	5.0 5.5	
	3	ss	7.5 8.0	
10	4	ss	10.0 10.5	
				SILT, tan, hard, (ML). NOTE: Contains weathered rock fragments. (Field description).
15	5	ss	15.0 15.5	
				Auger Refusal at 18.0 ft.
20				Metavolcanic Bedrock (Rock type based on Geologic Map of North Carolina).
25				
30				

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDRY LINES BETWEEN SOIL TYPES: IN-STU THE TRANSITION MAY BE GRADUAL

WATER TABLE DATA — DEPTH BELOW SURFACE NA @ 0 HRS. @ HRS.	BORING STARTED 1-23-90		BORING COMPLETED 1-23-90
	RIG Air Rotary	FOREMAN	APP'D BY ABN	AUGER: NA

ENGINEERING TECTONICS, P. A.

Sheet 2 of 2

OWNER: Davidson County Solid Waste Dept.	BORING NUMBER: MW-1A
PROJECT NAME: Davidson County Landfill	ARCHITECT-ENGINEER
SITE LOCATION: Holly Grove, NC	JOB. NO. 89-468-E

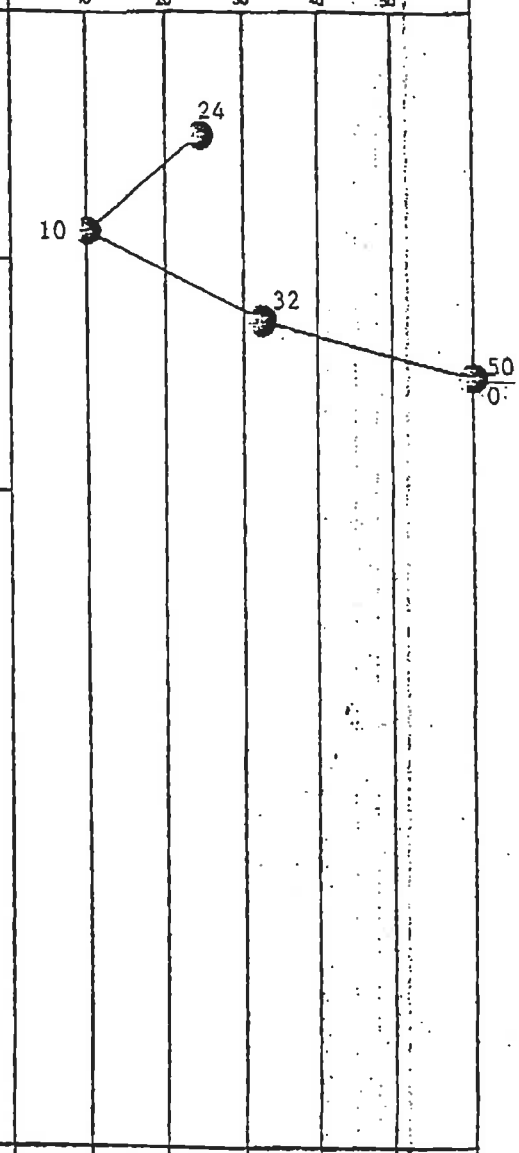
DEPTH IN FEET	SAMPLE NO.	SAMPLE TYPE	SAMPLE DEPTH FROM-TO	DESCRIPTION OF MATERIAL / SURFACE ELEVATION	UNCONFINED COMPRESSIVE STRENGTH TON/FT.² (1 2 3 4 5) · PLASTIC LIMIT % · WATER CONTENTS % · LIQUID LIMIT % (10 20 30 40 50) · STANDARD PENETRATION BLOWS/FT. (10 20 30 40 50)
35					
				Boring Terminated at 37.5 ft.	

THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDRY LINES BETWEEN SOIL TYPES: IN-SITU, THE TRANSITION MAY BE GRADUAL.

WATER TABLE DATA — DEPTH BELOW SURFACE	BORING STARTED		BORING COMPLETED	
_____ @ 0 HRS.				
_____ @ _____ HRS.	RIG	FOREMAN	APP'D BY	AUGER

OWNER: Davidson County Solid Waste Dept.	BORING NUMBER: MW-3A
PROJECT NAME: Davidson County Landfill	ARCHITECT-ENGINEER:
SITE LOCATION: Holly Grove, NC	JOB NO.: 89-468-E

DEPTH IN FEET	SAMPLE NO.	SAMPLE TYPE	SAMPLE DEPTH FROM-TO	DESCRIPTION OF MATERIAL SURFACE ELEVATION	UNCONFINED COMPRESSIVE STRENGTH TON S/FT.² (1, 2, 3, 4, 5) / PLASTIC LIMIT % / WATER CONTENTS % / LIQUID LIMIT % (10, 20, 30, 40, 50) / STANDARD PENETRATION BLOWS/FT. (10, 20, 30, 40, 50)
				SANDY SILT, brown, tan, white, firm, (ML). NOTE: (Field description).	
	1	ss	2.5 4.0		
5	2	ss	5.0 6.5		
	3	ss	7.5 9.0	CLAYEY SILT, gray, stiff, (ML). NOTE: (Field description).	
10					
				Auger Refusal at 13.5 ft.	
15				Metavolcanic Bedrock (Rock type based on Geologic Map of North Carolina).	
20					
25					
30					
				Boring Terminated at 32.0 ft.	



THE STRATIFICATION LINES REPRESENT THE APPROXIMATE BOUNDRY LINES BETWEEN SOIL TYPES: IN-STU. THE TRANSITION MAY BE GRADUAL

WATER TABLE DATA — DEPTH BELOW SURFACE: NA @ 0 HRS. ____ @ ____ HRS.	BORING STARTED: 1-23-90	BORING COMPLETED: 1-23-90	
	RIG: Air Rotary	FOREMAN:	APP'D BY: ABN	AUGER: NA

ENGINEERING TECTONICS, P. A.

FIELD GEOLOGIC LOG

PROJECT: *DAVIDSON COUNTY LANDFILL*		DATE: *10/27/92*	SHEET: *1* OF *1*
		DRILLING CONTRACTOR: *McCall Brothers Inc.*	
WELL No.: *MW-5*	SAMPLING METHOD: *Split Spoon (24")*	DRILLER:	
LOGGED BY: *M. Sanford*	OFFICE: *CDM/Ral*	DRILLING METHOD: *8" O.D. HSA and Air Rotary*	

SAMP. No.	DEPTH, feet	LITHOLOGY	BLOW COUNT	SAMPLE DESCRIPTION	DRILLING COMMENTS
				0-3 1/2" - dark brown silty, fine-grained SAND	
	1			*3 1/2" - 9 1/2' - light brown, fine-grained, sandy, clayey SILT*	
	2				
	3				
	4		*4*		
			11		
	5		*12*		
			12		
	6				
	7				
	8				
	9		*6*		
			10	*9.5' - 10.2' - light green, silty, clayey, fine-to-medium grained SAND with rock fragments, moist*	
			17		
	10		*50/3"*		*Auger refusal @ 10'*
	1				*Perched water on top of bedrock*
	2				
	3				
	4				
	15				
	6				*Water-bearing fracture zone encountered @ 18.67'*
	7			*10.2'- 25' - Air Rotary drilling Metavolcanics*	
	8				*Boring terminated @ 25'*
	9				
	20				

FIELD BOREHOLE LOG

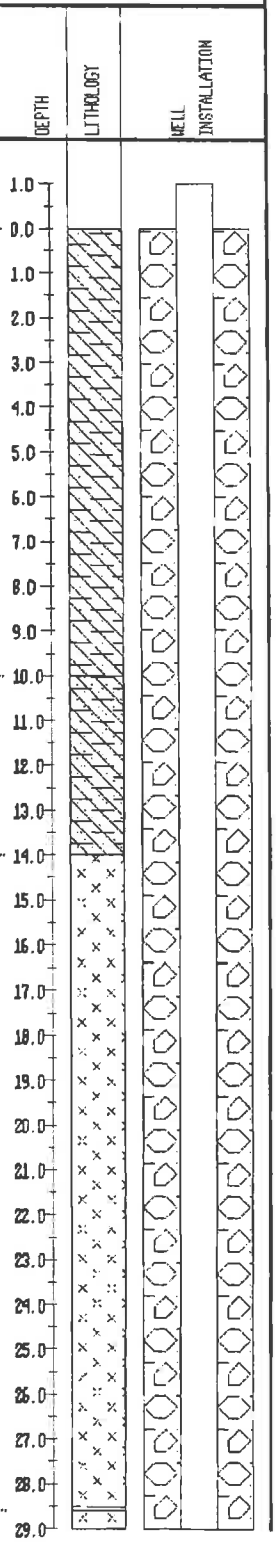
BOREHOLE NUMBER: MW-6

PROJECT NUMBER: DAVDCO-1
PROJECT NAME: Holly Grove Landfill
LOCATION: Lexington, North Carolina
DRILLING COMPANY: Engineering Tectonics
RIG TYPE & NUMBER: MOBILE B-80
DRILLING METHOD: Hollow Stem Auger
WEATHER: Sunny, 80 DEGREES
FIELD PARTY: D. Barron
GEOLOGIST: P. May
DATE BEGUN: 7/29/97 DATE COMPLETED: 7/30/97

TOP OF CASING ELEVATION: 781.25
TOTAL DEPTH: 65.0 FT
GROUND SURFACE ELEVATION: 779.04
SHEET 1 OF 2

STATIC WATER LEVEL (BLS)		
WC=While Drilling AB=After Boring		
Depth(ft)	58.5 bg	63.30 bg
Time	-	7:00 pm
Date	7/31/97	8/1/97

DEPTH	BLOW COUNTS	SAMPLING METHOD	SAMPLE NUMBER	MOISTURE	CONSISTANCY	SAMPLE RECOVERY	DRILL METHOD	LITHOLOGY DESCRIPTION
0.0								CLAYEY SILT: Light brown with trace fine sand.
5.0		G	S1					
10.0		G	S2					SANDY CLAYEY SILT: Light brown with some gravel sized partially weathered rock. Roller bit refusal at 12.0'. Setting outer casing in competent rock at 14'.
11.0		G						
14.0								DIORITE: Competent rock.



FIELD BOREHOLE LOG

BOREHOLE NUMBER: MW-6

PROJECT NUMBER: DAVDCD-1
PROJECT NAME: Holly Grove Landfill
LOCATION: Lexington, North Carolina
DRILLING COMPANY: Engineering Tectonics
RIG TYPE & NUMBER: MOBILE B-80
DRILLING METHOD: Hollow Stem Auger
WEATHER: Sunny, 80 DEGREES
FIELD PARTY: D. Barron
GEOLOGIST: P. May
DATE BEGUN: 7/29/97 DATE COMPLETED: 7/30/97

TOP OF CASING ELEVATION: 781.25
TOTAL DEPTH: 65.0 FT
GROUND SURFACE ELEVATION: 779.04
SHEET: 2 OF: 2

STATIC WATER LEVEL (BLS)		
WD=While Drilling AB=After Boring		
Depth(ft)	58.6 bg	63.30 bg
Time	-	7:00 pm
Date	7/31/97	8/1/97

DEPTH	BLOW COUNTS	SAMPLING METHOD	SAMPLE NUMBER	MOISTURE	CONSISTANCY	SAMPLE RECOVERY	DRILL METHOD	LITHOLOGY DESCRIPTION
29.0								DIORITE: No significant water bearing fractures. Boring Terminated at 65 feet.
30.0								
31.0								
32.0								
33.0								
34.0								
35.0								
36.0								
37.0								
38.0								
39.0								
40.0								
41.0								
42.0								
43.0								
44.0								
45.0								
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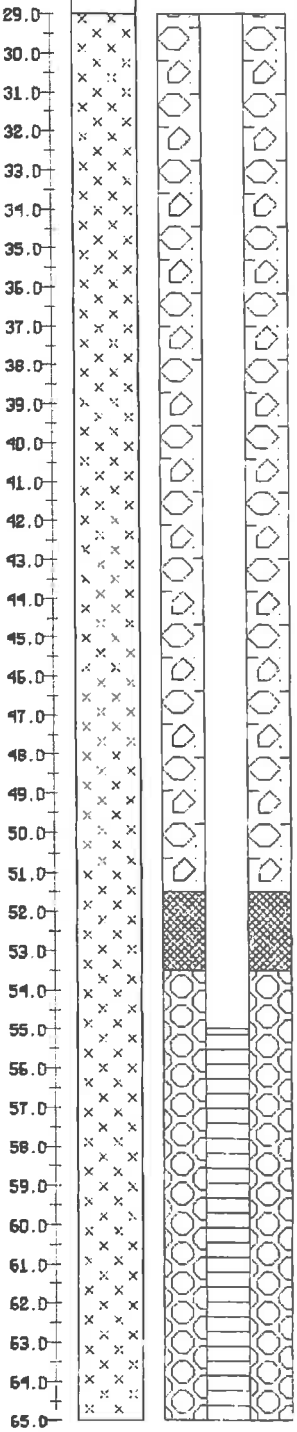
63.0								
64.0								
65.0								

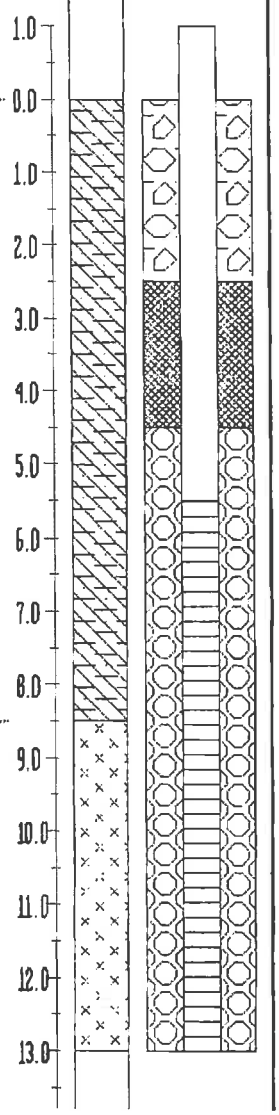


FIELD BOREHOLE LOG

BOREHOLE NUMBER: MW-10

PROJECT NUMBER: DAVDCO-1
PROJECT NAME: Holly Grove Landfill
LOCATION: Lexington, North Carolina
DRILLING COMPANY: Engineering Tectonics
RIG TYPE & NUMBER: MOBILE B-80
DRILLING METHOD: Hollow Stem Auger
WEATHER: Sunny, 80 DEGREES
FIELD PARTY: D. Barron
GEOLOGIST: P. May
DATE BEGUN: 7/30/97 DATE COMPLETED: 7/30/97

TOP OF CASING ELEVATION: 678.24
TOTAL DEPTH: 13.0 FT
GROUND SURFACE ELEVATION: 675.68
SHEET: 1 OF: 1

STATIC WATER LEVEL (BLS)		
WD=While Drilling AB=After Boring		
Depth(ft)	9.0 bg	2.48 bg
Time	11:00 am	-
Date	7/30/97	7/31/97

DEPTH	BLOW COUNTS	SAMPLING METHOD	SAMPLE NUMBER	MOISTURE	CONSISTANCY	SAMPLE RECOVERY	DRILL METHOD	LITHOLOGY DESCRIPTION
1.0								
0.0								CLAYEY SILT: Dark brown, dry, clayey silt with some gravel. Some brown silty sandy clay.
1.0								
2.0								
3.0	5	Ss	S1			18"		
4.0	8							
	8							
5.0								
6.0								
7.0								
8.0	50/6	Ss	S2			8"		
9.0								DIORITE: partially weathered rock. Auger refusal at 13'.
10.0								
11.0								
12.0								
13.0