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February 15, 2007

Ms. Jackie Drummond
North Carolina Department of Environment and Natural Resources
Division of Solid Waste Management
Solid Waste Section
401 Oberlin Road, Suite 150
Raleigh, North Carolina 27605

Subject: November 2006 Data Summary
Needmore Road Landfill Facility
CNA Holdings, Inc., Salisbury, North Carolina
Earth Tech Project No. 79891

Dear Ms. Drummond:

This technical memorandum presents a summary of the November 2006 sampling event completed at the Needmore Road Landfill in Salisbury, North Carolina.

Groundwater and surface water samples were collected on November 1st and 2nd. The sampling event was completed in accordance with the sampling plan presented as part of the Request for Status Change letter dated April 13, 2006 and approved in your email dated May 5, 2006.

Furthermore, a North Carolina Department of Environment and Natural Resources (DENR) letter dated June 1, 2006 approved a status change to monitored natural attenuation (MNA) in conjunction with phytoremediation. In this letter DENR requested that additional MNA parameters be added to ten wells. Consequently, monitoring for these parameters started with the November 2006 event.

The sampling plan is presented in Table 1. This table details the sampling requirements approved under the original plan from the April 13, 2006 letter along with the additional parameters requested in the June 1, 2006 DENR letter. The wells selected for these supplemental parameters are identified in the final column, labeled Expanded MNA, of Table 1. All sampling locations are presented in Figure 1.

Groundwater sampling data are summarized in Table 2. Only those parameters detected in one or more samples are included in the table. The data remains stable and comparable to the results of sampling events over the past two years.

Ethylene glycol was detected at six locations, the same as last event. The highest detection was noted at well B-09C (2,020 mg/L). The other detections were reported from locations B-01, B-10, B-23A, B-23B, and B-32B. Ethylene glycol concentrations have fluctuated at each these locations in recent years. Seasonal cycles have been observed at wells B-01 and B-09C in recent years, and the current data are consistent with these trends. The concentrations detected at the other locations were consistent with recent levels.

Detections of 1,4-dioxane were comparable to historic data. Several wells displayed concentrations higher than recent data, but the concentrations remained consistent with historical results. Only B-24A was outside the typical range when compared to data over the past few years. B-24A increased from 0.105 mg/L in May 2006 to 0.158 mg/L in November 2006. This concentration represents a historic maximum for this well. Concentrations at well B-24 have been increasing since approximately 2000. This location continues to have a relatively low concentration of 1,4-dioxane when compared with the other sampling locations. Also, the data is comparable to concentrations in the surrounding area. A decline in concentration of 1,4-dioxane was noted at monitoring well B-22B (0.328 mg/L). The decrease was not significant and remains consistent with historic data. All other 1,4-dioxane results were consistent with prior data.

DowTherm A™ concentrations were comparable to historic data. 1,1-Biphenyl was again detected only at well B-10 (0.276 mg/L). The highest biphenyl ether concentration was also detected at B-10 (3.12 mg/L). Both results are consistent with data collected over the last several years. All other results for other monitored locations were also consistent with recent data.

MNA parameters are generally indicative of the presence of biological activity. Elevated alkalinity and specific conductance along with decreased nitrate, oxidation reduction potential (ORP), and dissolved oxygen values in the plume area indicate the presence of biological activity. One or more of these indicators were noted in most of the monitoring wells in the plume area. Additionally, the supplemental sampling requested by DENR on June 1, 2006 for total organic carbon (TOC), volatile fatty acids, and the dissolved gasses methane, ethane, ethene, hydrogen, and carbon dioxide was completed during this event. The levels of these additional parameters were higher at wells in the plume than wells outside of plume. These parameters show strong indication of biological degradation in the plume area. Biological degradation is a significant component of natural attenuation of ethylene glycol and DowTherm A™ components at the site. The original MNA parameters supplemented with the additional sampling requested by DENR indicate that biological degradation is occurring at the site. Depletion of sulfate is also an indicator of biological activity. However, depleted sulfate concentrations were less commonly observed than other MNA indicators.

Surface water locations SW-3, SW-5, SW-7, and SW-8 were monitored for ethylene glycol, DowTherm A™ and 1,4-dioxane. Ethylene glycol was below the reporting limit of 7 mg/L in each of these samples. DowTherm A™ components biphenyl ether and 1,1-biphenyl, as well

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as 1,4-dioxane, were all below the reporting limit of 0.01 mg/L in each of these samples. No samples were collected from the creek sample locations (CSW-1 and CSW-2) because the creek was dry during the sampling event.

Maintenance of the phytoremediation program for 1,4-dioxane has continued. To date the majority of trees have remained healthy and show signs of growth. Tree growth has been limited or death has occurred in a few areas with the greatest amount of standing water. Ecolotree has recommended planting a new species of tree more suitable to the conditions in these areas. Supplemental planting is scheduled for late March or early April 2007. Ecolotree has prepared a project status and recommendation report. This report is attached. Inspections, maintenance, and monitoring of the phytoremediation program will continue. In addition, the MNA groundwater and surface water sampling program will proceed on the current May/November semiannual schedule.

Should you require further information or clarification of the attached report, please contact me at (770) 990-1420.

Sincerely,

Earth Tech, Inc.

Michael R. Shoemaker
Compliance Engineer

Bryon Dahlgren
Project Manager

cc: James Pullen, JCP Environmental Management

Table 1
May / November
MNA Sampling Program
Needmore Road Landfill
Earth Tech Project 79891

Location	1,4-Dioxane	Dowtherm A	Ethylene Glycol	VOC*	MNA**	Expanded MNA***
B-01	x	x	x	x	x	x
B-09C	x	x	x	x	x	
B-10 (Dup)	x	x	x	x	x	x
B-12	x	x			x	
B-14	x				x	
B-17B (Dup)	x	x			x	x
B-17C	x	x			x	x
B-19B	x	x			x	x
B-21A (Dup)	x				x	
B-21B	x				x	
B-22A	x	x		x	x	x
B-22B	x	x		x	x	x
B-23A	x	x	x	x	x	x
B-23B	x	x	x	x	x	x
B-24A	x	x		x	x	
B-24B	x	x		x	x	
B-24C	x	x		x	x	
B-32B	x	x	x		x	x
CSW-1	x					
CSW-2	x					
SW-3	x	x	x			
SW-5	x	x	x			
SW-7	x	x	x			
SW-8	x	x	x			

* VOCs to be collected during May event only

**MNA: alkalinity, nitrate, phosphate, sulfate, DO, ORP, Ferrous iron

*** Expanded MNA: TOC, methane, ethane, ethene, hydrogen, carbon dioxide, volatile fatty acids

Table 2
Groundwater Analytical Summary
Needmore Road Landfill, November 2006
Earth Tech Project 79891

Chemical Name	Unit	NC 2L Standard	B-01 11/2/2006	B-09C 11/1/2006	B-10 11/1/2006	B-10 Dup 11/1/2006	B-12 11/2/2006	B-14 11/2/2006	B-17B 11/1/2006
alkalinity	mg/L	--	3720	5160	1490	1490	274	911	337
1,1-biphenyl	mg/L	PQL*	<0.01	<0.01	0.276	0.312	<0.01	NA	<0.01
biphenyl ether	mg/L	PQL*	0.0446	<0.01	3.12	3.47	<0.01	NA	<0.01
1,4-dioxane	mg/L	0.007	4.68	1.29	0.509	0.554	0.216	0.124	2.84
ethylene glycol	mg/L	14	2000	2020	284	215	NA	NA	NA
nitrate nitrogen	mg/L	10	<0.1	0.064	<0.1	<0.1	<0.1	<0.1	<0.1
orthophosphate phosphorus	mg/L	--	0.46	0.24	0.14	<0.03	0.46	0.2	0.084
sulfate	mg/L	250	18.4	1	3.7	3.8	0.52	<0.5	2.5
total organic carbon	mg/L	--	5360	NA	1260	1410	NA	NA	5.3
volatile fatty acids (as acetic acid)	mg/L	--	7060	NA	1690	2120	NA	NA	<100
Dissolved Gases									
ethane	mg/L	--	<0.00001	NA	0.000031	<0.00005	NA	NA	0.00018
ethene	mg/L	--	0.00057	NA	0.0011	0.0014	NA	NA	<0.00001
methane	mg/L	--	8.4	NA	19	23	NA	NA	0.028
carbon dioxide	mg/L	--	240	NA	300	440	NA	NA	140
hydrogen	nM	--	120	NA	NA	NA	NA	NA	0.93
Field Parameters									
groundwater elevation	feet MSL	--	698.37	674.02	704.83	704.83	658.98	703.81	656.88
temperature	degrees C	--	17	17	17	17	17	16	17
pH	su	--	5.6	5.8	6.4	6.4	6.3	6.6	6.5
specific conductance	umhos/cm	--	1430	9880	2660	2660	548	1260	692
ORP	mV	--	-41	-7	-27	-27	-77	-76	81
dissolved oxygen	mg/L	--	0.1	0.1	0.3	0.3	1.5	0.1	1
ferrous iron	mg/L	--	5.4	3	4.8	4.8	<0.2	2.2	<0.2

PQL - Practical Quantitation Limit
* - Site Specific target chemical
no standard specified under 15A NCAC 2L.0202
mg/L - milligrams per liter
mV - millivolts
su - standard units
umhos/cm - micromhos/cm
degrees C - degress Celsius
feet MSL - feet above mean sea level

Table 2
Groundwater Analytical Summary
Needmore Road Landfill, November 2006
Earth Tech Project 79891

Chemical Name	Unit	NC 2L Standard	B-17B Dup 11/1/2006	B-17C 11/1/2006	B-19B 11/2/2006	B-21A 11/1/2006	B-21A Dup 11/1/2006	B-21B 11/1/2006	B-22A 11/1/2006
alkalinity	mg/L	--	342	333	1070	90.9	81	318	442
1,1-biphenyl	mg/L	PQL*	<0.01	<0.01	<0.01	NA	NA	NA	<0.01
biphenyl ether	mg/L	PQL*	<0.01	<0.01	<0.01	NA	NA	NA	0.0259
1,4-dioxane	mg/L	0.007	2.88	2.92	0.0531	0.0129	0.0126	0.0507	1.12
ethylene glycol	mg/L	14	NA	NA	<7	NA	NA	NA	NA
nitrate nitrogen	mg/L	10	<0.1	<0.1	<0.1	1.7	1.7	<0.1	<0.1
orthophosphate phosphorus	mg/L	--	0.084	0.094	0.044	0.099	0.1	0.032	0.12
sulfate	mg/L	250	2.5	3	<0.5	7.4	7.5	8.1	0.99
total organic carbon	mg/L	--	4.5	5	2.7	NA	NA	NA	4.1
volatile fatty acids (as acetic acid)	mg/L	--	237	184	150	NA	NA	NA	<100
Dissolved Gases									
ethane	mg/L	--	0.00051	0.00052	0.000072	NA	NA	NA	0.0029
ethene	mg/L	--	<0.00001	<0.00001	0.000048	NA	NA	NA	0.00016
methane	mg/L	--	0.077	0.056	1.1	NA	NA	NA	0.00033
carbon dioxide	mg/L	--	160	130	190	NA	NA	NA	99
hydrogen	nM	--	0.96	0.78	1.4	NA	NA	NA	0.9
Field Parameters									
groundwater elevation	feet MSL	--	656.88	658.63	667.8	665.59	665.59	664.65	657.2
temperature	degrees C	--	17	17	16	16	16	17	16
pH	su	--	6.5	6.5	6.5	6.5	6.5	6.6	6.7
specific conductance	umhos/cm	--	692	675	1690	276	276	568	1020
ORP	mV	--	82	73	-46	86	87	-21	-97
dissolved oxygen	mg/L	--	0.9	0.4	1	3.8	3.8	0.6	1.3
ferrous iron	mg/L	--	<0.2	<0.2	2.6	<0.2	<0.2	1	2

PQL - Practical Quantitation Limit
* - Site Specific target chemical
no standard specified under 15A NCAC 2L.0202
mg/L - milligrams per liter
mV - millivolts
su - standard units
umhos/cm - micromhos/cm
degrees C - degress Celsius
feet MSL - feet above mean sea level

Table 2
Groundwater Analytical Summary
Needmore Road Landfill, November 2006
Earth Tech Project 79891

Chemical Name	Unit	NC 2L Standard	B-22B 11/1/2006	B-23A 11/2/2006	B-23B 11/2/2006	B-24A 11/1/2006	B-24B 11/1/2006	B-24C 11/1/2006	B-32B 11/2/2006
alkalinity	mg/L	--	622	2740	2930	416	385	123	679
1,1-biphenyl	mg/L	PQL*	<0.01	<0.01	<0.02	<0.01	<0.01	<0.01	<0.01
biphenyl ether	mg/L	PQL*	0.028	0.0791	0.128	0.0126	0.018	<0.01	0.0558
1,4-dioxane	mg/L	0.007	2.33	2.01	1.7	0.158	0.101	0.0195	0.0996
ethylene glycol	mg/L	14	NA	255	907	NA	NA	NA	344
nitrate nitrogen	mg/L	10	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
orthophosphate phosphorus	mg/L	--	0.086	<0.03	0.26	0.062	0.035	<0.03	<0.15
sulfate	mg/L	250	0.52	2	2.2	1.9	2.5	<0.5	1.1
total organic carbon	mg/L	--	10.3	1850	2550	NA	NA	NA	741
volatile fatty acids (as acetic acid)	mg/L	--	184	691	2090	NA	NA	NA	737
Dissolved Gases									
ethane	mg/L	--	0.00077	<0.00001	<0.00001	NA	NA	NA	<0.00001
ethene	mg/L	--	0.00014	0.000072	0.000058	NA	NA	NA	0.00013
methane	mg/L	--	5.2	6.6	13	NA	NA	NA	5.4
carbon dioxide	mg/L	--	250	490	420	NA	NA	NA	240
hydrogen	nM	--	1.1	1.2	1.1	NA	NA	NA	3.8
Field Parameters									
groundwater elevation	feet MSL	--	657	657.16	657.2	654.99	654.96	NA	716.08
temperature	degrees C	--	16	16	16	15	15	15	16
pH	su	--	6.5	6.2	6.3	6.3	6.6	7.6	6
specific conductance	umhos/cm	--	1230	4530	4930	747	685	242	1430
ORP	mV	--	-66	-26	-56	62	-26	-221	-76
dissolved oxygen	mg/L	--	1	0.6	0.7	0.8	0.6	0.5	0.4
ferrous iron	mg/L	--	3	2.8	2.9	1	1.6	2	5

PQL - Practical Quantitation Limit
* - Site Specific target chemical
no standard specified under 15A NCAC 2L.0202
mg/L - milligrams per liter
mV - millivolts
su - standard units
umhos/cm - micromhos/cm
degrees C - degress Celsius
feet MSL - feet above mean sea level

Table 3
Surface Water Analytical Summary
Needmore Road Landfill, November 2006
Earth Tech Project 79891

Chemical Name	Unit	CSW-1 11/1/2006	CSW-2 11/1/2006	SW-3 11/1/2006	SW-5 11/1/2006	SW-7 11/1/2006	SW-8 11/1/2006
1,1-biphenyl	mg/L	Dry	Dry	<0.01	<0.01	<0.01	<0.01
biphenyl ether	mg/L	Dry	Dry	<0.01	<0.01	<0.01	<0.01
1,4-dioxane	mg/L	Dry	Dry	<0.01	<0.01	<0.01	<0.01
temperature	degrees C	Dry	Dry	12	12	12	12
pH	su	Dry	Dry	6.5	6.5	6.5	6.6
specific conductance	umhos/cm	Dry	Dry	77	76	77	85
ORP	mV	Dry	Dry	140	154	150	94
dissolved oxygen	mg/L	Dry	Dry	9.7	9.6	9.5	8.9
ferrous iron	mg/L	Dry	Dry	NA	NA	NA	NA

mg/L - milligrams per liter
mV - millivolts
su - standard units
umhos/cm - micromhos/cm
degrees C - degress Celsius

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SW-3 SLIGHTLY UPSTREAM OF CONFLUENCE WITH BEAVERDAM BRANCH

SW-2

SW-4

SW-1

SW-5

SW-6

SW-7

SW-8 ± 1000 FT UPSTREAM OF COOLEEMEE WEIR

CSW-1

CSW-2

APPROXIMATE LOCATIONS

B-38A B-38B

B-19 B-19B

B-09C

B-21B B-21A

B-12C B-17C B-17B B-22B B-22A

B-23B B-23A EXT-27

B-24B B-24A B-24C

B-25B B-25A B-25C

B-13

B-18

B-01

B-14

B-10

B-32B

B-33B

B-15

TAYLOR PIT

LEGEND

GROUNDWATER SAMPLE LOCATION

SURFACE WATER SAMPLE LOCATION

N

0' 400' 800'

SCALE

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FIGURE 1

2006 SAMPLING LOCATIONS

NEEDMORE ROAD LANDFILL - CNA HOLDINGS
SALISBURY, NORTH CAROLINA

FEBRUARY 2007 79891

Phytoremediation EBuffer®
2006 Year-end Report

Prepared for:
Dora Chiang, Earth Tech
and
Jim Pullen, JCP Environmental

Needmore Road Landfill Facility
Salisbury, North Carolina

Ecolotree Project #2005.15

January 2007

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2006 Year-end Report for the Phytoremediation EBuffer at the Needmore Landfill near Salisbury, North Carolina.

Contents

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Figures

The EBuffer® (EBuffer) planted December 6, 2005 at the toe of the closed Needmore Landfill (Site) near Salisbury, North Carolina is designed to intercept and speed mineralization of 1,4-dioxane within the poplar tree root zone. This report summarizes 2006 operation and maintenance activities for the Site.

At this time, no fatal flaws are apparent to prevent the Needmore poplar root systems from intercepting surface and shallow groundwater moving from the landfill area. This opinion is based on the Needmore EBuffer plant health, root zone soil chemistry, surface water chemistry and the maintenance commitment when compared to 15 similar EBuffers installed around the country. Based on that perspective, plans are in place to replace any struggling or dead trees along with a 30% buffer area expansion to enhance the long-term EBuffer phytoremediation performance.

1. EBuffer® Installation Activities

1.1 EBuffer Installation Review

The EBuffer is placed to intercept 1,4-dioxane moving off the Site toward the adjacent South Yadkin River. The Site is an area approximately 8000 sq. ft. in size at the toe of the Needmore Landfill selected by Earth Tech and the owner for phytoremediation.

The Site focuses the drainage water moving from the landfill toward the river through an under-road culvert. The site had an existing drainage structure that collected the landfill runoff and seepage water with the ability to pump the collected water to an on-site treatment facility. The collection and treatment facilities are not currently in use but were left intact for later use if needed. The runoff and seepage water now passing through the EBuffer is either evapo-transpired to the atmosphere or flows eventually into the South Yadkin River.

At time of EBuffer installation, the area was planted with trees and grass. The plant root zone is primarily a clay soil previously disturbed during landfill and drainage system construction. A native gravel layer underlays the entire EBuffer zone at 6-8 ft. below ground surface.

1.2 2005 Design and Installation

Installation tasks included:

1. June 8, 2005 - on-site meeting was held to review the design specifics. The outcome of this meeting was a design report (see Ecolotree "Site Evaluation and Draft Phytoremediation Design," June 27, 2005).
2. November 28, 2005 - Biosolids compost (approximately 50 cubic yards) was delivered to the Site by Earth Products.
3. December 4, 2005 - Rooted trees were delivered from Ecolofarm, Lowden, IA. They were harvested and processed the previous week. Ecolotree delivered the tree materials: 106 13 - 14 ft rooted poplar and 100 poplar unrooted 24-inch cuttings. The tree varieties are DN-34 and DN-21 hybrid poplar; both varieties have proven survival and growth rates when planted in soils containing organic solvents. It rained over 1.25 inches a day prior to installation. Water was running off the landfill and through the Site drainage.

4. December 5 & 6, 2005 - Construction principally occurred. Planting crew included Ecolotree staff (Dr. Louis Licht, Ron Jones, Craig Baird), Earth Tech project manager (Dora Chiang), Earth Tech safety officer (Tim Ringo), Earth Tech equipment operator (Darrell Mason), and Celanese contracted site manager (Larry Brooks).
5. The EBuffer used 106 rooted hybrid poplar trees planted in a 12-row grid placed perpendicular to the natural drainage from the landfill. Figure 1 shows the general tree layout. Between-row spacing was approximately ten feet; the in-row spacing between the trees was approximately six feet.
6. The excavator dug to the water table and gravel layer approximately 6-ft bgs. Care was taken to avoid existing drainage piping buried in the Site.
7. Amendments placed with the trees into the excavated trenches included:
    a. 300 pounds of agricultural lime to increase soil alkalinity dosed onto the trench top following installation at the rate of approximately 0.5 pounds lime per linear foot of trench.
    b. 200 pounds of 15-15-15 fertilizer dosed in the trench at approximately one pound per tree concurrent with tree placement during planting.
    c. Approximately 50 cubic yards of compost placed onto the planting row before trenching then backfilled into the excavated trench following tree placement.
8. After planting, any damaged stems were pruned and shaped.
9. The on-site subcontracted (L. Brooks) returned during the week of Dec. 19 to install a deer fence around the Site perimeter.

1.3 2006 Site Maintenance Activities

1. April 5, 2006 - Early spring site visit by Ecolotree staff (C. Baird) and the on-site subcontractor (L. Brooks). Tasks accomplished included:
    a. Insurance cuttings were planted (Figure 4).
    b. Seepage areas were documented (Figure 5)
    c. Deer fence was inspected (Figure 6).
    d. 100 pounds of 13.13.13 NPK fertilizer was applied
    e. Trees were pruned and shaped after the trench was backfilled.

2. July 10, 2006 – Mid-summer site visit by Ecolotree staff (C. Baird) and the on-site subcontractor (L. Brooks). Tasks accomplished included:
    a. Foliar samples were taken. Results are located in Table 1.
    b. Trees and cuttings were inspected and overall health was assessed (Figures 7-10).
    c. Site health reviewed
    d. Pruned any damaged branches

3. December 5, 2006 – Late Fall site visit by Ecolotree staff (C. Baird), Earth Tech staff (Dora Chiang) and Celanese Project Manager (Jim Pullen), and on-site subcontractor (L. Brooks). Tasks accomplished included:
    a. Reviewed the site with C. Baird and a phone meeting with L. Licht (Figures 11-12)
    b. Performed tree survival growth audit (results in Figure 1)
        i. Insurance cuttings generally did not survive the storage, planting and growing season

II. 27 large rooted trees planted in 2005 died and require replacement.

c. Applied one pound of 10-10-10 fertilizer to the base of the trees in their rows.
d. Pruned and shaped the trees during inspection
e. Additional on-site soil and water samples were taken including
   I. Soils from three locations that represented three different poplar growth and health conditions. Results are located in Table 2.
   II. Surface water grab samples from three separate locations: two on the planted EBuffer drainage and one from the exiting stream (Figure 13). Results are located in Table 3

4. Ecolotree recommends a tree replanting activity. 2007 planting will include dead tree replacement and expansion area.
5. A 2007 expansion of the site will include a new area covering approximately X ft2 and require approximately Z trees. This will be covered in 2007 Proposed Task Order.

2. 2006 EBuffer Growth and Analytical Results with Discussion

Through 2006, the EBuffer site continues to stabilize following the installation. The EBuffer's rooted trees planted in December 2005 had strong survival over 65% of the planted area through the first growing season, especially in the fertile upland area. The remaining 35% of the area had lower survival rates. This lack of establishment is primarily attributed to ponding surface water, leading to hypoxia of the tree roots. Figure 1 shows the overall survival pattern.

The data collected during the EBuffer installation at the Needmore Landfill is summarized and categorized:

2.1 July 2006 Leaf Foliar Analyses

Leaf analyses are located in Table #1. These leaf samples are collected from three transects and each contains approximately 30 leaves from 8 – 10 poplar. These leaves are between the 4 and 12 leaf from the stem apex.

Discussion: Based on these foliar analyses:

1. Fertilizer at the rate of 1 pound per tree was applied during the fall 2006 maintenance.
2. Nitrogen is low which can be supplemented with mineral fertilizer
3. Phosphorous adequate but can be amended with the fertilization
4. Potassium high so not needed with fertilization
5. Appropriate fertilizer will be applied with the backfill soil at 2007 replant installation and three low doses during the growing season.
6. Iron and managanese are all high, but not apparently toxic. The copper, boron, and zinc appear in normal adequate range.
7. Sodium is low, which is a good indicator of low available sodium in the groundwater.
8. Aluminum on leaves often involves a surface deposition; thus near landfills the leaf foliar analyses has a wide range.
9. Continue analyzing foliar samples in 2007.

2.2 Plant Health Analyses

Plant health analyses are graphically displayed in Figure 1. The poplar tree health was graded for the entire site.

Discussion: Based on these tree health analyses:

1. The large rooted trees had a 65% rating of strong growth. An estimated 10% of trees were alive but stressed; 25% were dead.
2. The poplar grade pattern shows general health in the upland zone; the stress zone is located where the site is wetter. This wetness contributes to tree death due to oxygen deficit hypoxia and is most acute during the establishment year. The wetter area is at the toe of the landfill which receives drainage and is near a concrete maintenance hole. We expect strong survival in 2007 because the poplar will be planted in the spring and have less dormant time before new roots grow.
3. The cuttings brought to the site December 2005, were not planted because the site trenches required time to settle. The cuttings were stored in refrigeration for four months and planted in March 2006; less than 20% survived evidently due to death at time of planting.

2.3 December 2006 Soil and Water Analyses

Soils were sampled from transects on the site; results are located in Table 2. Water was sampled from two water ponded areas on the EBuffer edge and down gradient in the stream leaving the site; results are located in Table 3.

Discussion: Based on these soil and water analyses:

1. The soluble salts generally are low across the site soils meaning that leachable salts from the landfill are not at any elevated concern levels in the EBuffer
2. Potassium is low; zinc is also low in the soil, but not of major concern. Compost has provided zinc and potassium can be supplemented with mineral fertilizer addition.
3. The soluble iron is being precipitate and settled in the first ponded water area which is demonstrated by the color of the water.
4. Sodium adsorption ratio show that the calcium and magnesium in the water offsets the sodium, thus sodic conditions are not present.
5. The down stream water does have higher nitrate-nitrogen, but almost all soluble elements are more diluted and less concentrated in the stream leaving the site through the culvert.

3. 2007 EBuffer Path Forward
Recommended Operations and Maintenance Plan

3.1 2007 EBuffer Operation and Maintenance

Table 4 lists the tasks and timing for the second growing season.

The local staff supported by Ecolotree staff will perform the following events in 2007:

1. continue maintaining trees/grass to maximize plant health

2. fertilize and mulch trees to continue developing a bioactive root zone for two functions:
    a. increase the evapotranspirative capacity so water is removed from the rooted soil to reduce surface and groundwater flow to the stream
    b. continue to increase root-zone carbon with subsequent increase microbial activity and resulting organic chemical sequestering and/or mineralization.
3. replant areas in March or early April 2007 where there was zonal death with 15 10-12 ft rooted DN21 variety poplar. We propose to interplant with Iowa willow whips in areas of ponded surface water draining through the site.. The Iowa Willow is a different species than hybrid poplar and has demonstrated vigorous survival and growth in intermittent saturated soil conditions.
4. plant an expansion zone to add area to the EBuffer footprint
    a. apply lime, compost and mineral fertilizer at time of planting and based on foliar nutrient analyses.
    b. regrade the trenches as needed due to settlement.
    c. an estimated 30 10-12 ft rooted DN21 variety poplar and 30 DN34 poplar interplant insurance poles will be sent from Ecolofarm via common carrier coordinated with L. Brooks.
5. the 2007 EBuffer installation and replanting will be performed by Earth Tech staff with support by the on-site subcontractor -L. Brooks. Local equipment operators will be retained by Earth Tech or other local contractors. Earth Products compost worked very well for the 2005 installation; this biosolid compost or similar is recommended to amend the trenches for the 2007 planting.
6. the local contractor will continue to mow and maintain the fence, plus be available to aid the Ecolotree staff during a site visit.
7. Ecolotree, Inc. project manager Lou.Licht will provide remote monthly support from North Liberty IA. and will not be present to plant these replacement and new tree.
8. Ecolotree, Inc. project manager or other experienced agronomist will travel and meet on-site in late Fall 2007 to grade all on-site trees, review the foliar results, prune as needed and recommend the 2008 path forward.

Site name:	Needmore Landfill	Legend:	
Site location:	North Carolina	**Bold** =	deficient concentration
Ecolotree project #:	2005.15	*Italic* =	high concentration
Sampling date:	#######	Normal =	sufficient concentration
Sampled by:	Craig Baird		

FOLIAR		1 wet zone	2 dry upland	3 plot transect
Essential macronutrients:	Units			
Nitrogen	%	**1.97**	**2.47**	**2.78**
Phosphorus	%	0.41	0.42	0.43
Potassium	%	*3.08*	*2.59*	*2.78*
Magnesium	%	0.41	0.33	0.34
Sulfur	%	0.39	0.40	0.37
Calcium	%	0.87	1.04	0.71
Essential micronutrients:				
Iron	ppm	*271*	*262*	*179*
Manganese	ppm	*359*	*444*	*271*
Boron	ppm	68	69	61
Copper	ppm	15	13	12
Zinc	ppm	65	84	64
Non-essential elements:				
Sodium	ppm	**0.02**	**0.02**	**0.02**
Aluminum	ppm	*155*	*1,101*	*225*

Table 1: 07.10.06 Needmore Landfill Poplar Foliar Analyses

Site:	Needmore Landfill	Legend:
Location:	Salisbury NC	**Bold** = very low/low
Sampling date:	12.14.06	*Italic* = very high
Sampled by:	Craig Baird, Ecolotree	Normal = sufficient

Sample ID		#1 - A	#1 - B	#2 - A	#2 - B	#3 - A	#3 - B
Sample description		Upland	Upland	Wet area	Wet area	Ponded soil	Ponded soil
Agronomic properties:							
Soil pH	N/A	**5.4**	**5.2**	**5.5**	**5.3**	5.8	5.9
Organic matter	%	*6.6*	3.5	3.5	2.8	3.7	2.9
Soluble salts	mmho/cm	**0.1479**	**0.0699**	**0.0473**	**0.0464**	**0.0450**	**0.0675**
Cation exchange capacity	meq/100 g	7.8	7.4	**4.7**	**5.7**	7.2	**5.5**
Essential macronutrients:							
Phosphorus	mg/kg	81	31	19	25	9	15
Potassium	mg/kg	148	122	**84**	**56**	**65**	**69**
Magnesium	mg/kg	248	166	154	169	149	198
Sulfur	mg/kg	*27*	*25*	*33*	*32*	16	20
Calcium	mg/kg	560	536	296	*351*	*400*	*687*
Essential micronutrients:							
Iron	mg/kg	*157*	*103*	*58*	*53*	*269*	*86*
Manganese	mg/kg	20	17	23	14	19	20
Boron	mg/kg	1.1	1.0	0.5	1.0	0.9	1.0
Copper	mg/kg	1.4	1.3	1.1	1.0	1.6	1.3
Zinc	mg/kg	2.2	**0.5**	0.7	**0.4**	0.8	**0.5**
Non-essential nutrients:							
Sodium	mg/kg	45	22	40	26	52	45
Arsenic	mg/kg	1.21	1.02	1.29	1.01	1.11	1.05

Table 2: 12.06.06 Needmore EBuffer Soils Analyses

Site:	Needmore Landfill			
Location:	Salisbury NC			
Sampling date:	12.5.06			
Sampled by:	Craig Baird, Ecolotree			
Sample ID		#1	#2	#3
Water Sample description		Upland Impoundment #1 - Red	Midslope Impoundment #2 - Black	Downgradient stream - culvert below site
pH	no unit	6.3	6.6	6.8
Conductivity	mmho/cm	0.736	0.630	0.417
Total Dissolved Solids	mg/l	628	507	341
Sodium Adsorption Ration (SAR)	no unit	1.6	1.6	1.6
Sodium	mg/l	46.9	46.8	43.6
Calcium	mg/l	37.0	35.9	32.3
Magnesium	mg/l	15.2	16.7	13.7
Chloride	mg/l	29.9	38.4	10.5
Sulfur as sulfate	mg SO4/l	73.6	67.9	13.2
Nitrogen as Nitrate	mg NO3/l	<0.1	0.184	0.781
Carbonate	mg CO3/l	<24	<24	<20
Bi carbonate	mg HCO3/l	534	364	291
Phosphorus	mg/l	0.122	0.816	0.071
Potassium	mg/l	23.2	18.2	7.7
Boron	mg/l	0.165	0.150	0.114
Copper	mg/l	0.071	0.017	0.007
Iron	mg/l	1510	31.1	20.2
Lead	mg/l	<.006	0.008	<.006
Arsenic	mg/l	<0.01	<0.02	<0.03

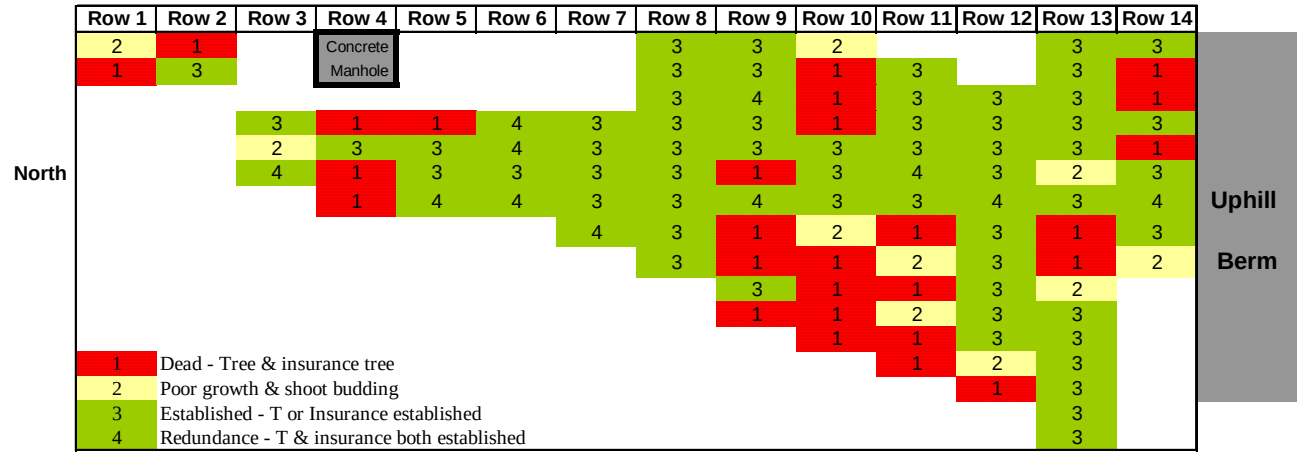
Table 3: 12.06.06 Needmore Ponded Surface Water Analyses

Task	January	February	March	April	May	June	July	August	September	October	November	December
Inspection by Onsite staff (submit inspection log)*			*	*	*	*	*	*	*	*		
New planting by local contractor			*	*								
Irrigate the trees as needed *						#	#	#	#			
Inspection by Ecolotree											X	
Picture documentation											X	
Fertilize the trees			*	*							X	
Apply herbicide along tree rows			*	*	*	*	*	*	*	*		
Apply insecticide as needed			*	*	*	*	*	*	*	*		
Prune trees as needed			*	*							X	
Sample and analyze foliar samples							* X					
Perform tree growth audit											X	
Ecolotree discusses site with staff		X	X	X	X	X	X	X	X	X	X	
Prepare year end summary report												* X

Table 4: 2007 Needmore Operations and Maintenance Schedule

X = denotes responsibility of Ecolotree Inc.
* = denotes responsibility of On-site subcontractor
# = denotes application applied only as needed.

4. Installation and Maintenance Photographs



Legend	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total
1	1	1	0	3	1	0	0	0	4	7	4	1	2	3	27
2	1	0	1	0	0	0	0	0	0	2	2	1	2	1	10
3&4	0	1	2	1	3	4	5	9	7	3	6	10	12	5	68
Total	2	2	3	4	4	4	5	9	11	12	12	12	16	9	**105**

Legend	Total	% Total
1	27	25.71%
2	10	9.52%
3&4	68	64.76%
Total	**105**	

Figure 1. 12/05/06. Tree health diagram

Figure 2. 12/05/05. Site appearance before installation of EBuffer®. Temperature was 20 degrees Fahrenheit. Approximately 1.25 inches of rain had fallen the previous day.

Figure 3. 12/05/05. Water on the site was runoff draining from the landfill following the previous day's rain. It did not stop the installation.

Figure 4. 04/05/06. View of trees and insurance cuttings looking uphill (southeast) toward toe of landfill.

Figure 5. 04/05/06. View of site looking east across drainage area. Note seepage area.

Figure 6. 04/05/06. Trees and cuttings down slope near drainage structure. Note deer fence.

Figure 7. 07/10/06. View looking uphill (southeast) toward toe of landfill.

Figure 8. 07/10/06. View from toe of landfill overlooking site.

Figure 9. 07/10/06. Looking down slope from Site.

Figure 10. 07/10/06. View of tree performance and growth.

Figure 11. 12/05/06. View from toe of landfill overlooking Site.

Figure 12. 12/05/06. View looking uphill (southwest).

Figure 13. 12/05/06. Looking down-slope. Note orange-colored water seepage.