



Terraprobe

Consulting Geotechnical & Environmental Engineering
Construction Materials Engineering, Inspection & Testing

Schaeffers Consulting Engineers
6 Ronrose Drive
Concord, ON
L4K 4R3

Attention: Mr. Nelson Lee, C.E.T.

October 17, 2019

Re: Review of Landfill Impact Assessment Report, 8001 County Road 27 Barrie Ontario

Dear Mr. Lee

As requested, the purpose of this letter is to provide additional information regarding the Landfill Impact Assessment that was conducted for the above-noted property by Terraprobe. The report entitled "Landfill Impact Assessment; Proposed Residential Development Lot 1, Concession 11, Innisfil (Northeast Corner Hwy 27 and Salem Road) Barrie Annex Land was prepared in October 2010. A peer review of the above report was recently conducted by Golder Associates, as summarized in their letter dated September 27, 2019.

The comments provided by Golder Associates in their September 2019 letter generally agreed with Terraprobe's report. Golder requested further information with respect to the following comments:

Site RUGs are not defined in the report

AMEC's report (2000 Spring Monitoring Program) summarized 2000 groundwater water chemistry for the six on site monitoring wells and concluded that OW-2 exhibited elevated nitrate concentrations above the Reasonable Use Guideline. A site plan provided in the AMEC report notes the location of the monitoring wells (Appendix A). It is noted that OW-2 is not a boundary well and it is anticipated that the concentration of nitrate would decrease through natural attenuation prior to reaching the property boundary.

Reasonable Use is further addressed by Trow in the Operation and Closure Plan for the Holly Site, "there is no evidence to suggest that groundwater migrating offsite exceeds any criteria under MOEE Policy 15-08 ("Reasonable Use"). Excerpts from the Trow report are also included in Appendix A.

It is anticipated that concentrations of parameters would have improved due to natural attenuation in the years since the waste material was removed.

As noted in the report appendix on April 30, 2001 the Ministry of the Environment Approvals Branch sent a letter to the Ministry of Transportation that states, "with the removal of the waste and contaminate soil from the site and based on the analytical results of the soil and groundwater samples and the post remediation geophysical study, the office agrees with the consultants that the site meets Table A criteria for residential and parkland use as outlined in The Guideline for Use at Contaminated Sites in Ontario.

Terraprobe Inc.

Greater Toronto

11 Indell Lane
Brampton, Ontario L6T 3Y3
(905) 796-2650 Fax: 796-2250

Hamilton – Niagara

903 Barton Street, Unit 22
Stoney Creek, Ontario L8E 5P5
(905) 643-7560 Fax: 643-7559

Central Ontario

220 Bayview Drive, Unit 25
Barrie, Ontario L4N 4Y8
(705) 739-8355 Fax: 739-8369

Northern Ontario

1012 Kelly Lake Rd., Unit 1
Sudbury, Ontario P3E 5P4
(705) 670-0460 Fax: 670-0558

www.terraprobe.ca

Given the Ministry correspondence it is reasonable to conclude that groundwater and soil impacts are not an issue. However, it would be prudent for Terraprobe to summarize Volatile Organic Compounds (VOC) data collected at the landfill as the report does not include a summary or statement of compliance related to these parameters.

As noted by Golder, no direct comparison for total petroleum hydrocarbons/ heavy oils is possible between the older laboratory results and the current MOECC Table 1 Standards, due to changes in laboratory testing and reporting methods.

A copy of the laboratory results from the groundwater testing conducted by AMEC is provided in Appendix B. The results of the ground water analysis were compared to the current MOECC Table 1 Standards. No exceedances of the Standards were identified.

Petroleum hydrocarbons were detected by AMEC in the soil at the former landfill site at levels ranging from about 120 to 230 ug/g. Also, a review of AMEC's groundwater results indicate that some of the method detection limits (MDLs) from their VOC and TPH results were higher than the current Standards. Due to that, it is possible that low levels of TPH and/or some VOCs may have been present in the groundwater at the former landfill at that time.

As noted in the Landfill Impact Assessment, it is Terraprobe's opinion that this landfill site due to its characterization, closure and waste removal in 2000 will not impact the proposed residential development located at the north boundary line of the landfill site.

It shall be noted on title that the Report is only valid for the proposed development described in the Report and further that any subsequent development of the site would require the completion of a separate Guideline D4 assessment report for review.

Terraprobe recommends approaching the approval authority to discuss the need for continued D4 assessments as waste material no longer exists on the property.

I trust this information is sufficient for your needs, should you require anything further please

Sincerely,



Kim Pickett, C.E.T, LET, QP_{ESA}
Senior Environmental Project Manager



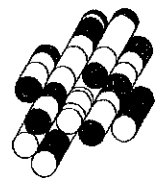
Serena Oyama, C.E.T., P. Geo(Limited)
Senior Project Manager



Samuel Oyedokun, P.Eng., PMP., QP_{ESA}
Associate

APPENDIX A

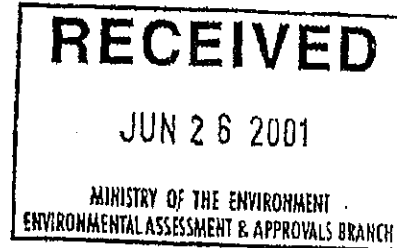
TERRAPROBE INC.



June 25, 2001

TC85325

George Lai
Ministry of the Environment
Environmental Assessment and Approvals Branch
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5



Re: MTO Holly Landfill Site, Innisfil, Ontario; Provisional CofA # A252204

Dear Mr. Lai:

AMEC Earth & Environmental Limited (AMEC) was retained by the Ministry of Transportation of Ontario (MTO) to assess potential impacts on the above referenced site and complete a remedial action program. The MTO acquired the site in 1946, and the last waste was deposited in 1992, although most of the waste deposition occurred in the 1970s. As documented in the report discussed at our meeting in your offices on May 1, 2001, the remediation is now complete.

The groundwater quality in the landfill has been monitored since 1994 and no significant impacts have been noted over these years (reports attached). In addition, no putrescible wastes were deposited below the water table and the remnant buried waste materials (approximately 6,000 tonnes) were removed in the fall of 2000 as part of the remedial action plan.

Based on the above information, AMEC requests that the above referenced Provisional Certificate of Approval be revoked since the site is no longer a landfill. AMEC also recommends that no further monitoring be conducted on this site, since the soil and groundwater quality meet the Table A (potable) criteria from the MOE *Guideline for Use at Contaminated Sites in Ontario*, and the source of potential future impacts (the waste) has been removed.

Yours truly,



Donald Ford, B.Sc.
Head, Site Assessment and Remediation
Direct Tel.: 905-568-2929
Direct Fax: 905-568-1686
E-mail: Donald.ford@amec.com

CF/

P:\DECOM\Projects\85325\Docs\MOE_revised_letter.doc

EC Earth & Environmental Limited
Traders Blvd. East, Suite 110
Mississauga, Ontario
L4Z 3K7
+1 (905) 568-2929
+1 (905) 568-1686

www.amec.com

A0009147_169

Holly Landfill Site

This landfill site is located in the south half of Lot 1, Concession 11 in the Town of Innisfil. Access via Concession 11, approximately 200 m west of the Former Highway 27 (now Simcoe County Road 27). This site was formerly used as an MTO landfill, but waste material was removed by General Waste Inc. in 1997. Some imported fill material was subsequently placed to the north of monitoring well OW-4. Further waste materials were discovered by AMEC in a detailed subsurface investigation of the site (AGRA, 1999). Seven monitoring wells (OW-1A/B to OW-6) existed as of July, 2000 on the site, including a replacement well installed by AGRA in May, 1998 (Figure 3).

Groundwater elevations in July, 2000 (Table 3) were similar to the previous data (AGRA, 1999; Gartner Lee, 1997). The groundwater flow gradient is relatively flat beneath the former landfill footprint, with flow estimated to be to the northwest.

The 2000 groundwater chemistry data are summarized in Table 4 and the Laboratory Certificates of Analysis are provided in Appendix C. The groundwater samples from monitoring well OW-2 in and below the former landfill exhibited elevated nitrate concentrations (3.2 mg/L) that are above the Reasonable Use Guideline. However, other landfill leachate indicator parameters such as chloride were present at low to moderate levels (0.8 mg/L). Therefore, the elevated nitrate concentrations observed at the Holly site may be attributed to agricultural uses in the area and/or to naturally elevated nitrates.

In summary, the concentrations of leachate-related parameters (i.e., iron, nitrate, DOC, TKN) in the monitoring wells within the landfill area are lower than the RUC values calculated by Trow (1995b), with the exception of DOC in OW-1A and OW-1B, and iron in OW-5. Iron concentrations in OW-5 exceeded Reasonable Use Guideline and DOC levels in OW-1A and OW-1B exceeded the respective ODWO and Reasonable Use Guideline. Sodium exceeded the RUC but was below the ODWO at OW-4B. However, none of the affected wells are at or near the downgradient property boundary.

s.N/R

Conclusions

The groundwater level and chemistry data from the July, 1999 sampling events at all three sites were generally consistent with previous data. No groundwater impacts were found at or near any of the property boundaries with respect to the RUC at the Innisfil and Holly sites (Trow, 1995a,b) or the ODWO and/or PWQO and for the Forest Home Site.

Recommendations

s.N/R

AMEC, on behalf of MTO, has completed the remediation of the Holly site, and if the C of A is revoked, the sampling program should be terminated. If the C of A has not been revoked by the spring of 2001, annual monitoring should continue.

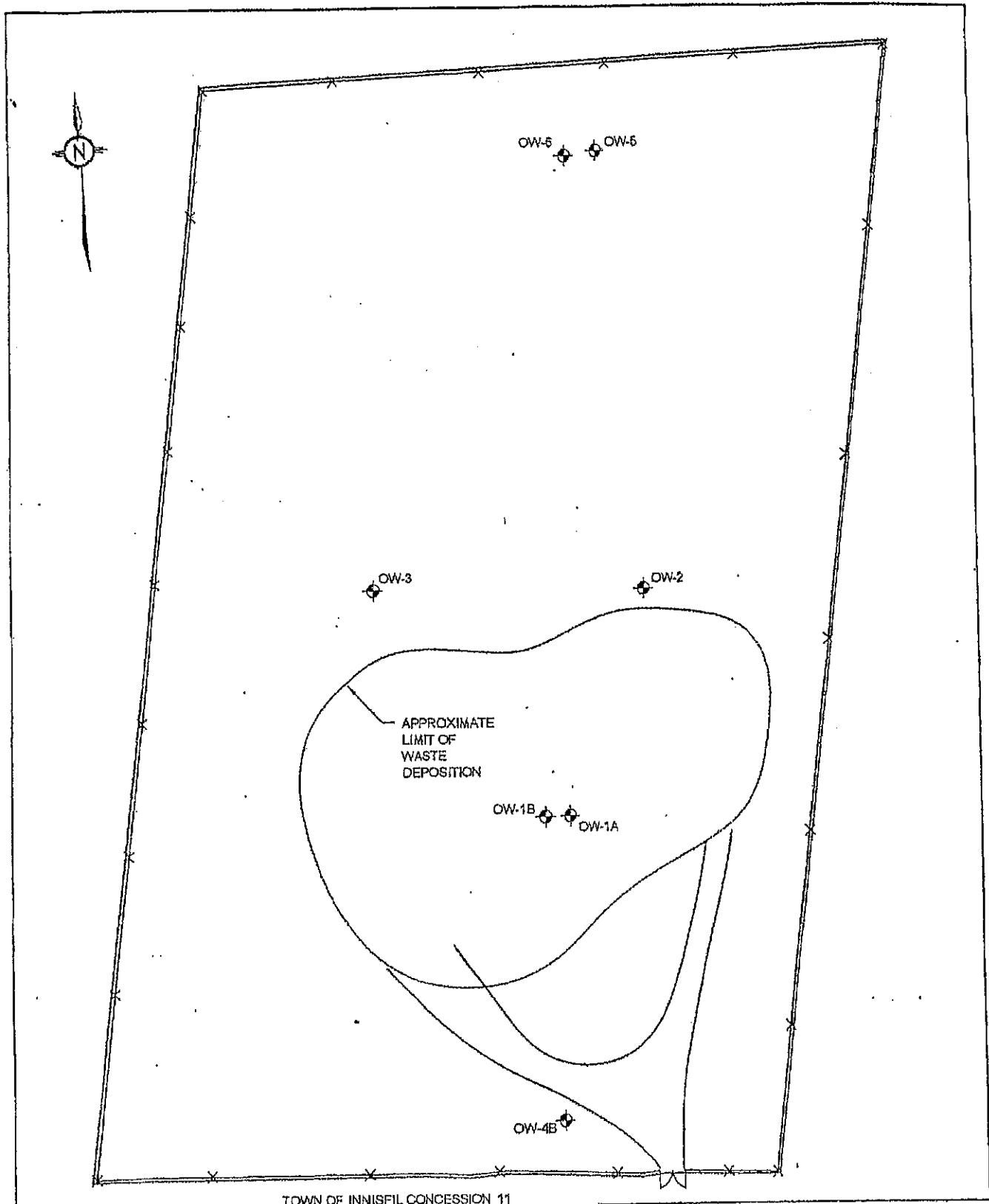
References

AGRA Earth and Environmental Limited, 1998. *1998 Spring Monitoring, Three MTO Simcoe County Landfill Sites*. Prepared for the Ontario Ministry of Transportation, October 23, 1998.

Dames and Moore, Canada, 1996. *Fall Monitoring Event, Holly Pit Former Waste Disposal Yard*. Prepared for the Ontario Ministry of Transportation, November 1, 1996.

Gartner Lee Limited, 1997. *Monitoring Report for the Spring and Fall Sampling and Monitoring Program, Three MTO Simcoe County Landfill Sites*. Prepared for the Ontario Ministry of Transportation, December 15, 1997.

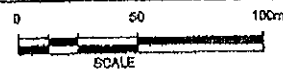
A0009147_172-000573



TOWN OF INNISFIL CONCESSION 11

LEGEND

- OW-1  MONITORING WELL LOCATION
-  PROPERTY LINE
-  FENCE LINE



amec

ONTARIO MINISTRY OF
TRANSPORTATION
SIMCOE COUNTY LANDFILL SITES
HOLLY LANDFILL SITE

SITE PLAN
A0009127 176

FIGURE 2

1. Introduction

Trow Consulting Engineers Ltd. (Trow) has been retained by the Ministry of Transportation (MTO) to prepare an Operational and Site Closure Plan for the Holly Pit Waste Disposal Site (Holly Site) located on the north side of Concession Road 11, just west of Highway 27 in Innisfil, Ontario. Existing site conditions are presented in Drawing 1.

In conjunction with the Operational and Closure Plan, Trow conducted an Environmental Investigation of the Holly Site to identify existing and/or potential site impacts as a result of previous landfilling operations. Trow's findings indicated that there is no potential impact on the surrounding areas (agricultural and light industrial land-use). The Environmental Investigation is provided under separate cover.

1.1 Purpose

The purpose of this document is to detail an Operational and Closure Plan which includes an evaluation of the possible use of catch basin material and road sweepings from Simcoe County as cover material. Subsequent to acceptance of this Closure Plan by the MOEE, the measures described in this document will be implemented.

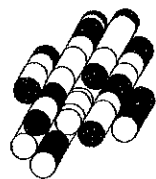
1.2 Background

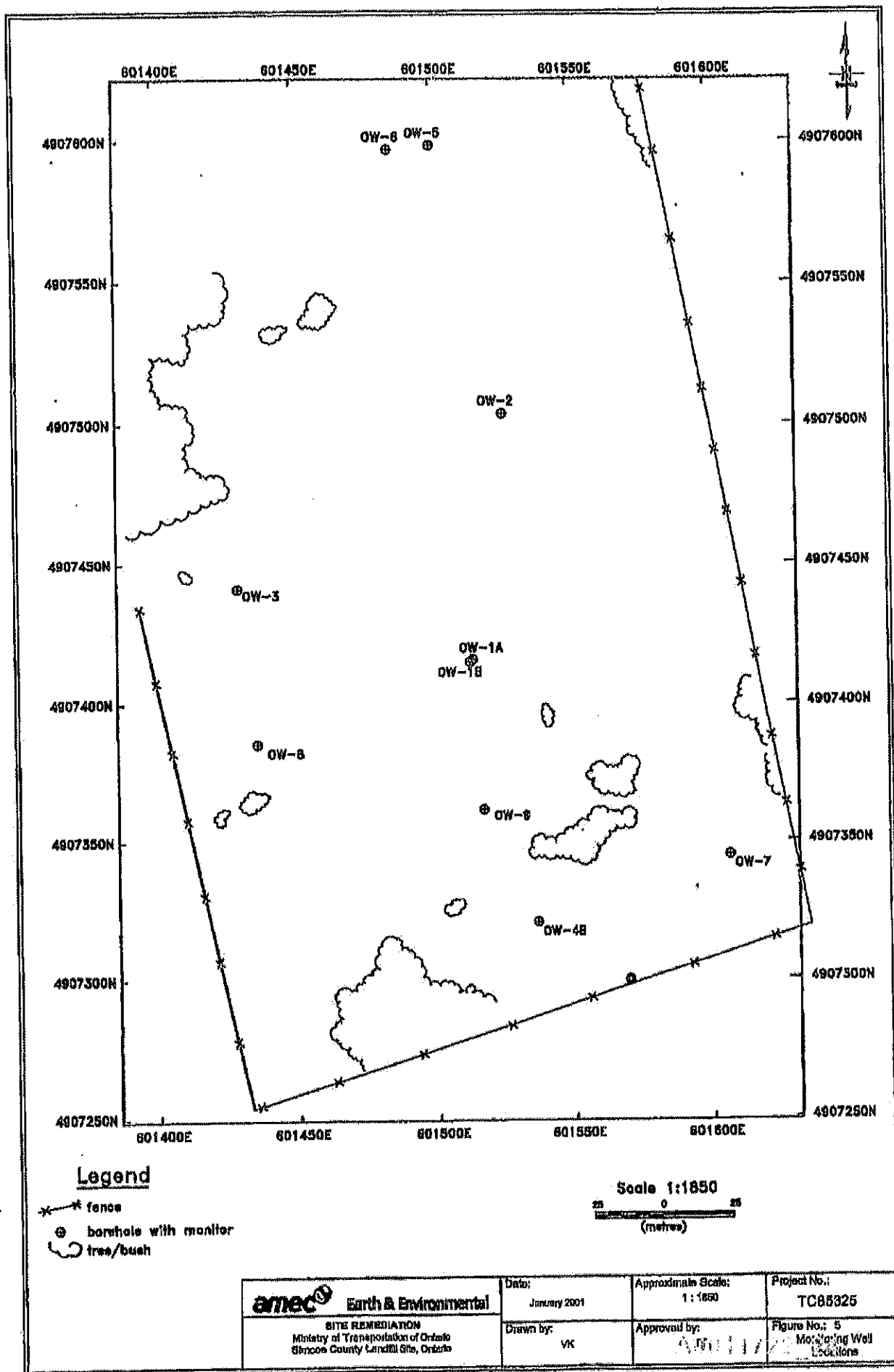
The results of the environmental investigation of the Holly Pit site indicate that minor localized impact on water quality is occurring as a result of landfilling operations. There is no evidence to suggest that groundwater migrating offsite exceeds any criteria under MOEE Policy 15-08 ("Reasonable Use").

There is presently no surface drainage within the Holly Pit; all surplus moisture infiltrates to the shallow watertable aquifer. Minor ponding is observed in localized low lying areas after significant rainfall events.

APPENDIX B

TERRAPROBE INC.







Client : AMEC Earth and Environmental Ltd.
160 Traders Blvd, Unit 110
Mississauga, Ontario L4Z 3K7

Date: February 12, 2001
Date Revised: March 20, 2001
Page: 1 of 1

Project Name : Holly Landfill

Sample Type: Water

Project No. : TC 85325

Lab Ref.: F2000-2126/01

Contact : Tom Thorn & Don Ford

Final

Lab #	Sample ID	TPH Hot Extractable (mg/L)
Unit		
Method Detection Limit		1
S2000-12427	OW-1A (16/12/00)	<1
S2000-12428	OW-1B (16/12/00)	<1
S2000-12429	OW-2 (16/12/00)	<1
S2000-12430	OW-3 (16/12/00)	<1
S2000-12431	OW-4B (16/12/00)	<1
S2000-12432	OW-5 (16/12/00)	<1
S2000-12433	OW-7 (16/12/00)	<1
S2000-12434	OW-8 (16/12/00)	<1
S2000-12435	OW-9 (16/12/00)	<1
Lab Blank		<1

for signature
Cynthia Ridge, C. Chem.
Q.A./Q.C. Officer

[Signature]
Suman Punani, C. Chem.
Laboratory Manager



Client : AMEC Earth and Environmental Ltd.
104 Crockford Blvd.,
Scarborough, Ontario M1R 3C6

Date: January 26, 2001
Date Revised: March 20, 2001
Page: 4 of 4

Project Name: Holly Landfill

Sample Type: Water

Project No. : TC 85325

Lab. Ref.: F2000-2126/01

Contact : Don Ford/Tom Thorn

Final

CERTIFICATE OF ANALYSIS

Volatile Organic Compounds (EPA 624)

Lab #	Sample ID	Date Collected	Unit	Parameters	MDL* (µg/L)	S2000-12432 GW-5 (16/12/00) (µg/L)	S2000-12433 GW-7 (16/12/00) (µg/L)	S2000-12434 GW-8 (16/12/00) (µg/L)	S2000-12435 GW-9 (16/12/00) (µg/L)
				Tetrachloroethene	0.3	< 0.3	< 0.3	< 0.3	< 0.3
				Dibromochloromethane	0.4	< 0.4	< 0.4	< 0.4	< 0.4
				Chlorobenzene	0.3	< 0.3	< 0.3	< 0.3	< 0.3
				Ethylbenzene	0.3	< 0.3	< 0.3	< 0.3	< 0.3
				Bromoform	0.3	< 0.3	< 0.3	< 0.3	< 0.3
				1,1,2,2-Tetrachloroethane	0.3	< 0.3	< 0.3	< 0.3	< 0.3
				1,3-Dichlorobenzene	0.3	< 0.3	< 0.3	< 0.3	< 0.3
				1,4-Dichlorobenzene	0.4	< 0.4	< 0.4	< 0.4	< 0.4
				1,2-Dichlorobenzene	0.4	< 0.4	< 0.4	< 0.4	< 0.4
				m/p-Xylene	0.6	< 0.6	< 0.6	< 0.6	< 0.6
				o-Xylene	0.2	< 0.2	< 0.2	< 0.2	< 0.2
				Styrene	0.2	< 0.2	< 0.2	< 0.2	< 0.2
				Acetone	10	< 10	< 10	< 10	< 10
				Methyl Ethyl Ketone	10	< 10	< 10	< 10	< 10
				MIBK	10	< 10	< 10	< 10	< 10
				2-Chloroethyl vinyl ether	10	< 10	< 10	< 10	< 10
				Surrogates					
				Dibromofluoromethane (%)		82	82	87	75
				Toluene-d8 (%)		102	107	101	101
				4-Bromofluorobenzene (%)		100	103	106	105

Comments: Method: EPA624/524.2 Rev. 3 - Purge and Trap/GC/MS
Values in ppb (µg/L)

* Method Detection Limit

Analyst: T. Wyton, B. Sc.


Cynthia Ridge, C. Chem.
Q.A./Q.C. Officer


Suman Punani, C. Chem.
Laboratory Manager

AMEC Earth & Environmental Limited
160 Traders Blvd East Unit 4
Mississauga Ontario
Canada L4Z 3K7
Tel +1 (905) 568-2929
Fax +1 (905) 690-1141
www.amec.com

A90011723 27

Client : AMEC Earth and Environmental Ltd.
104 Crockford Blvd.,
Scarborough, Ontario M1R 3C6

Date: January 26, 2001
Date Revised: March 20, 2001
Page: 3 of 4

Project Name: Holly Landfill

Sample Type: Water

Project No. : TC 85325

Lab. Ref.: F2000-2126/01

Contact : Don Ford/Tom Thorn

Final

CERTIFICATE OF ANALYSIS

Volatile Organic Compounds (EPA 624)

Lab #	Sample ID	MDL* (µg/L)	S2000-12432 OW-5 (16/12/00) (µg/L)	S2000-12433 OW-7 (16/12/00) (µg/L)	S2000-12434 OW-8 (16/12/00) (µg/L)	S2000-12435 OW-9 (16/12/00) (µg/L)
mit	Parameters					
	Methyl Chloride	0.3	< 0.3	< 0.3	< 0.3	< 0.3
	Vinyl Chloride	0.4	< 0.4	< 0.4	< 0.4	< 0.4
	Bromomethane	0.4	< 0.4	< 0.4	< 0.4	< 0.4
	Chloroethane	0.4	< 0.4	< 0.4	< 0.4	< 0.4
	Trichlorofluoromethane	0.3	< 0.3	< 0.3	< 0.3	< 0.3
	1,1-Dichloroethene	0.3	< 0.3	< 0.3	< 0.3	< 0.3
	Trichloromethane	0.5	< 0.5	< 0.5	< 0.5	< 0.5
	1,2-Dichloroethene	0.2	< 0.2	< 0.2	< 0.2	< 0.2
	1,1,1-Dichloroethane	0.6	< 0.6	< 0.6	< 0.6	< 0.6
	1,2-Dichloroethane	0.7	< 0.7	< 0.7	< 0.7	< 0.7
	Chloroform	0.5	< 0.5	< 0.5	< 0.5	< 0.5
	1,1,1-Trichloroethane	0.5	< 0.5	< 0.5	< 0.5	< 0.5
	Carbontetrachloride	0.3	< 0.3	< 0.3	< 0.3	< 0.3
	Benzene	0.4	< 0.4	< 0.4	< 0.4	< 0.4
	1,2-Dichloroethane	0.4	< 0.4	< 0.4	< 0.4	< 0.4
	Trichloroethene	0.4	< 0.4	< 0.4	< 0.4	< 0.4
	1,2-Dichloropropane	0.4	< 0.4	< 0.4	< 0.4	< 0.4
	Bromodichloromethane	0.3	< 0.3	< 0.3	< 0.3	< 0.3
	1,3-Dichloropropene	0.4	< 0.4	< 0.4	< 0.4	< 0.4
	Toluene	0.3	< 0.3	< 0.3	< 0.3	< 0.3
	1,3-Dichloropropene	0.3	< 0.3	< 0.3	< 0.3	< 0.3
	1,1,2-Trichloroethane	0.4	< 0.4	< 0.4	< 0.4	< 0.4



Client : AMEC Earth and Environmental Ltd.
104 Crockford Blvd.,
Scarborough, Ontario M1R 3C6

Date: January 26, 2001
Date Revised: March 20, 2001
Page: 2 of 4

Project Name: Holly Landfill

Sample Type: Water

Project No. : TC 85325

Lab. Ref.: F2000-2126/01

Contact : Don Ford/Tom Thorn

Final

CERTIFICATE OF ANALYSIS

Volatile Organic Compounds (EPA 624)

Lab #	Sample ID	Date Collected	Unit	Parameters	MDL* (µg/L)	Lab Blank (µg/L)	S2000-12427 OW-1A (16/12/00) (µg/L)	S2000-12428 OW-1B (16/12/00) (µg/L)	S2000-12429 OW-2 (16/12/00) (µg/L)	S2000-12430 OW-3 (16/12/00) (µg/L)	S2000-12431 OW-4B (16/12/00) (µg/L)
				Tetrachloroethene	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
				Dibromochloromethane	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
				Chlorobenzene	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
				Ethylbenzene	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
				Bromoform	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
				1,1,2,2-Tetrachloroethane	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
				1,3-Dichlorobenzene	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
				1,4-Dichlorobenzene	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
				1,2-Dichlorobenzene	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
				m/p-Xylene	0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
				o-Xylene	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
				Styrene	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
				Acetone	10	< 10	< 10	< 10	< 10	< 10	< 10
				Methyl Ethyl Ketone	10	< 10	< 10	< 10	< 10	< 10	< 10
				MIBK	10	< 10	< 10	< 10	< 10	< 10	< 10
				2-Chloroethyl vinyl ether	10	< 10	< 10	< 10	< 10	< 10	< 10
				Surrogates							
				Dibromofluoromethane (%)		73	89	84	78	86	81
				Toluene-d8 (%)		103	107	102	97	103	105
				4-Bromofluorobenzene (%)		103	101	102	106	104	102



Client : AMEC Earth and Environmental Ltd.
104 Crockford Blvd.,
Scarborough, Ontario M1R 3C6

Date: January 26, 2001
Date Revised: March 20, 2001
Page: 1 of 4

Project Name: Holly Landfill

Sample Type: Water

Project No. : TC 85325

Lab. Ref.: F2000-2126/01

Contact : Don Ford/Tom Thom

Final

CERTIFICATE OF ANALYSIS

Volatile Organic Compounds (EPA 624)

Lab #	Sample ID	Lab Blank	S2000-12427	S2000-12428	S2000-12429	S2000-12430	S2000-12431
Unit		(µg/L)	OW-1A (16/12/00) (µg/L)	OW-1B (16/12/00) (µg/L)	OW-2 (16/12/00) (µg/L)	OW-3 (16/12/00) (µg/L)	OW-4B (16/12/00) (µg/L)
Parameters	MDL* (µg/L)						
Ethyl Chloride	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Vinyl Chloride	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Bromomethane	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Chloroethane	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Trichlorofluoromethane	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
1,1-Dichloroethene	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dichloromethane	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,2-Dichloroethene	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,1-Dichloroethane	0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
1,2-Dichloroethane	0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7
Chloroform	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
1,1-Trichloroethane	0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbontetrachloride	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Benzene	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
1,2-Dichloroethane	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Trichloroethene	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
1,2-Dichloropropane	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Bromodichloromethane	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
1,3-Dichloropropene	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Toluene	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
1,3-Dichloropropene	0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
1,1,2-Trichloroethane	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4



Client : AMEC Earth and Environmental Ltd.
160 Traders Blvd, Unit 110
Mississauga, Ontario L4Z 3K7

Date: February 12, 2001
Date Revised: March 20, 2001
Page: 1 of 1

Project Name : Holly Landfill

Sample Type: Water

Project No. : TC 85325

Lab Ref.: F2000-2126/01

Contact : Tom Thorn & Don Ford

Final

CERTIFICATE OF ANALYSIS

TPH (Purgeable & Extractable)

Lab #	Sample ID	Date Collected	Unit	Lab Blank	S2000-12427 OW-1A (16/12/00)	S2000-12428 OW-1B (16/12/00)	S2000-12429 OW-2 (16/12/00)	S2000-12430 OW-3 (16/12/00)
				(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)
Parameters	MDL* (ug/L)							
TPH Purgeable (<C10)	5.0			<5.0	<5.0	<5.0	<5.0	<5.0
TPH Extractable (C10-C25)	50			<50	**<250	**<250	**<250	**<250
Surrogate Recovery Purgeable (%)				73	89	84	78	86
Surrogate Recovery Cold Ext. (%)				101	118	120	116	117

Lab #	Sample ID	Date Collected	Unit	S2000-12431 OW-4B (16/12/00)	S2000-12432 OW-5 (16/12/00)	S2000-12433 OW-7 (16/12/00)	S2000-12434 OW-8 (16/12/00)	S2000-12435 OW-9 (16/12/00)
				(ug/L)	(ug/L)	(ug/L)	(ug/L)	(ug/L)
Parameters	MDL* (ug/L)							
TPH Purgeable (<C10)	5.0			<5.0	<5.0	<5.0	<5.0	<5.0
TPH Extractable (C10-C25)	50			**<250	**<250	**<250	**<250	**<250
Surrogate Recovery Purgeable (%)				81	82	82	87	75
Surrogate Recovery Cold Ext. (%)				117	118	118	1130	116

Comments: Total hydrocarbons quantified as Toluene/Diesel
Method: EPA624/524.2 Rev. 3 - Purge and Trap/GC/MS
EPA 8015-Solvent Ext./GC/FID
All values in ug/L (ppb)
* Method Detection Limit
** Higher detection limit due to low sample volume

Analyst: R. Grewal, M.Sc.
T. Wyton, B.Sc.

for signature
Cyndie Ridge, C. Chem.
Q.A./Q.C. Officer

[Signature]
Suman Punani, C. Chem.
Laboratory Manager

AMEC Earth & Environmental Limited
160 Traders Blvd East Unit 4
Mississauga Ontario
Canada L4Z 3K7
Tel +1 (905) 568-2929
Fax +1 (905) 890-1141
www.amec.com

00011723 1



Client : AMEC Earth and Environmental Ltd.
104 Crockford Blvd.,
Scarborough, Ontario M1R 3C6

Date: January 26, 2001
Date Revised: March 20, 2001
Page: 2 of 2

Project Name : Holly Landfill

Sample Type: Water

Project No. : TC 85325

Lab Ref.: F2001-2126/01

Contact : Don Ford/Tom Thorn

Final

CERTIFICATE OF ANALYSIS

Polynuclear Aromatic Hydrocarbons

Lab #	Sample ID	Date Collected	Unit	MDL *	S2000-12432	S2000-12433	S2000-12434	S2000-12435
				(µg/L)	OW-5	OW-7	OW-8	OW-9
					(16/12/00)	(16/12/00)	(16/12/00)	(16/12/00)
					(µg/L)	(µg/L)	(µg/L)	(µg/L)
Parameters								
Naphthalene				0.03	<0.03	<0.03	<0.03	<0.03
Acenaphthylene				0.03	<0.03	<0.03	<0.03	<0.03
Acenaphthene				0.04	<0.04	<0.04	<0.04	<0.04
Fluorene				0.03	<0.03	<0.03	<0.03	<0.03
Phenanthrene				0.04	<0.04	<0.04	<0.04	<0.04
Anthracene				0.03	<0.03	<0.03	<0.03	<0.03
Fluoranthene				0.03	<0.03	<0.03	<0.03	<0.03
Pyrene				0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene				0.04	<0.04	<0.04	<0.04	<0.04
Chrysene				0.04	<0.04	<0.04	<0.04	<0.04
Benzo(b)fluoranthene				0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene				0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene				0.01	<0.01	<0.01	<0.01	<0.01
Indeno(123 cd.)pyrene				0.05	<0.05	<0.05	<0.05	<0.05
Dibenzo(ah)anthracene				0.05	<0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene				0.03	<0.03	<0.03	<0.03	<0.03
Surrogate Recovery								
Naphthalene-d8					94	92	94	92
Anthracene-d10					99	99	103	100
Perylene-d12					91	87	90	90

Comments: Modified EPA 625 Solvent Ext./GC/MS

* Method Detection Limit

Analyst: T. Wyton, B.Sc.
AMEC Earth & Environmental Limited
160 Traders Blvd East Unit 4
Mississauga Ontario
Canada L4Z 3K7
Tel +1 (905) 568-2929
Fax +1 (905) 890-1141
www.amec.com

for signature
Cynthia Ridge, C. Chem.
Q.A./Q.C. Officer

Signature
Suman Punani, C. Chem.
Laboratory Manager

A0011773 32



Client : AMEC Earth and Environmental Ltd.
104 Crockford Blvd.,
Scarborough, Ontario M1R 3C6

Date: January 26, 2001
Date Revised: March 20, 2001
Page: 1 of 2

Project Name : Holly Landfill

Sample Type: Water

Project No. : TC 85325

Lab Ref.: F2001-2126/01

Contact : Don Ford/Tom Thorn

Final

CERTIFICATE OF ANALYSIS

Polynuclear Aromatic Hydrocarbons

Lab #	Sample ID	Date Collected	Unit	Lab Blank	S2000-12427 OW-1A (16/12/00) (µg/L)	S2000-12428 OW-1B (16/12/00) (µg/L)	S2000-12429 OW-2 (16/12/00) (µg/L)	S2000-12430 OW-3 (16/12/00) (µg/L)	S2000-12431 OW-4B (16/12/00) (µg/L)
Parameters	MDL * (µg/L)								
Naphthalene	0.03			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Acenaphthylene	0.03			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Acenaphthene	0.04			<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Fluorene	0.03			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Phenanthrene	0.04			<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Anthracene	0.03			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Fluoranthene	0.03			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Pyrene	0.03			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Benzo(a)anthracene	0.04			<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chrysene	0.04			<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Benzo(b)fluoranthene	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(k)fluoranthene	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(a)pyrene	0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Indeno(123 cd.)pyrene	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dibenzo(ah)anthracene	0.05			<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Benzo(ghi)perylene	0.03			<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Surrogate Recovery									
Naphthalene-d8				76	82	80	76	91	94
Anthracene-d10				92	100	96	86	102	99
Perylene-d12				82	86	87	80	89	91



Client : AMEC Earth and Environmental Ltd.
160 Traders Blvd, Unit 110
Mississauga, Ontario L4Z 3K7

Date: February 8, 2001
Date Revised: March 20, 2001
Page: 2 of 2

Project Name : Holly Landfill

Sample Type: Water

Project No. : TC 85325

Lab Ref.: F2000-2126/01

Contact : Tom Thorn & Don Ford

Final

CERTIFICATE OF ANALYSIS

Sample ID	Date Collected	S2000-12433 QW-7 (16/12/00)	S2000-12434 QW-8 (16/12/00)	S2000-12435 QW-9 (16/12/00)	Lab Blank	Q.C. Standards Actual	Q.C. Standards Expected
Parameters	Unit	MDL*					
Metals							
Aluminum	(mg/L)	0.0001	<0.0001	<0.0001	<0.0001	1.01	1.00
Barium	(mg/L)	0.005	0.017	0.009	<0.001	0.99	1.00
Beryllium	(mg/L)	0.005	0.050	0.087	<0.005	0.55	0.50
Cadmium	(mg/L)	0.001	<0.001	<0.001	<0.001	0.54	0.50
Cobalt	(mg/L)	0.001	<0.001	<0.001	<0.001	0.94	1.00
Copper	(mg/L)	0.05	131	112	<0.05	10.3	10.0
Iron	(mg/L)	0.0001	<0.0001	<0.0001	<0.0001	0.55	0.50
Lead	(mg/L)	0.001	<0.001	<0.001	<0.001	0.56	0.50
Manganese	(mg/L)	0.001	0.003	<0.001	<0.001	0.56	0.50
Nickel	(mg/L)	0.001	<0.001	<0.001	<0.001	1.09	1.00
Phosphorus	(mg/L)	0.001	0.020	0.021	<0.001	1.07	1.00
Potassium	(mg/L)	0.05	3.2	20	<0.05	19.6	20.0
Sodium	(mg/L)	0.05	9.7	8.7	<0.05	4.1	4.0
Sulfur	(mg/L)	0.001	0.001	0.003	<0.001	0.55	0.50
Titanium	(mg/L)	0.005	<0.005	<0.005	<0.005	1.08	1.00
Zinc	(mg/L)	0.05	14.5	18	<0.05	20.1	20.0
Chromium	(mg/L)	0.005	<0.005	<0.005	<0.005	1.10	1.00
Cobalt	(mg/L)	0.005	<0.005	<0.005	<0.005	2.13	2.00
Phosphorus	(mg/L)	0.005	<0.005	<0.005	<0.005	1.09	1.00
Lead	(mg/L)	0.001	<0.001	<0.001	<0.001	0.55	0.50
Sodium	(mg/L)	0.005	<0.005	<0.005	<0.005	0.55	0.50
Zinc	(mg/L)	0.001	0.008	<0.001	<0.001	0.55	0.50

Comments : * Method Detection Limit

for analysis
Dymhia Ridge, C. Chem.
Q.A./Q.C. Officer

[Signature]
Suman Punani, C. Chem.
Laboratory Manager

AMEC Earth & Environmental Limited
160 Traders Blvd East Unit 4
Mississauga Ontario
Canada L4Z 3K7
Tel +1 (905) 568-2929
Fax +1 (905) 890-1141
www.amec.com

A0011723 36.



Client : AMEC Earth and Environmental Ltd.
160 Traders Blvd, Unit 110
Mississauga, Ontario L4Z 3K7

Date: February 8, 2001
Date Revised: March 20, 2001
Page: 1 of 2

Project Name : Holly Landfill

Sample Type: Water

Project No. : TC 85325

Lab Ref.: F2000-2126/01

Contact : Tom Thorn & Don Ford

Final

CERTIFICATE OF ANALYSIS

Lab / Sample ID			S2000-12427 OW-1A (16/12/00)	S2000-12428 OW-1B (16/12/00)	S2000-12429 OW-2 (16/12/00)	S2000-12430 OW-3 (16/12/00)	S2000-12431 OW-4B (16/12/00)	S2000-12432 OW-5 (16/12/00)
Parameters	Unit	MDL*						
Metals								
Silver	(mg/L)	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Aluminium	(mg/L)	0.005	0.021	<0.005	0.107	0.018	0.009	0.04
Barium	(mg/L)	0.005	0.091	0.069	0.020	0.096	0.078	<0.005
Beryllium	(mg/L)	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Bismuth	(mg/L)	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Calcium	(mg/L)	0.05	79	93	69	86	124	3
Cadmium	(mg/L)	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt	(mg/L)	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	(mg/L)	0.001	0.005	0.001	0.003	0.004	0.001	<0.001
Copper	(mg/L)	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Iron	(mg/L)	0.001	0.022	0.009	0.092	0.016	0.008	0.039
Potassium	(mg/L)	0.05	28	16	1.3	16.9	12	0.2
Magnesium	(mg/L)	0.05	5.8	6.9	4.9	6.6	8.3	2
Manganese	(mg/L)	0.001	<0.001	0.005	0.011	<0.001	<0.001	0.001
Molybdenum	(mg/L)	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Sodium	(mg/L)	0.05	67	12	3.6	23	86	0.5
Nickel	(mg/L)	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Phosphorus	(mg/L)	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006
Lead	(mg/L)	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Vanadium	(mg/L)	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	(mg/L)	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001