STONECLIFFE WASTE DISPOSAL SITE
CORPORATION OF THE UNITED TOWNSHIPS OF HEAD, CLARA AND MARIA

2011/2012 BIENNIAL REPORT

Prepared by: Jp2g Consultants Inc.
Engineers • Planners • Project Managers
Project No. 2006025N – AOR
and
AECOM
File No. 60285244

May 2013

Jp2g Consultants Inc.

ENGINEERS ■ PLANNERS ■ PROJECT MANAGERS

Jp2g Consultants Inc.
ENGINEERS ■ PLANNERS ■ PROJECT MANAGERS

J.M. Janota, P.Eng., M.Sc.
J.E. Hunton, MCIP, RPP

TRANSMITTAL

TO Ministry of the Environment
2430 Don Reid Drive
Ottawa, ON K1H 1E1

DATE: May 30, 2013

PROJECT: Stonecliffe WDS

ATTENTION: Emily Tieu

PROJECT NO.: 2006025N

The following shop drawings are:

( ) mailed
(x) courier

( ) delivered by hand
( ) to be picked up

QUANTITY	DESCRIPTION
1	2011/2012 Biennial Report with CD

Comments

Per: _____
Kevin Mooder, MCIP RPP

c.c. Melinda Reith, Township
Spencer Bootsma, AECOM

EXECUTIVE SUMMARY

The Stonecliffe Waste Disposal Site is located on Lots 21 and 22, Concession 11, in the geographic Township of Head, in the Township of Head, Clara and Maria. The 2011/2012 Biennial Report provides a brief description of the site's approval status as required to satisfy Condition 54 of the Provisional Certificate of Approval (now referred to as Environmental Compliance Approval ECA) No. A412405, dated April 28, 2008. The report details the results of the 2011/2012 operations and environmental monitoring program.

Site Development and Operations

Site operations in 2009/2010 can be summarized as follows:

- The ECA approved a total waste disposal volume of 26,680m^3 as detailed in the Site Development and Operations Plan dated September, 2003
- In 2011 the Township extended the bear fencing and spread the on-site cover material to establish new grades for waste disposal
- As of December 31, 2012 the total remaining capacity is estimated to be 9,550 m^3
- The Township has implemented a curbside collection of recyclables and an enhanced waste diversion program at this site
- The Township in consultation with MNR will complete the plan of survey and transfer of lands from the Crown as required under Condition 13

Environmental Monitoring

The results of the monitoring program are presented in a report prepared by AECOM and entitled Stonecliffe Landfill Site – 2011/2012 Groundwater and Surface Water Monitoring Report", dated May 2013, which is attached to this report as Part 2. Reference should be made to the AECOM Report for a discussion on the results and for recommendations related to future monitoring.

Recommendations

- When the Township establishes the next trench, a field survey should be completed to establish base conditions to determine an annual landfilling rate.
- The Township will continue its efforts to obtain ownership of the site and buffer as required under Condition 13.
- The Township and contractors must keep accurate records of waste types received and hauled from the site, cover applications, complaints and emergency situations.

TABLE OF CONTENTS

DRAWINGS

DRAWING 1: EXISTING CONDITIONS PLAN 2012
DRAWINGS 2 AND 3 DATED 2003

APPENDICES

PART 2 – 2011/2012 MONITORING REPORT

Part 1

2011/2012 Site Development and Operations

1.0 INTRODUCTION

The Township of Head, Clara and Maria retained Jp2g Consultants Inc. to complete the 2011/2012 Biennual Report for the Stonecliffe Waste Disposal Site. The completion of this report is required to satisfy Condition 54 of the Provisional Certificate of Approval (now referred to as Environmental Compliance Approval ECA) No. A412405 for the use and operation of a 0.9 hectare landfilling area within a total site area of 2.43 hectares. The site is located on Lots 21 and 22, Concession 11, geographic Township of Head in the Township of Head, Clara and Maria at 67 Kenny Road.

1.1 Background

In November 2002 Jp2g Consultants Inc. submitted an Application to amend the Certificate dated April 2, 1980 to reflect current MOE guidelines as requested by the Ministry. The Application was supported with a "Site Development and Operations Plan" which identified an expansion to the 0.6 ha landfilling area within the 2.0 ha site and a proposed contaminant attenuation zone. The design proposed continuation of a trench and cover operation within a total 1.19 ha landfilling area and a total site area of 25 ha. MOE requested that the site be redesigned to reduce the landfilling area footprint.

In response the "Site Development and Operations Plan" dated September 2003 was filed resulting in a ECA dated April 28, 2008 issued for approval of a 0.9 ha landfilling site and a transfer station within a 2.43 ha site. A copy of the ECA is found in **Appendix A**.

Specific conditions related to the site area under the new ECA required the Township's action, generally summarized as follows:

11. Pursuant to Section 197 of the Act, the Owner or any person dealing with the property in anyway must be provided a copy of the Certificate.

12. Within 60 days of acquiring the land for the site and the Contaminant Attenuation Zone from the Crown (MNR) the Township shall complete a Certificate of Requirement as per Schedule "B" of the Certificate. The signed document shall be signed by the Director registered on title, and a copy filed with the District Manager.

13(a) Within 2 years of April 28, 2008 the Township shall purchase the CAZ and amend the Certificate to include into the total site area.
(b) The Township shall obtain from the CPR a written agreement for use of their property for a CAZ. The Township shall maintain a record of negotiations with CPR.
(c) The Township (Owner) must continue to own the property rights to the CAZ for duration of the contaminating lift span of the site.
(d) The Township (Owner) shall notify the Director in writing within 30 days after any change in the ownership of the property rights in the CAZ.

A copy of the ECA was filed with MNR June 10, 2008 and the Ontario Land Surveyor filed a preliminary reference plan with MNR in April 2009. Copies of all relevant correspondence is found in **Appendix B**.

1.2 Scope

Condition 54 of the Provisional ECA for the Stonecliffe Waste Disposal Site, requires that the Township submit a Biennial Report documenting the site operations and environmental monitoring of the Site by May 31, 2010 and by May 31 every two (2) years thereafter. The submission date of the first report was amended by Steve Burns Ottawa District Manager to May 31, 2011. The 2011/2012 Biennual Report includes a summary of site development, operations, compliance issues, and the groundwater monitoring results presented in this report as follows:

Part 1 Site Development and Operations
Part 2 Environmental Quality Monitoring

2.0 SITE DEVELOPMENT

During 2011/2012 the Stonecliffe Waste Disposal Site operations involved a modified area and cover method of landfilling. Covering is to occur once per week during the summer season and at least once monthly during the winter season.

Development of the site is to proceed in accordance with the approved design drawings contained in the "Site Development and Operations Plan", dated September 2003 as follows:

- Drawing 2 of 3 "Operations Plan" dated August 2003 plotted Sept. 23, 2003
- Drawing 3 of 3 "Final Contours and Section" dated August 2003 plotted Sept. 22, 2003

Copies of these drawings have been included in this report for reference.

In 2008 the Township erected a bear fence within the 0.9 ha landfilling area. As shown on **Drawing 1** the fencing has been extended in a southerly direction beyond the approved landfilling area limits. In 2011 the Township regraded a portion of the landfilling area for waste disposal. Landfilling has occurred within the approved landfilling area in 2011/2012.

It has been decided that a modified area method of disposal be continued within the bear fencing for Stages 1 to 4 to achieve final design contours, and then final disposal on site will involve area disposal.

In 2011 The Township filed an application to amend the ECA to permit the storage of a small amount of household hazardous wastes. Due to excessive fees to process and detail required the application was withdrawn.

3.0 SITE OPERATIONS

The operational portion of this Biennual Report is based on documentation provided by the Township and a site survey undertaken by Jp2g Consultants Inc.

3.1 Survey of the Landfill Site

A topographic survey of the waste disposal area was last conducted by Jp2g Consultants Inc. in December 2012. The survey information has been used to prepare Drawing 1 to show the location of waste placement, designated waste storage areas and the landfill site contours to date.

3.2 Landfill Capacity

Based on a test pit investigation in July 2000 it was estimated that approximately 5700m^2 of area had been used for disposal with approximately 12,875m^3 of landfilled space utilized at the Stonecliffe Site. The design (Jp2g 2003) provided for a total waste disposal volume of 26,680m^3, so as of July 2000 there was a remaining capacity of 13,805m^3. This capacity assumed a remaining trench capacity of 779m^3 and an area fill capacity of 13,023m^3.

Based on the December 2012 survey in comparison to the final approved waste disposal contours (not including final cover) shown on **Drawing 1** which is based on Drawing 2 of 3 there is an estimated remaining capacity of 9,550 m^3.

3.3 Waste Diversion Program

In February 2007 the Township implemented a curbside collection recycling program through a private contractor. The list of materials picked up includes:

- metal and aluminum cans
- plastic containers and bottles
- milk and juice boxes/cartons
- paper and cardboard
- glass containers and bottles
- aluminum foil and plates
- plastic bags
- styrofoam
- waste oil products
- small appliances

The Stonecliffe Landfill Site also has established storage and management area on site for:

- scrap metal
- appliances (refrigerants)
- tires
- mattresses/furniture
- brush
- electronics

3.4 Summary of Waste Received and Transferred Fromthe Site

The Stonecliffe Waste Disposal Site accepts solid non-hazardous municipal waste, scrap metal, white goods, tires, scrap wood, brush, leaves, and other yard waste. Waste is landfilled, brush and clean wood is burnt, white goods, scrap metal furniture and tires are removed as required by a licensed contractor. Based on the site attendants' and municipal records **Appendix C** the following summarizes the waste types managed at the site.

According to available Township records the following summarizes waste deliveries to the site:

	2011			2012		
Month	**Private**	**Business**	**# Bags**	**Private**	**Business**	**# Bags**
Jan.	63	2	133	41	0	82
Feb.	48	0	78	60	0	98
Mar.	59	0	109	84	0	134
Apr.	88	0	164	123	0	142
May	88	1	356	85	6	147
June	106	10	338	71	8	269
July	136	49	856	93	19	562
Aug.	125	20	797	94	25	712
Sept.	106	11	362	91	19	531
Oct.	107	7	249	73	10	329
Nov.	74	0	146	56	0	71
Dec.	56	0	130	55	0	87
Total	**1056**	**100**	**3718**	**926**	**87**	**3164**

The municipal truck collected and delivered 3,795 bags in 2011, and 2,218 bags in 2011.

The following summarizes 2011/2012 statistics for waste diversion.

- Brush Burning
  Clean brush and lumber was received and piled separately at the landfill site in 2010/2011. An estimated 71 and 67 loads respectively were burned at the site.

- Tires
  Based on Township records, approximately 107 tires were received at the site.

- White Goods/Refrigerated Appliances
  A recorded 38 and 4 appliances were removed from the site in 2011/2012.

- Scrap Metal
  A recorded 230 kg and 840 kg of scrap metal removed in 2011/2012.

- Computers and Electronics
  7 and 37 units were removed by the Contractor in 2011/2012.

- C & D Waste
  The treated lumber, drywall, shingles, windows, etc. were typically landfilled unless unusable items were diverted by the attendant and available for reuse.

3.5 Compliance Issues

The Township received a Site Inspection Report prepared by Lance Larkin dated August 11, 2011 no major non-compliance issues was noted except the requirements of Condition 13.

- MNR approval of plan of survey
- obtain approval from CPR
- document transfer of ownership
- registration
- Certificate of Report
- Amend Certificate to current size

As required under Condition 13 the Township is to obtain lands from the Crown for the site and CAZ. The process has been initiated; **Appendix B** includes copies of the following correspondence:

- June 10, 2008 Certificate to MNR
- June 10, 2008 letter to OVR
- June 26, 2008 MNR survey requirements
- June 26, 2008 letter to CPR
- April 9, 2009 letter to CPR

A copy of the preliminary reference plan prepared by Kasprazak Surveying Ltd. OLS was filed with MNR Peterborough in April 2009. No further action has been taken.

The Township should review their recording and reporting requirements to ensure compliance with Conditions 21, 46, 48, 49, 50, 51, 52, 56, 59 and 60.

A copy of the ECA and a Compliance Summary Table is included in **Appendix A**.

4.0 ENVIRONMENTAL QUALITY MONITORING

The information required to address the environmental quality monitoring reporting requirements of Condition 54 is based on the report entitled "Stonecliffe Landfill Site – 2011/2012 Groundwater and Surface Water Report" dated May 2013, prepared by AECOM. This report is found in Part 2 of this Report.

Accompany the Site Inspection Report was a MOE Technical Support Section groundwater review dated February 16, 2012 of the 2009/2010 Annual Report, requesting that the seep be remediated. As of the August 2012 monitoring event, the Township had not completed the work.

5.0 RECOMMENDATIONS

The next field survey may permit a more comprehensive review to determine the quantity of annual landfilled volume and remaining site capacity.

The Township will continue their efforts to obtain ownership of the site and buffer area from the Crown as required under Condition 13.

The 2013 monitoring event will record the results of any remediation of the seep.

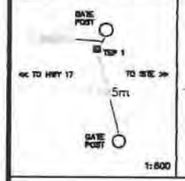
Report prepared by:
Jp2g Consultants Inc.
Engineers • Planners • Project Managers

for Perry Larochelle
Technical Field Representative

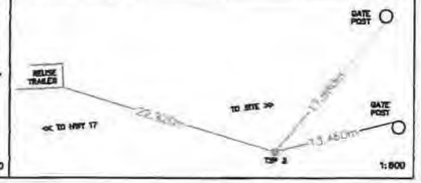
Kevin Mooder, MCIP, RPP
VP Environmental Services

TSP 1: SPIKE IN GRAVEL	TSP 2: SPIKE IN GRAVEL
NORTHING: 1000.000m	NORTHING: 1000.000m
EASTING: 2000.317m	EASTING: 2067.208m
ELEVAION: 99.792m	ELEVAION: 102.168m

DETAIL 1: TSP 1



DETAIL 2: TSP 2



BH-4-II
BH-4-I
BH-3-I & BH-3-II (~35m)
BH-1-I & BH-1-II (~200m)
SCRAP METAL
WHITE GOODS
WEEE
TIRES
BRUSH/ BURN PILE
INNER ENTRANCE GATE
HWY 17
REUSE MATERIAL
GRAVEL ACCESS ROAD
TSP 1
TSP 2
OUTER ENTRANCE GATE
103
104
105
106
107
108
109
110
SHED
BH-2-I
BH-2-II
0.9ha LANDFILLING AREA

LEGEND

- LANDFILLING AREA
- ROADWAY
- TREELINE
- ELECTRIC BEAR FENCE
- TIRES — WASTE DIVERSION AREA
- LANDFILL TRENCH
- BH-1-II — MONITORING WELL LOCATION
- 108 — 2012 SURFACE CONTOURS

NOTES:

SURFACE CONTOURS GENERATED BY INFORMATION FROM DECEMBER 06, 2012 LAND SURVEY COMPLETED BY JP2G CONSULTANTS INC.

SCALE: 1:500

10 0m 10 20 40

No.	DATE	BY	REVISIONS

Jp2g Consultants Inc.
ENGINEERS ■ PLANNERS ■ PROJECT MANAGERS

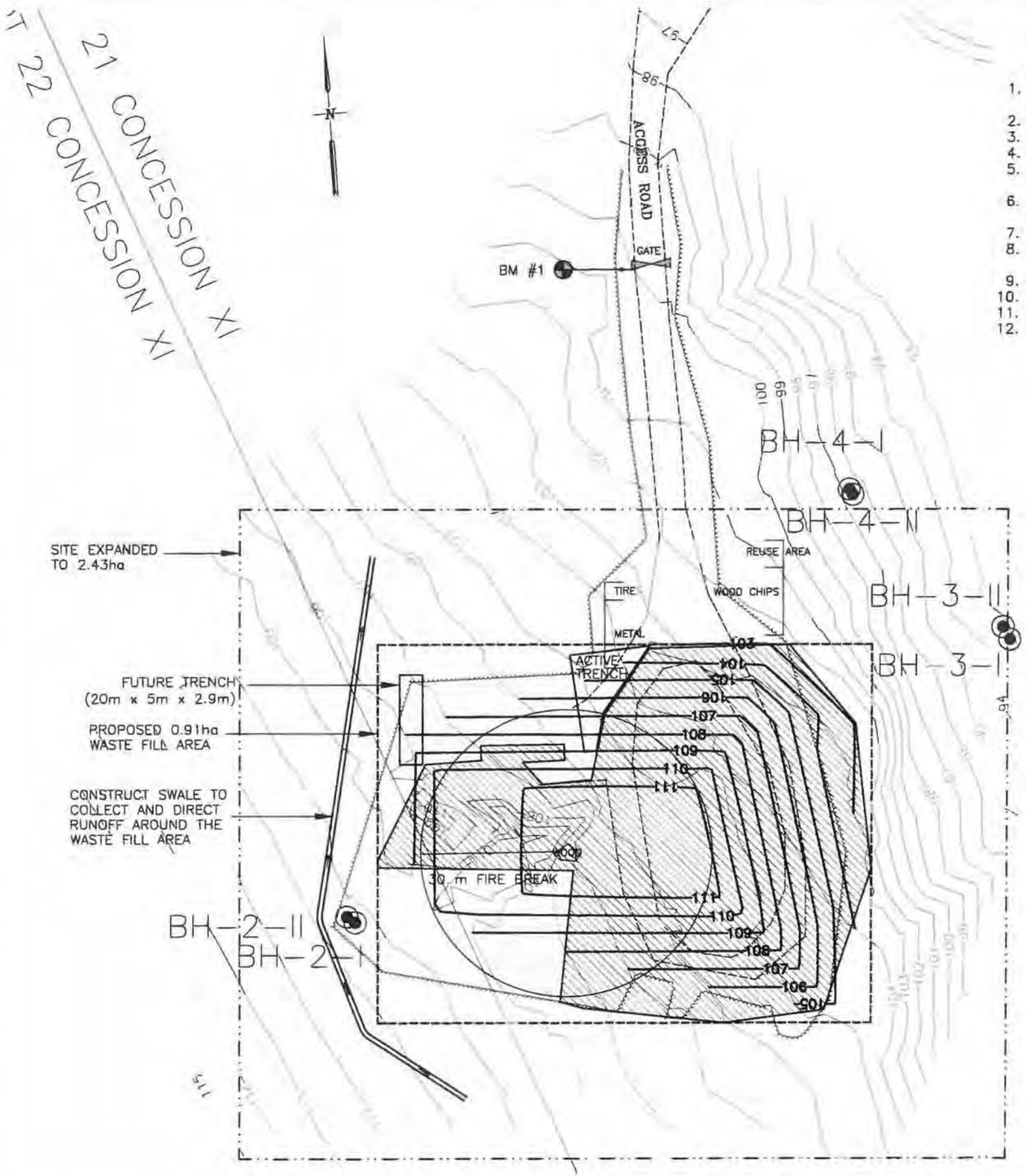
DESIGNED	RM
DRAWN	RM
CHECKED	PRL
APPROVED	KM
SCALE	1:500

STONECLIFFE WASTE DISPOSAL SITE

PART LOT 21/22, CONCESSION XI, GEOGRAPHIC TOWNSHIP OF HEAD, TOWNSHIP OF HEAD, CLARA, AND MARIA

EXISTING CONDITIONS PLAN 2012

DATE	JAN 2013
PROJECT	2006025N
PLOTTED	29-MAY-13
DRAWING	1

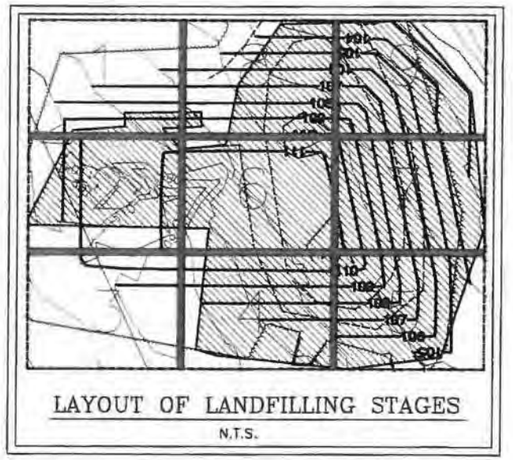


NOTES:

1. Existing conditions are based on topographic site survey by Janota Patrick & Associates Ltd., dated July 7, 2000 and site review on September 2, 2003, by Jp2g Consultants Inc staff.
2. The metal and tire piles should be segregated with logs as shown.
3. A 30m fire break must be established should the Township desire to burn clean brush.
4. An area for re-use items should be established as shown.
5. Clear away trees and underbrush as required to establish waste management facilities, fire break and swale.
6. This drawing is for illustrative purposes only. The layout of waste and recyclable material storage facilities, fire break, and swale are subject to change to meet specific requirements.
7. Final cover to be placed progressively as waste reaches final elevations.
8. Final contours include final cover. Final cover to include 600mm of earth material and 150mm of topsoil or equivalent.
9. All dimensions are in metres unless otherwise noted.
10. The tipping face should not exceed 10m in length.
11. Landfilling to occur in stages. Refer to detail on this sheet for stage layout.
12. Due to limited landfilling activity in Stage 3, cover material could be stock piled in this area.

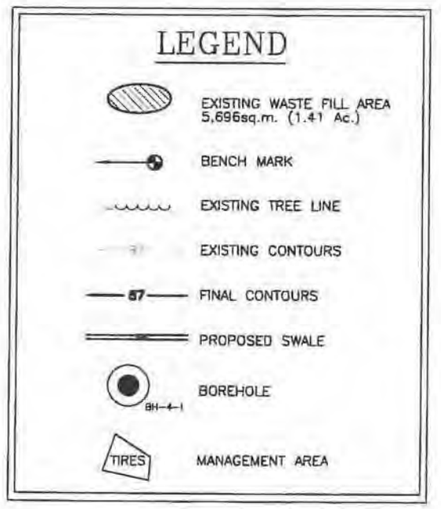
VOLUMES

EXISTING BELOW GROUND	12,875cu.m.
ACTIVE TRENCH	489cu.m.
FUTURE TRENCH	290cu.m.
PROPOSED EXPANSION (EXCLUDING FINAL COVER)	13,026cu.m.
TOTAL:	26,680cu.m.



LAYOUT OF LANDFILLING STAGES

N.T.S.



Jp2g Consultants Inc.

ENGINEERS · PLANNERS · PROJECT MANAGERS
PEMBROKE · OTTAWA

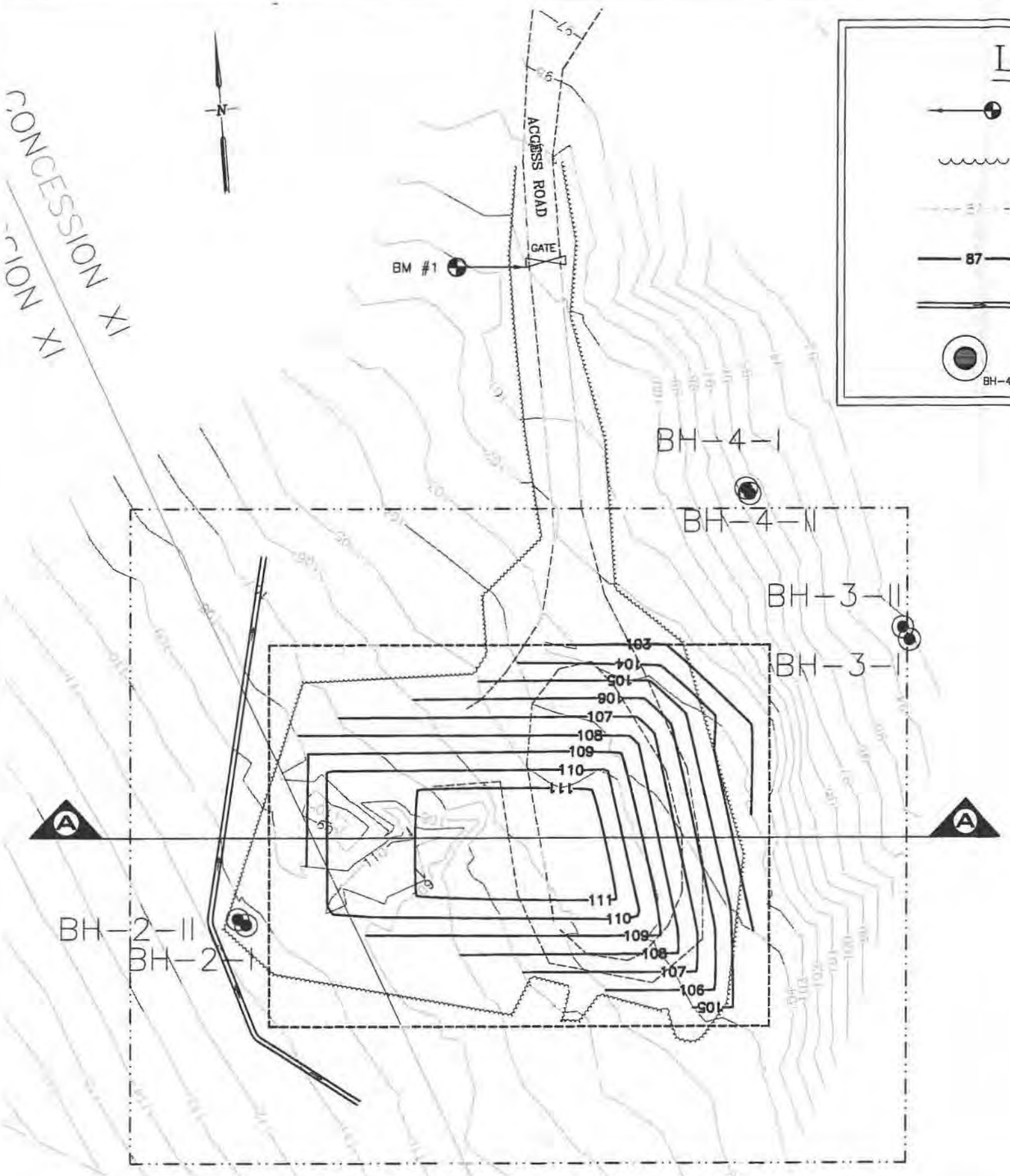
DESIGNED	MAB
DRAWN	MAB
CHECKED	KJM
APPROVED	KJM
SCALE	HORIZ. 1:500

TOWNSHIPS OF HEAD, CLARA & MARIA
STONECLIFFE WASTE DISPOSAL SITE

OPERATIONS PLAN

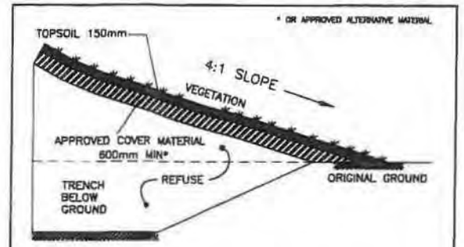
DATE	AUG. 2003
PROJECT	20060250
PLOTTED	Sep 22/2003
DRAWING	2 of 3

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

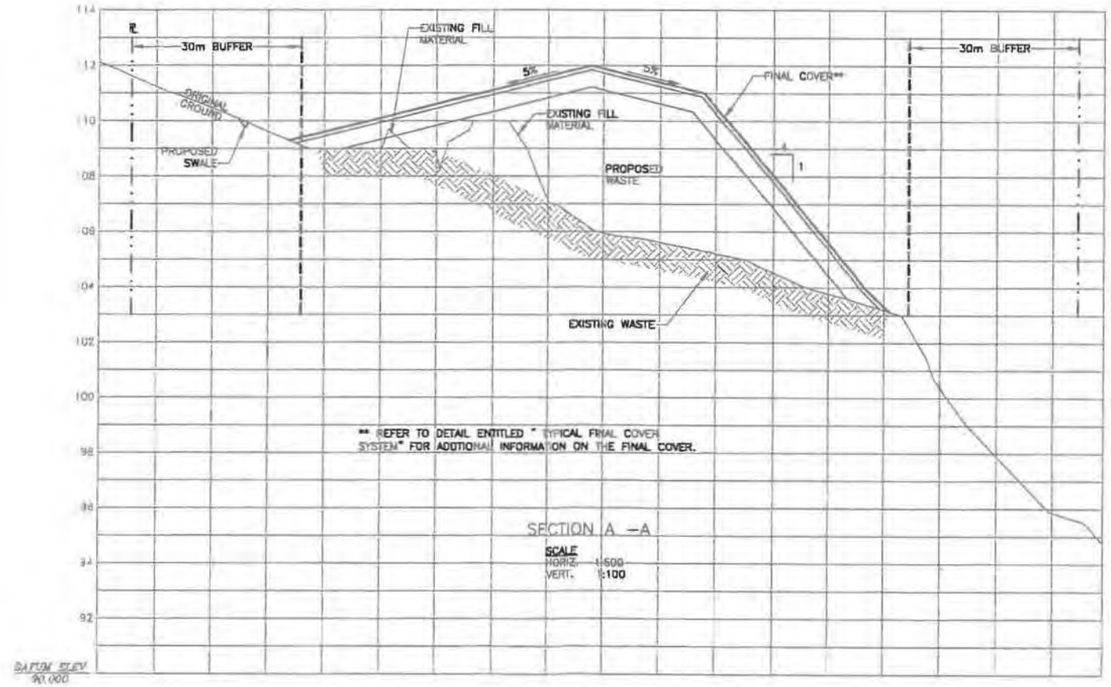


LEGEND

- BENCH MARK
- EXISTING TREE LINE
- EXISTING CONTOURS
- 87 FINAL CONTOURS
- PROPOSED SWALE
- BOREHOLE BH-4-I



TYPICAL FINAL COVER SYSTEM
N.T.S



SECTION A -A
SCALE
HORIZ. 1:500
VERT. 1:100

Jp2g Consultants Inc.
ENGINEERS · PLANNERS · PROJECT MANAGERS
PEMBROKE · OTTAWA

DESIGNED	MAB
DRAWN	MAB
CHECKED	KJM
APPROVED	KJM
SCALE	HORIZ. 1:500

TOWNSHIPS OF HEAD, CLARA & MARIA
STONECLIFFE WASTE DISPOSAL SITE
FINAL CONTOURS AND SECTION

DATE	AUG. 2003
PROJECT	20060250
PLOTTED	Sep 22/2003
DRAWING	3 of 3

APPENDIX A

ECA AND COMPLIANCE SUMMARY

Ministry of the Environment

Ottawa District Office

2430 Don Reid Drive
Ottawa ON K1H 1E1

Telephone: (613) 521-3450
Fax: (613) 521-5437

Ministère de l'Environnement

Bureau de district d'Ottawa

2430, promenade Don Reid
Ottawa ON K1H 1E1

Téléphone: (613) 521-3450
Télécopieur: (613) 521-5437

Ontario

June 10, 2009

Mrs. Melinda Reith, Clerk.
Townships of Head, Clara & Maria
15 Township Hall Rd.
Stonecliffe, Ontario, K0J 2K0

Dear Madam:

Re: Stonecliffe (Head) Waste Disposal Site (#A412405).

This letter acknowledges receipt of the report entitled: "Stonecliffe Landfill Site, 2008 Groundwater and Surface Water Monitoring Report, AECOM, May 29, 2009" submitted in accordance with Condition 41(f) of the Certificate of Approval #412405. Please note that the report has been forwarded to the Ministry's Technical Support Section for a scientific evaluation.

Please note that pursuant to Conditions 55, I hereby amend the preamble of Condition 54 to read as follow:
"*The Owner shall prepare and submit an Annual Report to the District Manager by May 31, 2011. The subsequent Annual Reports shall be submitted on a biennial basis by May 31 and they shall cover the previous two (2) calendar years. The Annual Report shall include at a minimum, the following:*". Condition 54 (a) to (p) remain unchanged.

Should you have any questions or concerns, please contact Marc-Etienne LeSieur, Senior Environmental Officer at (613) 521-3450 ext. 229 (1-800-860-2195 ext. 229) or marc.lesieur@ontario.ca.

Sincerely,

Steve Burns
District Manager

File: SI RE HE C11 610.

bc: Mr. Kevin Mooder, Jp2g Consultant Inc., 1150 Morrison Drive, Suite 410, Ottawa, ON, K2H 8S9

Ministry of the Environment / Ministère de l'Environnement

Ontario

AMENDED PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A412405
Issue Date: April 28, 2008

The Corporation of the Township of Head, Clara and Maria
15 Township Hall Road
Stonecliffe, Ontario
K0J 2L0

Site Location: 67 Kenny Road
Head, Clara and Maria Township, County of Renfrew

You have applied in accordance with Section 27 of the Environmental Protection Act for approval of:

0.9-hectare landfilling site and a transfer station within a 2.43-hectares total site area.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

a. "Owner" means any person that is responsible for the establishment or operation of the site being approved by this *Certificate* , and includes the The Corporation of the Township of Head, Clara & Maria, its successors and assigns;

b. "Ministry" means the Ministry of the Environment;

c. "Director" means the one or more persons who from time to time are so designated for the purpose of Section 37 of the *Environmental Protection Act* ;

d. "Regional Director" means the Director, Eastern Region, Ministry of the Environment;

e. "Certificate" means this Provisional Certificate of Approval No. A412405, as amended from time to time, including all schedules attached to and forming part of this Certificate;

f. "Site" means Stonecliffe Waste Disposal Site with its associated buildings and storage facilities located on Lot 21 and 22, Concession XI, Geographic Township of Head, Renfrew County;

g. "*EPA* " mean the *Environmental Protection Act* , R.S.O. 1990, C. E-19 as amended;

h. "*O.Reg. 558* " means Ontario Regulation 558/00 issued to amend O.Reg. 347;

i. "*O.Reg. 347* " means Ontario Regulation 347 (General-Waste Management Regulation), R.R.O 1990, as amended;

j. "summer season" means the time period between May 15 to September 15;

k. "winter season" means the time period between September 16 to May 14;

l. "District Manager" means the District Manager, Ottawa District Office, Eastern Region;

m. "white goods which contain refrigerants" means white goods which contain, or may contain refrigerants, and which include, but are not restricted to refrigerators, freezers and air-conditioning systems;

n. "*O. Reg. 903* " means Regulation 903, R.R.O. 1990, made under the *OWRA* , as amended from time to time;

o. "*OWRA* " means the *Ontario Water Resources Act* , R.S.O. 1990, c. O.40, as amended;

p. "*PA* " means the *Pesticides Act* , R.S.O. 1990, c. P-11, as amended from time to time;

q. "*NMA* " means *Nutrient Management Act* , 2002, S.O. 2002, c. 4, as amended from time to time;

r. "*SDWA* " means *Safe Drinking Water Act* , 2002, S.O. 2002, c. 32, as amended from time to time;

s. "*O. Reg. 189* " means Ontario Regulation 189/94, amended to Ontario Regulation 238/01, entitled "Refrigerants";

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

GENERAL

1. (a) The Owner shall ensure compliance with all the conditions of this Certificate and shall ensure that any person authorized to carry out work on or operate any aspect of the Site is notified of this Certificate and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

(b) Any person authorized to carry out work on or operate any aspect of the Site shall comply with the conditions of this Certificate.

2. (a) Except as otherwise provided by this Certificate, the Site shall be designed, developed, built, operated and maintained in accordance with the documentation listed in the attached Schedule "A" and in a way that ensures the health and safety of all persons and prevents adverse effects on the natural environment or on any persons.

(b) Where there is a conflict between a provision of any document, including the application referred to in this Certificate and the conditions of this Certificate, the conditions in this Certificate shall take precedence.

(c) Where there is a conflict between the application and a provision in any documents listed in Schedule "A", the application shall take precedence, unless it is clear that the purpose of the document was to amend the application and that the Ministry approved the amendment.

(d) Where there is a conflict between any two documents listed in Schedule "A", other than the application, the document bearing the most recent date shall take precedence.

3. The issuance of, and compliance with the conditions of this Certificate does not:

(a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement; or

(b) limit in any way the authority of the Ministry to require certain steps be taken or to require the Owner to furnish any further information related to compliance with this Certificate.

4. The requirements of this Certificate are severable. If any requirement of this Certificate, or the application of any requirement of this Certificate to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this Certificate shall not be affected thereby.

5. The Owner shall ensure that all communications/correspondence made pursuant to this Certificate includes reference to this Certificate number.

NOTIFICATION OF CHANGES

6. The Owner shall notify the Director in writing, and forward a copy of the notification to the District Manager, within thirty (30) days of the occurrence of any changes:

(a) the ownership of the Site;
(b) the operator of the Site;
(c) the address of the Owner;
(d) the partners, where the Owner is or at any time becomes a partnership and a copy of the most recent declaration filed under the *Business Names Act*, R.S.O. 1990, c. B.17, as amended, shall be included in the notification;
(e) the name of the corporation where the Owner is or at any time becomes a corporation, other than a municipal corporation, and a copy of the most current information filed under the *Corporations Information Act* , R.S.O. 1990, c. C.39, as amended, shall be included in the notification.

7. No portion of this Site shall be transferred or encumbered prior to or after closing of the Site

unless the Director is notified in advance. In the event of any change in ownership of the Site, other than change to a successor municipality, the Owner shall notify the successor of and provide the successor with a copy of this Certificate, and the Owner shall provide a copy of the notification to the District Manager and the Director.

INSPECTIONS

8. No person shall hinder or obstruct a Provincial Officer from carrying out any and all inspections authorized by the *OWRA* , the *Act* , the *PA* , the *SDWA* or the *NMA* of any place to which this Certificate relates, and without limiting the foregoing:

(a) to enter upon the premises where the approved processing is undertaken, or the location where the records required by the conditions of this Certificate are kept;
(b) to have access to, inspect, and copy any records required to be kept by the conditions of this Certificate;
(c) to inspect the Site, related equipment and appurtenances;
(d) to inspect the practices, procedures, or operations required by the conditions of this Certificate; and
(e) to sample and monitor for the purposes of assessing compliance with the terms and conditions of this Certificate or the *Act* , the *OWRA* , the *PA* , the *SDWA* or the *NMA*.

INFORMATION and RECORD RETENTION

9. (a) Any information requested by the Ministry, concerning the operation of the Site and its operation under this Certificate, including but not limited to any records required to be kept by this Certificate shall be provided to the Ministry, immediately upon request. Records shall be retained for two (2) years except as otherwise authorized in writing by the Director.

(b) The receipt of any information by the Ministry or the failure of the Ministry to prosecute any person or to require any person to take any action, under this Certificate or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as:

(i) an approval, waiver, or justification by the Ministry of any act or omission of any person that contravenes any term or condition of this Certificate or any statute, regulation or other legal requirement; or

(b) acceptance by the Ministry of the information's completeness or accuracy.

10. The Owner shall ensure that a copy of this Certificate, in its entirety and including all its Notices of Amendment, and documentation listed in Schedule "A", are retained at the Owner's office at all times and at the Site during the operating hours approved in this Certificate.

CERTIFICATE OF REQUIREMENT

11. Pursuant to Section 197 of the *Act* , neither the Owner nor any person having an interest in the property that the Site is on, shall deal with the property in any way without first giving a copy of this Certificate to each person acquiring an interest in the property as a result of the dealing.

12. The Owner shall:

(a) within sixty (60) days of the date of the acquisition of the land for the Site and the Contaminant Attenuation Zone, submit to the Director for the Director's signature two (2) copies of a completed Certificate of Requirement containing a registerable description of the property that the Site is on, in accordance with Form 4 of Regulation 688 under *Land Registration Reform Act* , R.R.O. 1990 c. L.4, as amended.

(b) Section (8) of Form 4, above, shall be completed in accordance with the wording in Schedule "B" of this Certificate.

(c) Within ten (10) calendar days of receiving the Certificate of Requirement signed by the Director, the Owner shall register the Certificate of Requirement in the appropriate Land Registry Office on title to the Site and submit to the Director immediately following registration the duplicate registered copy.

(d) Within ten (10) calendar days of receiving the Certificate of Requirement signed by the Director, the Owner shall submit a copy of the Certificate of Requirement to the District Manager. A photocopy is acceptable.

CONTAMINANT ATTENUATION ZONE

13. (a) Within twenty four (24) months from the date of this Certificate, the Owner shall purchase land necessary to establish the Contaminant Attenuation Zone in accordance with Item #1 of Schedule "A". Upon acquisition of the land for the Contaminant Attenuation Zone, the Owner shall amend this Certificate to include the additional land in the total Site area.

(b) The Owner shall obtain from Canadian Pacific Railway and/or Ottawa Valley Railway a written agreement for the use of their property as the Contaminant Attenuation Zone.

(i) The Owner shall establish and maintain a record of negotiations with Canadian Pacific Railway and/or Ottawa Valley Railway required by Condition 13(b), above. This record shall be in the form of a log or a dedicated electronic file and shall include as a minimum:

- details on correspondence between the negotiating parties; and/or
- date and time of the meeting;
- persons attending the meeting; and
- conclusions reached and decisions made at the meeting.

(ii) The record required by Condition 13(b)(i) shall be made available to the District Manager upon a request.

(c) The Owner must continue to own the property rights to the Contaminant Attenuation Zone for duration of the contaminating life span of the Site.

(d) The Owner shall notify the Director in writing within thirty (30) days after any change in the ownership of the property rights in the Contaminant Attenuation Zone.

SERVICE AREA

14. The approved service area for the Site is the Township of Head, Clara & Maria.

WASTE TYPES

15. (a) Only solid non-hazardous waste shall be accepted at the Site for landfilling.

(b) Only clean woodwaste, scrap metal and tires shall be accepted at the Site for bulking and subsequent transfer off-site for further processing. Re-use items shall accepted and stored in a designated area until removal to the landfilling area. Re-use items should be landfilled after ninety (90) days if not removed from Site.

(c) No liquid industrial wastes or hazardous wastes as defined under *O.Reg. 347* and *O.Reg. 558* shall be accepted at the Site.

SITE CAPACITY

16. The total waste disposal volume of the Site, including the waste, daily cover and intermediate cover, but excluding final cover, is 26,680 cubic metres. This capacity includes 13,654 cubic metres of the existing waste and 13,026 cubic metres of the waste proposed to be landfilled at the Site.

WASTE PLACEMENT

17. No additional waste shall be placed below existing ground within the fill area to maintain a vertical separation between the groundwater table and the waste.

18. (a) Disposal of waste shall only occur within the areas as delineated on Drawing No. 2 of 3, entitled "Operations Plan" dated September 22, 2003, Item 1(c) of Schedule "A".

(b) No waste shall be placed above the final contours shown on Drawing No. 3 of 3, entitled "Final Contours and Section, Item 1(d) of Schedule "A".

DAILY AND INTERIM COVER

19. (a) Daily and interim cover material shall consist of a permeable material and it shall be applied in accordance with Item 1(a) of Schedule "A".

(b) The Owner shall keep records of the cover application activities in accordance with Condition 51.

(c) Daily cover and interim cover shall be applied as follows:

(i) At least once weekly during the summer season, at end of the working day, the entire working face shall be covered with a minimum thickness of 150 mm of daily cover.

(ii) At least once monthly during the winter season, at end of the working day, the entire working face shall be covered with a minimum thickness of 150 mm of daily cover.

(iii) In areas where landfilling has been temporarily discontinued for twelve (12) months or more, a minimum thickness of 300 mm of interim cover shall be placed.

(d) The frequency of application and the cover thickness in subsections (i), (ii) and (iii) are minimum requirements, and may have to be increased if environmental adverse effects have been found to occur as per written instructions of the District Manager.

OPERATIONAL ISSUES

20. (a) The normal operating hours of the Site shall be as follows:

Summer Season:		Winter Season:	
daily:	7:30 p.m. - 8:30 p.m.	daily:	3:00 p.m. - 4:00 p.m

(b) The Owner may provide alternative hours of operation providing that they are correctly posted at the Site gate, that suitable public notice is given of any change and that there are no objections or complaints from the public regarding the hours of operation.

21. The Owner shall ensure that all loads of waste are properly inspected by trained Site personnel prior to acceptance at the Site and that the vehicles are directed to the appropriate areas for disposal or transfer of the waste. The Owner shall notify the District Manager, in writing, of load rejections at the Site within three (3) days from their occurrence.

22. Waste shall be deposited in a manner that minimizes the exposure area at the landfill working face and shall be compacted before cover material is applied in accordance with the procedure listed in Item 1(a) of Schedule "A".

23. (a) The Owner shall ensure that no burning of waste is taking place at the Site.

(b) The Owner shall ensure that burning of clean wood waste approved to take place at the Site, is done in accordance with the Ministry's Guideline C-7, entitled "Burning at Landfill Sites", dated April 1994, and updated from time to time.

(c) The Owner shall ensure that burning of clean wood waste is done only when absolutely necessary and when the wood waste cannot be chipped to create a re-usable wood product.

24. The Owner shall ensure that no scavenging is taking place at the Site. Re-use items may be removed from the Site under strict supervision of the Site attendant.

25 The Owner shall ensure that all buildings or structures at the Site are free of any possible landfill gas accumulation. If necessary, the Owner shall provide adequate ventilation systems to relieve landfill gas accumulations in the buildings or structures at the Site.

26 The access road and on-site roads shall be provided and maintained so that vehicles hauling waste to and from the Site may travel readily and safely on any operating day.

SIGNS

27. The Owner shall maintain a sign at the main entrance/exit to the Site on which the following information is legibly displayed:

(a) name of the Site and Owner;
(b) this Certificate number;
(c) normal hours of operation;
(d) allowable and prohibited waste types;
(e) telephone number to which complaints may be directed;
(f) twenty-four hour emergency telephone number (if different from above);
(g) a warning against unauthorized access; and
(h) a warning against dumping outside the Site.

28. The Owner shall install and maintain signs at the Site to direct vehicles to the working face and the disposal/storage areas designated for wastes requiring special handling procedures.

SITE SECURITY

29. The Owner shall maintain the entrance/exit gate to provide control of the Site access.

30. During non-operating hours, the Owner shall ensure that the Site entrance/exit gate is locked and the Site is secured against access by unauthorized persons.

31. No waste shall be received at the Site except during the operating hours when the Site is under the supervision of trained Site personnel.

SURFACE WATER MANAGEMENT

32. (a) Temporary berms and ditches shall be constructed around the active waste disposal area, as necessary, to prevent extraneous surface water from contacting the active working face.

(b) The Owner shall ensure that any discharge of surface water to the natural environment is undertaken in accordance with the Ministry's requirements.

BIRD, ANIMAL, VECTOR AND VERMIN CONTROL

33. Scavenging birds and animals shall be adequately controlled at the Site to prevent any environmental adverse effects.

34. Vector and vermin shall be adequately controlled at the Site using a licensed exterminator to prevent any environmental adverse effects.

LITTER CONTROL

35. The Owner shall take all practical steps to prevent the escape of litter from the Site. At minimum, monthly pick-up of litter at the Site and along the access road in the vicinity of the Site shall be carried out. Litter fencing shall be erected around the working area of the landfill as required.

DUST CONTROL

36. The Owner shall control fugitive dust emissions from the on-site sources including, but not be limited to the on-site roads, stockpiled cover material and closed landfill areas. If necessary, the major sources of dust shall be treated with water and/or dust suppression materials to minimize the overall dust emissions from the Site.

37. The Owner shall ensure that reasonable efforts are made to keep the access road used by vehicles to leave the Site, free of waste or excess mud or dirt.

NOISE

38. Noise from or related to the operation of the Site shall be kept to a minimum and in any event, the Owner shall comply with the criteria set out in the Ministry's guideline entitled "Noise Guidelines for Landfill Sites".

TRAFFIC CONTROL

39. The Owner shall post visible signs along the traffic route providing clear directions to the Site.

VISUAL SCREENING

40. The Owner shall maintain adequate screening of the waste disposal activities undertaken at the Site from the traffic on Kenny Road and the surrounding properties.

ENVIRONMENTAL MONITORING

41. (a) Groundwater monitoring shall be undertaken in accordance with the monitoring program included in Item #1 of Schedule "A".

(b) In addition to the groundwater monitioring parameters included in Item #1 of Schedule "A", all existing monitors will be analyzed on a one-time basis for the for the following volatile organic compounds in 2008:

(i) benzene
(ii) 1,4 dichlorobenzene
(iii) dichloromethane
(iv) toluene
(v) vinyl chloride

(c) Subsequent monitoring for the volatile organic compounds listed in Condition 41(b), above, shall be continued as per the groundwater sampling schedule approved in this Certificate in the background groundwater monitoring well BH2 and in the monitoring well that shows the highest concentrations of the volatile organic compounds during the 2008 sampling event(s).

(d) No changes to the groundwater monitoring program shall be implemented prior to receiving a written approval from the District Manager.

(e) A certified Professional Geoscientist or Engineer possessing appropriate hydrogeologic training and experience will execute or directly supervise the execution of the groundwater monitoring and reporting program.

(f) The monitoring results and the analysis of the results shall be submitted to the District Manager, by May 31, 2009. Subsequent monitoring results shall be included in the Annual Report, as per Condition 54.

GROUNDWATER WELLS/MONITORS

42 The Owner shall ensure that all groundwater monitoring wells which form part of the monitoring program are properly capped, locked and protected from damage.

43 Where landfilling is to proceed around monitoring wells, suitable extensions shall be added to the wells, and the wells shall be properly re-secured.

44 Any groundwater monitoring wells included in the on-going monitoring program that are damaged shall be assessed, repaired, replaced or decommissioned by the Owner, as required.

(a) The Owner shall repair or replace any monitoring well which is destroyed or in any way made to be inoperable for sampling such that no more than one regular sampling event is missed.

(b) All monitoring wells which are no longer required as part of the groundwater monitoring program, and have been approved by the Director for abandonment, shall be decommissioned by the Owner, as required, in accordance with *O. Reg. 903* , that will prevent contamination through the abandoned well. A report on the decommissioning of the well shall be included in the annual monitoring report for the period during which the well was decommissioned.

45. (a) The Owner shall install and maintain additional monitoring well nests to complete the groundwater monitoring network which fully delineates the horizontal and vertical extend of leachate migration resulting from the landfilling activities at the Site. The design of the additional wells and their locations shall be as shown on Item #1 of Schedule "A".

(b) The additional monitoring well nests shall be installed within one (1) year of the first exceedance of the following trigger:

(i) concentrations of four (4) of the parameters tested for in the groundwater monitoring wells BH1-I and BH1-II in any one sampling/testing event exceed 75% of the concentration values for the said parameters listed in the Ministry's Guideline B-7 entitled "Incorporation of the Reasonable Use Concept into MOE Groundwater Management Activities", dated April 1994, as amended.

INSPECTIONS

46. (a) The Owner shall ensure that monthly Site inspections are undertaken by trained Site personnel.

(b) The areas to be inspected shall include, but not be limited to the following:

(i) condition of the active disposal areas, the tire pile, the scrap metal pile and the re-use area and the woodwaste pile;

(ii) condition of the surface water drainage works, presence of flow in the swale constructed to collect and direct the run-off around the waste landfilling area, visual inspection of the water for signs of contamination, and an indication whether or not the flow is discharged on or off-site;

(iii) presence of any ponded water at the Site;

(iv) condition of the on-site roads for evidence of excessive erosion and fugitive dust emissions;

(v) presence of litter at the Site's perimeter and litter fences;

(vi) condition of the interim cover and of the final cover;

(vii) presence of birds, vector, vermin and animals;

(viii) condition of the on-site facilities, the gate and its lock and the signs required by this Certificate;

(ix) condition of the groundwater monitoring wells required for the groundwater monitoring program approved by this Certificate;

(x) amount of the cover material to ensure that sufficient daily cover is available at all times that the Site is in operation; and

(xi) presence of leachate springs.

(c) Records of inspections shall be created in accordance with Condition 50.

TRAINING

47. All operators of the Site shall be trained in the following areas:

(a) terms, conditions and operating requirements of this Certificate;

(b) operation and management of the landfill and the other waste storage areas as described in the documents in Schedule "A" attached to this Certificate unless otherwise required by the conditions of this Certificate;

(c) outline of the responsibilities of the operators of the Site;

(d) any environmental concerns pertaining to wastes being handled at the Site;

(e) proper inspection, receiving and recording procedures and the activities to be undertaken during and after a load rejection;

(f) occupational health and safety concerns pertaining to the wastes to be handled at the Site;

(g) relevant environmental legislation and regulations, including but not limited to the *Act* and O. Reg. 347; and

(j) operation of equipment and procedures to be followed in the event of an emergency situation.

RECORDS KEEPING

48. (a) The Owner shall retain all documentation listed in Schedule "A" for as long as this Certificate is valid.

(b) The Owner shall retain at the Site or at the municipal office, all records required by this Certificate, for a minimum of two (2) years from the date of their creation.

(c) The Owner shall retain the employee training records for as long as the employee is working at the Site.

(d) The Owner shall make all of the above documents and records available for inspection upon request by the staff of the Ministry.

COMPLAINTS

49 The Owner shall establish and maintain a written record of the complaints regarding the operation of the Site. This record shall be in the form of a log or a dedicated electronic file and it shall include, as a minimum, the following information:

(a) name, address and the telephone number of the complainant;
(b) time and date of the complaint;
(c) waste management activities undertaken and the types and amounts of waste stored at the time of the complaint;
(d) general meteorological conditions including, but not limited to the ambient temperature, approximate wind speed and direction and sunny versus cloudy, inversion versus clear and windy, etc. at the time of the complaint;
(e) details of the complaint;
(f) actions taken to remediate the cause of the complaint; and
(g) proposed actions to be taken to prevent reoccurrence in the future.

INSPECTIONS

50. The Owner shall establish and maintain a written record of the Site inspections as required by Condition 46. This record shall be in the form of a log or a dedicated electronic file and it shall include, as a minimum, the following information:

(a) date and time of inspection;
(b) name, title and signature of trained personnel conducting the inspection;
(c) a listing of all the areas inspected and any deficiencies observed; and
(d) recommendations for remedial action and the completion date of such action.

COVER APPLICATION

51. The Owner shall establish and maintain a written record of the cover application activities as required by Condition 19. This record shall be in the form of a log or a dedicated electronic file and it shall include, as a minimum, the following information:

(a) date and time of cover application; and
(b) type of cover and thickness applied.

WHITE GOODS

52. The Owner shall establish and maintain a written record of the white goods handling activities as required by Condition 59. This record shall be in the form of a log or a dedicated electronic file and it shall include, as a minimum, the following information:

(a) date of the record;
(b) types, quantities and source of white goods which contain refrigerants received;
(c) details on removal of refrigerants as required by *O. Reg. 189* ; and
(d) the quantities and destination of the white goods and/or refrigerants transferred.

LITTER CONTROL ACTIVITIES

53. The Owner shall establish and maintain a written record of the litter control activities as required by Condition 35. This record shall be in the form of a log or a dedicated electronic file and it shall include, as a minimum, the following information:

(a) date and time of litter pick-up; and
(b) name, title and signature of trained personnel conducting the litter pick-up.

ANNUAL REPORT

54. The Owner shall prepare and submit an Annual Report to the District Manager by May 31, 2010 The subsequent Annual Reports shall be submitted on a biennial basis by May 31 and they shall cover the previous two (2) calendar years. The Annual Report shall include at a minimum, the following:

(a) calculations of the volume of waste landfilled, the daily and interim covers, the final cover and the overall volume of the Site capacity used during the reporting period;

(b) a comparison of the actual capacity used to the estimates of the capacity estimated;

(c) an estimate of the remaining Site life;

(d) amount of the scrap metal, tires, woodwaste transferred off-site for further processing;

(e) summary of activities related to handling of white goods;

(f) any changes in operations, equipment, or procedures used at the Site, any operating problems encountered and corrective actions taken;

(g) indication whether there has been flow observed in the swale and the destination of this flow;

(h) details on the monitoring program undertaken, outlining monitor locations, analytical parameters sampled, and frequency of sampling;

(i) an analysis and interpretation of the groundwater monitoring data, a review of the adequacy of the monitoring program, conclusions of the monitoring data, and recommendations for any changes that may be necessary;

(j) summary of inspections undertaken at the Site, including the results of the surface water drainage works;

(k) summary of any public complaints received and the responses made;

(l) a discussion of cover stockpile activities including use, timing, locations and erosion protection;

(m) status update on the final cover placement, and seeding activities undertaken in the closed sections of the landfill;

(n) a statement as to compliance with all conditions of this Certificate and the other relevant Ministry's groundwater and surface water requirements;

(o) recommendations respecting any proposed changes in the operation of the Site;

(p) any other information that the Regional Director or the District Manager may require.

55. The frequency or timing of the submission of the Annual Report from Condition 54 may changed with the written approval from the District Manager.

EMERGENCY SITUATIONS

56. Any spills, fires or other emergency situations shall be forthwith reported directly to the Ministry's Spills Action Centre (1-800-268-6060) and shall be cleaned up immediately.

In addition, the Owner shall submit, to the District Manager a written report within three (3) days of any spill or incident, outlining the nature of the incident, remedial measures taken and the measures taken to prevent future occurrences at the Site.

57. The Owner shall ensure that adequate fire fighting and contingency spill clean-up equipment is

available and that the emergency response personnel are familiar with the use of such equipment and its location(s).

LANDFILL CLOSURE

58 At least two (2) years prior to the anticipated date of closure of the landfill at this Site or the date when 90 per cent of the total waste disposal volume is reached, whichever occurs first, the Owner shall submit to the Director for approval, with a copy to the District Manager, a detailed Site Closure Plan pertaining to the termination of the landfilling operations at the Site, post-closure inspection, maintenance and monitoring and the end use. The plan shall include, but not be limited to the following:

(a) plan showing Site appearance after closure;

(b) description of the proposed end use for the Site;

(c) descriptions of the procedures for closure of the Site, including but not be limited to, the following:

- (i) advance notification of the public of the Site closure;
- (ii) posting a sign at the Site entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
- (iii) completion, inspection and maintenance of the final cover and landscaping;
- (iv) Site security after landfill closure;
- (v) removal of unnecessary landfill-related structures, buildings and facilities; and
- (vi) final construction of any necessary control, treatment, disposal and monitoring facilities for ground and surface water and for landfill gas.

(d) description of the procedures for post-closure care of the Site, including:

- (i) operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas, if applicable;
- (ii) record keeping and reporting; and
- (iii) complaint contact and response procedures.

(e) an assessment of the adequacy of and need to implement the contingency plans; and

(f) an estimate of the contaminating life span of the Site, based on the results of the monitoring programs to-date.

WHITE GOODS HANDLING

59. With respect to accepting white goods containing refrigerants, the Owner shall ensure that:

(a) all white goods which contain refrigerants which have not been tagged by a licensed

technician to verify that the equipment no longer contains refrigerants, are stored in a separate area in an upright position; and

(b) white goods which contain refrigerants received on-site shall be shipped off-site in order to have the refrigerants removed by a licensed technician in accordance with *O. Reg. 189* ; or

(c) the refrigerant is removed on-site from white goods by a licensed technician, in accordance with *O. Reg. 189* , prior to shipping white goods off-site; and

(d) records of white goods handling shall be created in accordance with Condition 52.

COMPLAINT RESPONSE PROCEDURE

60. If at any time, the Owner receives complaints regarding the operation of the Site, the Owner shall respond to these complaints according to the following procedure:

(a) The Owner shall record each complaint in a log book or through a computerized tracking system as described in Condition 49.

(b) The Owner upon receipt of the complaint shall initiate appropriate steps to determine all possible causes of the complaint and proceed to take the necessary actions to eliminate the cause of the complaint and forward a formal reply to the complainant.

(c) The Owner shall submit, within seven (7) days of the occurrence, a written report to the District Manager identifying the source(s) of the complaint and details of what action was taken to rectify the problem and prevent a recurrence.

SCHEDULE "A"

1. Application for a Certificate of Approval for a Waste Disposal Site, signed by Diane Beauchamp, Clerk Treasurer, The Corporation of the Township of Head, Clara & Maria, and dated December 4, 2002, and the supporting documentation prepared by Jp2g Consultants Inc. consisting of the following documents:

(a) Report entitled "Stonecliffe Waste Disposal Site, Site Development and Operations Plan", dated September 2003, including the groundwater monitoring program.

(b) Drawing No. 1 of 3, entitled "Site Plan" dated December 16, 2003

(c) Drawing No. 2 of 3, entitled "Operations Plan" dated September 22, 2003

(d) Drawing No. 3 of 3, entitled "Final Contours and Section" dated September 4, 2003

2. Letter dated May 13, 2004 from Lauree J. Armstrong and Mark A. Bruce, Jp2g Consultants Inc.

to Margaret Wojcik, Ministry of Environment, providing the following additional information:

-clarification on the amount of the existing waste at the site
-proposed use of the chipped clean wood
-location of the closest sensitive receptors
-clarification of the zoning of the site
-description of the road leading to the site
-estimated life of each of the landfilling stages
-clarification on fire handling procedures at the site
-confirmation that the owner will accept the recommendations in the report

3. Letter dated March 17, 2008 from Kevin Mooder, Jp2g Consultants Inc. to Margaret Wojcik, Ministry of Environment, providing the following additional clarification on the waste types received at the site, the operating hours and the proposed schedule for the purchase of the Contaminant Attenuation Zone, as well as other comments on the proposed draft Certificate of Approval.

4. Letter dated April 17, 2008 from Patty Wong, Gartner Lee Limited, to Marc-Ettienne LeSiieur, Ministry of Environment, providing the additional clarification on the monitoring for the volatile organic compounds and the schedule and the trigger for the installation of the additional monitoring wells.

Schedule "B"

This Schedule "B" forms part of this Provisional Certificate of Approval for a Waste Disposal Site

CERTIFICATE OF REQUIREMENT

s. 197(2)
Environmental Protection Act

This is to certify that pursuant to a(n) [INSERT ORDER OR DECISION TYPE] [INSERT ORDER OR DECISION NUMBER OR IDENTIFIER] issued by [INSERT NAME OF ISSUING PERSON, POSITION] dated [INSERT DATE] with respect to [INSERT DESCRIPTION, SUCH AS CONTAMINATION, WASTE DISPOSAL SITE, ETC.] on the [INSERT REGISTERABLE DESCRIPTION OF THE PROPERTY]. The following person(s):

[INSERT PERSON(S) NAMED IN INSTRUMENT]

and any other persons having an interest in the [INSERT REGISTERABLE DESCRIPTION OF THE PROPERTY] are required, before dealing with the property in any way, to give a copy of the [INSERT ORDER OR DECISION TYPE] including any amendments that may be made thereto, to every person who will acquire an interest in the property as a result of the dealing.

Under subsection 197(3) of the Environmental Protection Act, this requirement applies to each person who, subsequent to the registration of this certificate, acquires an interest in the real property.

The reasons for the imposition of these terms and conditions are as follows:

1. Conditions 1, 3-7, inclusive 9 and 10 are included to clarify the legal rights and responsibilities of the Owner.

2. Condition 2 is included to ensure that the Site is operated in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.

3. Condition 8 is included to ensure that the appropriate Ministry staff has ready access to the operations of the Site which are approved under this Certificate. The Condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the *Act* , the *OWRA* , the *PA* , the *NMA* and the *SDWA* .

4. Conditions 11 and 12 are included, pursuant to subsection 197(1) of the *Act* , to ensure that any persons having an interest in the site are aware that the land has been approved and used for the purposes of waste disposal.

5. Condition 13 is included require an establishment of the Contaminant Attenuation Zone to bring the site into compliance with Guideline B-7.

6. Conditions 14 and 15 are included to specify the approved areas from which waste may be accepted at the Site and types and amounts of waste that may be accepted for disposal at the Site, based on the Owner's application and supporting documentation.

7. Conditions 16, 17 and 18 are included to specify restrictions on the extent of landfilling at this Site based on the Owner's application and supporting documentation. These limits define the approved volumetric capacity of the Site. Condition 16 is also included to specify restrictions on the extent of landfilling within the fill area to maintain a vertical separation between the groundwater table and the waste.

8. Condition 19 is included to specify the requirement of daily or interim covers applications to control potential nuisance effects, to facilitate vehicle access on the Site and to ensure an acceptable Site appearance.

9. Condition 20 is included to specify the hours of operation for the landfill Site and a mechanism for amendment of the hours of operation.

10. Condition 21 is included to require inspections that would ensure that only approved waste types are accepted at the Site and that the Ministry is notified of any attempts to dispose off unacceptable wastes.

11. Condition 22 is included to require waste compaction to maximize the capacity of the Site and to provide environmental benefits associated with greater compaction of waste.

12. Condition 23(a) is included to prohibit burning of waste at the Site because of concerns with air emissions, smoke and other nuisance effects and the potential fire hazard. Condition 23(b) is included to control burning of wood products at the Site, to minimize potential environmental adverse effects.

13. Condition 24 is included to ensure protection of public health and safety, and minimization of potential damage to environmental controls, monitoring and other works at the Site due to uncontrolled removal of materials from waste at the Site.

14. Condition 25 is included to ensure that all buildings and structures at the Site are free of any landfill gas accumulation, which due to a methane gas component may be explosive and thus create a danger to any persons at the Site.

15. Condition 26 is included to require reasonable maintenance of the on-site roads to ensure safe

delivery of waste to the working face or to and from the other waste type storage areas.

16. Conditions 27 and 28 are included to ensure that the users of the Site are fully aware of important information and restrictions related to the Site operations as specified by this Certificate.

17. Conditions 29, 30 and 31 are included to ensure that the Site access and integrity are controlled by preventing unauthorized access when the Site is closed and no Site attendant is on duty.

18. Condition 32 is included to ensure that drainage onto or leaving the Site does not adversely affect Site operations or create a nuisance or a hazard to the health and safety of the environment.

19. Conditions 33 - 40, inclusive, and 59 are included to ensure that the Site is designed and operated in a way that does not result in a hazard or nuisance to the natural environment or any persons.

20. Condition 41 is included to provide information that demonstrates that the Site is performing as designed and the impacts on the natural environment are within the Ministry's limits.

21. Conditions 42, 43 and 44 are included to ensure the integrity of the groundwater monitoring network so that accurate monitoring results are achieved and the natural environment is protected.

22. Condition 45 is also included to require the Owner to install additional groundwater monitoring wells to delineate the leachate impacts on the groundwater resources at the Site and the Contaminant Attenuation Zone.

23. Condition 46 is included to ensure that regular inspections are conducted at the Site, to verify that the Site is operated in accordance to this Certificate and in a manner that would not result in a hazard or nuisance to the natural environment or any persons.

24. Condition 47 is included to ensure that the Site is operated and supervised by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any persons.

25. Conditions 48 - 55, inclusive, are included to ensure that information pertaining to Site development, operations and monitoring date is documented and any possible improvements to Site design, operations or monitoring programs are identified. Condition 54 is also included to provide the Ministry with a concise and organized tool to review the Site activities and the effectiveness of the design and to verify compliance with the conditions of this Certificate and other relevant Ministry's requirements.

26. Condition 56 is included to ensure that incidents of spills are reported to the Ministry to ensure public health and safety and environmental protection.

27. Condition 57 is included to ensure that staff and equipment are available to handle emergency situations.

28. Condition 58 is included to ensure that final closure of the Site is completed in an aesthetically pleasing manner and to ensure long-term protection of the natural environment.

29. Condition 60 is included to the ensure that the District Manager is informed of any complaints with respect to the operation of the Site, which would indicate problems with the operation of the Site and non-compliance with the Act. Condition 60 is also included to ensure that any complaints regarding Site operations at the Site are responded to in a timely manner.

This Provisional Certificate of Approval revokes and replaces Certificate(s) of Approval No. A412405 issued on April 2, 1980.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

1 The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2 The grounds on which you intend to rely at the hearing in relation to eachportion appealed.

The Notice should also include:

3 The name of the appellant;
4 The address of the appellant;
5 The Certificate of Approval number;
6 The date of the Certificate of Approval;
7 The name of the Director;
8 The municipality within which the waste disposal site is located;

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., 12th Floor
P O Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 39, *Environmental Protection Act*
Ministry of Environment and Energy
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

* **Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act

DATED AT TORONTO this 28th day of April, 2008

THIS CERTIFICATE WAS MAILED
ON April 30, 2008
N.P
(Signed)

Tesfaye Gebrezghi, P.Eng.
Director
Section 39, *Environmental Protection Act*

MW/

c: District Manager, MOE Ottawa
Lauree Armstrong, Jp2g Consultants Inc.

ECA No. A412406 last amended July 19, 2006
Compliance Summary Table

	Condition (summary text)	Statement of Compliance
1.	Definitions 1.1 to 1.9.	Understood
2.	Site shall be designed and operated in accordance with the documents listed in Schedule "A" and with the conditions of the Certificate.	Understood
3.	Requirements under the EPA RSO 1990	Understood
4.	Requirements of the Certificate are severable	Understood
5.	The Applicant shall ensure compliance with all terms and conditions of the Certificate	Understood
6a.	The Applicant shall furnish forthwith, upon request of the MOE, any information requested with respect to compliance with the Certificate	Understood
6b.	After providing the information, without action by the Ministry shall not be construed as an approval, etc.	Understood
7.	The Applicant shall allow Ministry personnel or authorized representatives to carry out inspections	Understood
8.	Correspondence refer to Provisional Certificate of Approval No. A412406	Understood
9.	Applicant to notify Director of changes within 30 days	Understood
10.	In the event of any change in ownership the Applicant shall inform the owner in writing of the Certificate	Understood
11.	Information made available in accordance with the provisions of the Freedom of Information and Protection of Privacy Act	Understood
12.	Records required by the Certificate to be kept on Owner's premises for a minimum of 2 years	Understood
13.	The theoretical maximum volumetric capacity or the site is 18,502m^3	Understood
14.	The site to be developed and operated in accordance with Item 8 Schedule "A"	In compliance
15.	The Owner shall ensure all wastes are managed and disposed of in accordance with O. Reg. 347	Understood
16.	By March 31, 2004 the Owner shall submit to the Director for approval, plans for the area designated Fill Beyond Approved Limits	Jp2g filed March 23, 2004
17.	By July 31, 2004 the Owner shall submit to the Director for approval: i) completed plan of survey ii) documents showing land ownership iii) copy of registration of plan of survey	Understood
18.	No burning of wastes permitted with the exception of controlled burning of brush and other clean wood wastes as per MOE Guideline C-7 and Section 4.21 MOE Guideline Manual (C-8-1)	Understood
19.	Monitoring shall be undertaken in accordance with Section 9.0 Item 8 and Section 6 of Item 9 Schedule "A"	Understood
20.	By May 31, 2006 and every 2 years thereafter the Owner shall submit to the District Manager a report of operation and monitoring results	Amended June 10, 2009 to odd numbered years
21.	In the event of off-site exceedances of water quality criteria, the MOE shall notify the District Manager within 2 weeks	Understood
22.	The monitoring program outlined in Section 10 of Item 8 and Items 10 and 11 of Schedule "A" may be revised by the District Manager at their discretion. The Owner may request in writing to the District Manager changes to the program	Understood
23.	At least one (1) year prior to closure of the site, the Owner shall submit a closure, post-closure monitoring, maintenance and reporting program to the Director	Understood

APPENDIX B

AGENCY CORRESPONDENCE

Jp2g Consultants Inc.
ENGINEERS ■ PLANNERS ■ PROJECT MANAGERS

J.M. Janota, P.Eng., M.Sc
J.E. Hunton, MCIP, RPP

June 10, 2008

Ministry of Natural Resources
31 Riverside Drive
Pembroke, ON K8A 8R6

Attention: Tom Giesler

Re: Stonecliffe (Head) Waste Disposal Site
Certificate No. A412405
Townships of Head Clara & Maria
Our Project No. 2006025I

Dear Tom:

Enclosed find a copy of the recent Amended Provisional Certificate of Approval for the above captioned landfill site.

In accordance with Condition 13(a) the municipality is to purchase from the Crown the lands necessary to establish a contaminant attenuation zone (CAZ) by April 28, 2010. The lands as approved by the Ministry of the Environment were described in the 'Stonecliffe Waste Disposal Site, Site Development and Operations Plan' dated September 2003. A copy of the relevant Section 5.5.1 in the report, Figure #2 and the MNR letter of June 17, 2003 is attached for your reference.

In addition as noted in Condition 13(b) the Township is to obtain approval from the railway for the use of their lands for the CAZ.

I understand Adam Kasprzak OLS has conducted the preliminary fieldwork to prepare the reference plan. By copy of this submission, I would ask that he coordinate further work with you and a draft copy of the plan be filed with you and our office to expedite.

Yours truly,
Jp2g Consultants Inc.
Engineers • Planners • Project Managers

Kevin Mooder
Sr. Project Planner

c.c. Melinda Reith, Clerk
Adam Kasprzak

KJM/jlp

Jp2g Consultants Inc.
ENGINEERS ■ PLANNERS ■ PROJECT MANAGERS

J.M. Janota, P.Eng., M.Sc
J.E. Hunton, MCIP, RPP

June 10, 2008

Ottawa Valley Railway
445 Oak Street East
North Bay, ON P1B 1A3

Attention: Scott Campbell, General Manager

Re: Stonecliffe (Head) Waste Disposal Site
MOE Certificate No. A412405
Townships of Head Clara & Maria
Our Project No. 2006025I

Dear Tom:

Enclosed find a copy of the recent Amended Provisional Certificate of Approval for the above captioned landfill site.

In accordance with Condition 13(a) the municipality is to purchase the lands necessary to establish a contaminant attenuation zone (CAZ) by April 18, 2010. The majority of these lands are presently owned by the Crown.

The CAZ lands as approved by the Ministry of the Environment (MOE) were described in the Stonecliffe Waste Disposal Site, Site Development and Operations Plan dated September 2003. A copy of the relevant Section 5.5.1 in the report and the accompanying correspondence Jp2g July 9, 2003 and CPR July 30, 2003 is attached for your reference.

As per Condition 13(a) the MOE has requested that the Township further negotiate with CPR/OVR. Please accept this submission as a request on behalf of the municipality to contact this writer to discuss options which should satisfy MOE requirements and address any railway operational concerns.

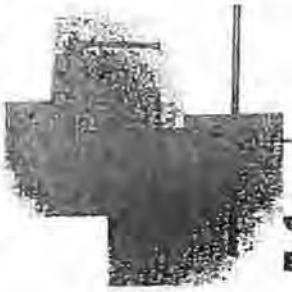
Yours truly,
Jp2g Consultants Inc.
Engineers • Planners • Project Managers

Kevin Mooder
Sr. Project Planner

c.c. Melinda Reith, Clerk

KJM/jlp

J.M. Jamota, M.Sc., P.Eng.
D.R. Patrick, C.E.T.
J.E. Hunton, M.C.I.P., R.P.P.



Jp2g Consultants Inc.
ENGINEERS • PLANNERS • PROJECT MANAGERS
Pembroke • Ottawa

July 9, 2003

Ottawa Valley Railway
Attention: Mr. Grant Bailey, General Manager
445 Oak Street East
North Bay, Ontario P1B 1A3

Dear Mr. Bailey:

RE: Township of Head, Clara & Maria
Acquisition of Groundwater Easement for Stonecliffe Waste Disposal Site
Certificate of Approval No. A412405; Our Project Number: 2006025D-MGT

As discussed during our telephone conversation, we are sending you this letter to inform you that the Township of Head, Clara & Maria is proceeding with the acquisition of groundwater easements that are necessary to operate their Stonecliffe Waste Disposal Site (Figure 1). The proposed groundwater easements would form part of the contaminant attenuation zone (CAZ). A CAZ is a three-dimensional zone that is located adjacent to a landfilling site, extends into the subsurface, and is intended to be used for the attenuation of contaminants from the landfilling site to levels that will not have an unacceptable impact beyond the boundary of the zone. Please find below some of the specifics for the site:

Stonecliffe Waste Disposal Site

Location:	North half of Lots 21 and 22, Concession XI, geographic Township of Head (Figure 2)
Size of the Waste Disposal Site:	1.8 ha
Status with the Ministry of the Environment :	Development and Operations Plan supporting site expansion has been submitted to the MOE and is waiting approval

At your earliest convenience, please advise us if it is possible for the Township to acquire a groundwater easement.

12 International Drive
Pembroke, Ontario
K8A 6W5

Phone: 613-735-2507
613-735-0649
Fax: 613-735-4513
Email: info@jp2g.com

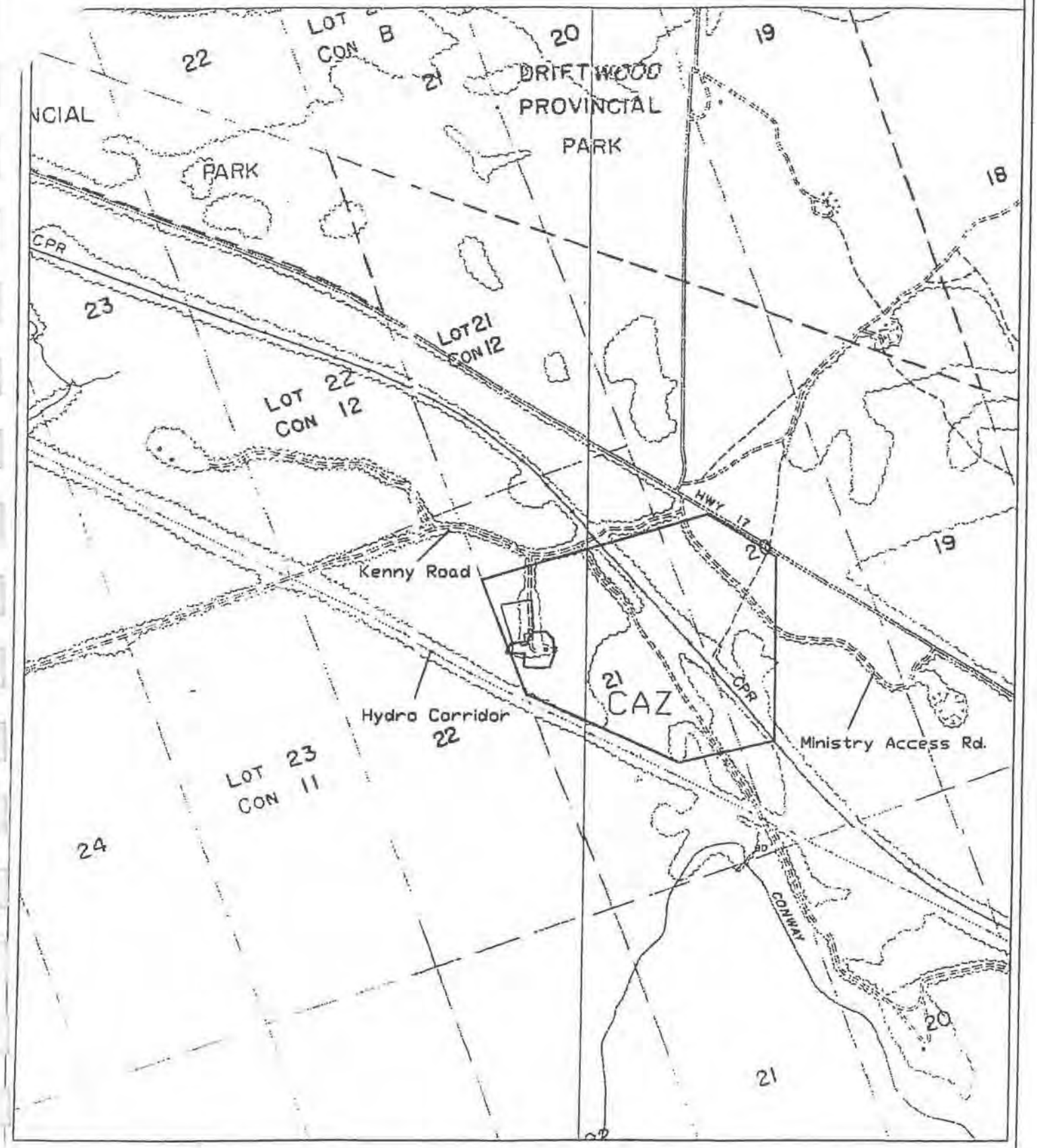
Should you have any questions or comments, please do not hesitate to contact the undersigned.

Yours very truly,
Jp2g Consultants Inc.
Engineers • Planners • Project Managers

Mark A. Bruce, P.Eng.
Project Engineer

MAB/

Attachments



SURROUNDING LAND USE

MACKEY WASTE DISPOSAL SITE

SCALE

FIGURE #2

Jp2g Consultants Inc.

ENGINEERS · PLANNERS · PROJECT MANAGERS
PEMBROKE · OTTAWA

CANADIAN PACIFIC RAILWAY

Real Estate

Suite 200
40 University Avenue
Toronto Ontario
M5J 1T1

Fax (416) 595-3112

July 30, 2003

Jp2g Consultants Inc.
12 International Drive
Pembroke, ON K8A 6W5

Attn: Mark A. Bruce, P.Eng., Project Engineer

Dear Sir:

Subject: Request for Groundwater Easement for a Contaminant Attenuation Zone, Mi. 23.89, North Bay Subdivision

I refer to your letter dated July 9, 2003 addressed to Ottawa Valley Railway. The letter discussed the need for groundwater easement for a Contaminant Attenuation Zone through CPR property a portion of which Ottawa Valley Railway currently leases.

After due consideration of your request, I regret to inform you that CPR cannot grant the groundwater easement.

Yours truly,

Syl M. Arduini
Manager, Leasing & Support
Real Estate Department

:gfe

cc: Ottawa Valley Railway
445 Oak Street East
North Bay, Ontario P1B 1A3
Attention: Mr. Grant Bailey, General Manager

Ministry of
Natural Resources
31 Riverside Drive
Pembroke, ON
K8A 8R6

Ministère des
Richesses naturelles

Telephone: (613) 732-5520
Facsimile: (613) 732-2972

Ontario

June 26, 2008

Mr. Kevin Mooder
JP2G Consultants Inc.
1150 Morrison Drive
Suite 410
Ottawa, ON K2H 8S9

Dear Mr. Mooder:

SUBJECT: Stonecliffe Waste Disposal Site Survey Instructions – Head Township

Please find enclosed your authorization to perform a survey of the Crown land in part of Lots 20 & 21, Concession 11 in Head Township for the purposes of the contaminant attenuation zone encompassing the Stonecliffe waste disposal site.

Should you have any questions please contact Tom Giesler, Sr. Lands & Waters Technician at (613) 732-5535.

Yours truly,

Michael Radford
Mountain River Area Supervisor
Pembroke District

TG/mbs

Encl.

c. Adam Kasprzak

Jp2g Consultants Inc.

ENGINEERS ■ PLANNERS ■ PROJECT MANAGERS

J.M. Janota, P.Eng., M.Sc.
J.E. Hunton, MCIP, RPP

June 26, 2008

Canadian Pacific Railway
400 University Avenue
Suite 200
Toronto, ON M5J 1T1

Attention: Syl M. Arduini
Manager, Leasing & Support
Real Estate Department

Re: Stonecliffe (Head) Waste Disposal Site
MOE Certificate of Approval No. A412405
Townships of Head, Clara and Maria
County of Renfrew
Our Project No. 2006025I

Dear Sir:

In reference to the attached Jp2g July 9, 2003 letter and your response dated July 30, 2003, I wish to confirm that the MOE has issued an Amended Provisional Certificate of Approval dated April 28, 2008 for the above captioned landfill site (copy attached).

In accordance with Condition 13(a) the municipality is to purchase the lands necessary to establish a contaminant attenuation zone (CAZ) by April 18, 2010. As per Condition 13(b) the MOE has requested that the Township further negotiate with CPR and/or OVR for the CAZ purpose.

In response to a June 10, 2008 request to OVR it was recommended that we contact your office again directly. I would be pleased to provide further information on the purpose of the CAZ, the future operation of the Stonecliffe Waste Disposal Site and the characteristics of the landfill leachate plume which is being monitored annually.

Yours truly,
Jp2g Consultants Inc.
Engineers • Planners • Project Managers

Kevin Mooder
Sr. Project Planner

KJM/dr

Encl.

c.c.: - Melinda Reith, Township (e-mail w/o encl.)
- Jeff Young, OVR (e-mail w/o encl.)

Jp2g Consultants Inc.
ENGINEERS ■ PLANNERS ■ PROJECT MANAGERS

J.M. Janota, P.Eng., M.Sc
J.E. Hunton, MCIP, RPP

April 9, 2009

Canadian Pacific Railway
400 University Avenue, Suite 200
Toronto, ON M5J 1T1

Attention: Syl M. Arduini
Manager, Leasing & Support
Real Estate Department

Re: Stonecliffe (Head) Waste Disposal Site
MOE Certificate No. A412405
Townships of Head, Clara and Maria
County of Renfrew
Our Project No. 2006025I

Dear Sir:

Further to our letter of June 26, 2008 (copy attached w/o enclosures) I wish to advise that a draft Plan of Survey has been prepared and filed with the Ministry of Natural Resources (MNR).

The purpose of this plan is to allow for the transfer of Crown lands to the Township, which will comprise the active landfill site and buffer lands to ensure environmental compliance. See attached MNR letter dated June 26, 2008.

As required by the Ministry of the Environment (MOE) the downgradient lands extend from the site to Provincial Highway No. 17 which includes a portion of the CPR mainline, for your reference the lands are located between North Bay and Pembroke.

By April 18, 2010 the MOE requests that the Township acquire the Crown lands, and establish a contaminant attenuation zone. This in effect would restrict development of a potable water supply well on the downgradient lands. Trusting a notice to this effect or some other means can be arranged through your office to satisfy MOE within the year.

I would be pleased to provide any additional information to facilitate this process.

Yours truly,
Jp2g Consultants Inc.
Engineers • Planners • Project Managers

Kevin Mooder
Sr. Project Planner

KJM/dr

c.c.: - Melinda Reith, Township (by e-mail)
- Jeff Young, OVR (by e-mail)

Ontario

Ministry of the Environment
Ministère de l'Environnement

Solid Non-Hazardous Waste Disposal Site Inspection Report

Client:	The Corporation of the Township of Head, Clara and Maria Mailing Address: 15 Township Hall Rd, Stonecliffe, Ontario, Canada, K0J 2L0 Physical Address: 15 Township Hall Rd, Head, Clara and Maria, Township, County of Renfrew, Ontario, Canada, K0J 2K0 Telephone: (613)586-2526, FAX: (613)586-2596, email: twpshcm@webhart.net Client #: 5050-4WZLAU, Client Type: Municipal Government		
Inspection Site Address:	Stonecliffe Waste Disposal Site Address: 67 Kenny Rd Lot 21 22 Concession 11, Head Clara and Maria, Township, County of Renfrew District Office: Ottawa GeoReference: ,		
Contact Name:	Melinda Reith	**Title:**	CAO
Contact Telephone:	(613)586-2526 ext	**Contact Fax:**	
Last Inspection Date:	2010/11/01		
Inspection Start Date:	2011/08/03	**Inspection Finish Date:**	2011/08/03
Region:	Eastern		

1.0 INTRODUCTION

Certificate of Approval No. A412405 permits the Stonecliffe Waste Disposal Site to receive municipal waste from the Townships of Head, Clara and Maria. As per Condition 15. (a) Only solid non-hazardous waste shall be accepted at the Site for landfilling. The site is not approved to accept asbestos waste.

The purpose of the inspection was to assess the site for compliance pursant to PCofA A412405, O.Reg. 347 for waste management and the Ontario Environmental Protection Act. The inspection involved a walk about of the site and a cursory review of pertinent files located at the Ottawa District Office. This inspection report reflects the observations made by the undersigned Environmental Officer during the August 3, 2011inspection.

The Site is in non-compliance with section 186(3) of the Ontario Environmental Protection Act since property has not been acquired for establishing a Contaminant Attenuation Zone as per Condition (13) of the Certificate.

2.0 INSPECTION OBSERVATIONS

Certificate of Approval Number(s):
A412405

2.1 FINANCIAL ASSURANCE:

Specifics:
n/a

2.2 APPROVED AREA OF THE SITE:

Specifics:
0.9-hectare landfilling site and a transfer station within a 2.43-hectares total site area.
(Certificate No. A412405, issued on April 28, 2008)

2.3 APPROVED CAPACITY:

Specifics:

Condition 16 states that the total waste disposal volume of the Site, including the waste, daily cover and intermediate cover, but excluding final cover, is 26,680 cubic metres. This capacity includes 13,654 cubic metres of the existing waste and 13,026 cubic metres of the waste proposed to be landfilled at the Site. (Certificate No. A412405, issued on April 28, 2008)

2.4 ACCESS CONTROL:

Specifics:

Site was locked. The electric bear fence operational.

2.5 COVER MATERIAL:

Specifics:

Some windblown litter noticed outside of the fill area. Sand is used as landfill cover.

2.6 WASTE BURNING:

Specifics:

The Township is not permitted to burn wastes at the site, with the exception of controlled burning of clean brush and wood in accordance with Ministry of the Environment Guideline C-7, *Burning at Landfill Sites* .

2.7 GROUNDWATER/SURFACEWATER IMPACT:

Specifics:

The ministry's review of the 2009/2010 Biennial Report, dated May 2011 is pending.

2.8 LEACHATE CONTROL SYSTEM:

Specifics:

No leachate control system in place. The landfill operates with monitored natural attenuation.

2.9 METHANE GAS CONTROL SYSTEM:

Specifics:

No methane gas control system required.

2.10 OTHER WASTES:

Specifics:

No hazardous wastes observed.

3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES

The previous inspection report noted that Condition (13) crown land acquisition is outstanding and that it must be addressed by the Township.

4.0 SUMMARY OF INSPECTION FINDINGS (HEALTH/ENVIRONMENTAL IMPACT)

Was there any indication of a known or anticipated human health impact during the inspection and/or review of relevant material, related to this Ministry's mandate?

No

Specifics:

Was there any indication of a known or anticipated environmental impact during the inspection and/or review of relevant material ?

No

Specifics:

Was there any indication of a known or suspected violation of a legal requirement during the inspection and/or review of relevant material which could cause a human health impact or environmental impairment ?

Yes

Specifics:
Condition [13.(a)] crown land acquisition is outstanding. As such, the Township is in non-compliance with section 186(3) of the Ontario Environmental Protection Act.

The following is excerpted from Certificate No. A412405:

13. (a) Within twenty four (24) months from the date of this Certificate, the Owner shall purchase land necessary to establish the Contaminant Attenuation Zone in accordance with Item #1 of Schedule "A". Upon acquisition of the land for the Contaminant Attenuation Zone, the Owner shall amend this Certificate to include the additional land in the total Site area.

(b) The Owner shall obtain from Canadian Pacific Railway and/or Ottawa Valley Railway a written agreement for the use of their property as the Contaminant Attenuation Zone.

(i) The Owner shall establish and maintain a record of negotiations with Canadian Pacific Railway and/or Ottawa Valley Railway required by Condition 13(b), above. This record shall be in the form of a log or a dedicated electronic file and shall include as a minimum:
- details on correspondence between the negotiating parties; and/or
- date and time of the meeting;
- persons attending the meeting; and
- conclusions reached and decisions made at the meeting.

(ii) The record required by Condition 13(b)(i) shall be made available to the District Manager upon a request.

Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material ?
No

Specifics:

Was there any indication of minor administrative non-compliance?
No

Specifics:

5.0 ACTION(S) REQUIRED

1. Pursuant to s.156 of the O.EPA, by September 1, 2011, submit to Provincial Officer Lance Larkin a copy of the documents required under Certificate No. A412405, Condition [13(b)(i)].

6.0 OTHER INSPECTION FINDINGS

As per a letter dated June 10, 2009 from Steve Burns to Melinda Reith, the township shall submit an annual report to the District Manager by May 31, 2011. Subsequent annual reports shall be submitted on a biennial basis by May 31 and they shall cover the previous two (2) calendar years.

7.0 INCIDENT REPORT

Applicable
3445-8AVHK5

8.0 ATTACHMENTS

03-08-11_1421.jpg; 03-08-11_1422.jpg; 03-08-11_1425.jpg; 03-08-11_1426.jpg; 03-08-11_1430.jpg

PREPARED BY:
Environmental Officer:
Name: Lance Larkin
District Office: Ottawa District Office
Date: 2011/08/11
Signature

REVIEWED BY:
District Supervisor:
Name: Tara MacDonald
District Office: Ottawa District Office
Date: 2011/08/12

Signature:

File Storage Number: SI RE HE C11 610

Note:
"This inspection report does not in any way suggest that there is or has been compliance with applicable legislation and regulations as they may apply to this facility. It is, and remains, the responsibility of the owner and/or the operating authority to ensure compliance with all applicable legislative and regulatory requirements"

Janice Potvin

From: Kevin Mooder <kmooder@jp2g.com>
Sent: Thursday, September 01, 2011 2:04 PM
To: 'Larkin, Lance (ENE)'; twpshcm@xplornet.com
Subject: RE: Stonecliffe WDS Inspection Report
Attachments: image001.jpg

Lance
On behalf of the municipality and in consultation with Melinda Reith, Clerk I provide the following in regards to the requested Action Item in the Site Inspection Report:

- Copies of all correspondence (2003 to 2009) which was sent to the railways was included in Appendix B of Part 1 in the 2009/2010 Biennial Report dated May 2011
- As we didnt receive any acknowledgement or reply, and over the past 2 years the railway has been going through the process of disposition of the lands and now abandonment of the rail line, there was little chance of obtaining any reply.

Based on our records in reference to compliance with Conditions 11, 12 and 13, the Township has had the OLS prepare the plan which was deposited with MNR in April 2009.
To our knowledge no further progress has been made in processing the land transfer.

Kevin J. Mooder, MCIP, RPP
Senior Planner, Vice-President
Environmental Services

Jp2g Consultants Inc.
1150 Morrison Drive, Suite 410
Ottawa, ON K2H 8S9
Tel: (613) 828-7800
Fax: (613) 828-2600
E-mail: kmooder@jp2g.com

From: Larkin, Lance (ENE) [mailto:Lance.Larkin@ontario.ca]
Sent: Friday, August 12, 2011 3:57 PM
To: twpshcm@xplornet.com
Cc: Kevin Mooder
Subject: Stonecliff WDS Inspection Report

Please review the attached inspection report.

If you have any questions or concerns, please call me at 613-521-3450, ext. 229.

Jp2g Consultants Inc.
ENGINEERS ▪ PLANNERS ▪ PROJECT MANAGERS

J.M. Jarolin, P.Eng., M.Sc.
J.E. Hunton, MCIP, RPP

September 26, 2011

Ministry of Environment
EAAB
Floor 12A, 2 St. Clair Avenue West
Toronto, ON M4V 1L5

Attention: Tesfaye Gebrezghi, P.Eng.
Supervisor Waste

Re: Stonecliffe Waste Disposal Site
Certificate No. A412405
Corporation of the United Townships of Head Clara & Maria
Our Project No. 2006025L

Dear Sir:

This submission has been prepared in consultation with, and on behalf of the Corporation of the United Townships of Head Clara & Maria. The municipality has operated a special household hazardous waste collection day over the past 4 years. In order to maximize the diversion of municipal hazardous and special wastes (MHSW) from landfilling municipal Council wishes to establish a storage facility at the Stonecliffe WDS to supplement the current and proposed program with Stewardship Ontario.

The Stonecliffe Site is open to the public Thursday and Saturday and typically accepts 15 to 50 deliveries per day on average. The residents receive garbage collection once per week by a municipal vehicle. Depending on location recycling curbside pick-up is provided once a week or every other week. Recyclable materials are to be placed in clear plastic bags and are collected by a private contractor. In addition the Township office is a depot for the Call2Recycle Program which accepts recyclable batteries and cell phones, and has a bin for recyclable material storage.

Under the current Certificate last amended April 28, 2008 the Stonecliffe Site has storage areas for scrap metal, refrigerants, rubber tires, a burning area for brush, and the attendants office stores blue box materials, furniture and electronics. The quantity of MHSW materials which will be received during the course of the year will be limited. The existing attendants' office is a lockable steel container measuring 4m x 10m and can be easily equipped for storage of 6 to 8m^3 of MHSW as shown on the Site Plan. The container will be passively vented. The addition of the MHSW depot will complement the current waste diversion programs in the municipality and at the site. Trusting the Certificate can be amended to include this initiative.

Yours very truly,

Jp2g Consultants Inc.
Engineers • Planners • Project Managers

Kevin Mooder, MCIP RPP
Sr. Project Manager

KJM/jlp

c.c. Melinda Reith, Clerk
Lance Larkin, MOE Ottawa

Ministry of the Environment
Operations Division
Floor 12A
2 St Clair Ave W
Toronto ON M4V 1L5
Fax: (416)314-8452
Telephone: (416) 212-3697

Ministère de l'Environnement
Division des Opérations
Étage 12A
2 av St Clair O
Toronto ON M4V 1L5
Télécopieur : (416)314-8452
Téléphone : (416) 212-3697

Ontario

November 4, 2011

Melinda Reith, Municipal Clerk
The Corporation of the Township of Head, Clara and Maria
15 Township Hall Rd
Stonecliffe, Ontario
K0J 2L0

Dear Madam:

Re: Application for Approval of Waste Disposal Sites
Amendment - Establishment of a secure storage facility on the Stonecliffe Landfill Site
Head, Clara and Maria Township, County of Renfrew
MOE Reference Number 0237-8MEH6V

We acknowledge receipt of your application for approval dated September 19, 2011 and received on October 5, 2011, and an application fee in the amount of $300.00 for the following:

Approval Type:	Waste Disposal Sites
Project Description:	Amendment - Establishment of a secure storage facility for municipal hazardous and special waste on the Stonecliffe Landfill Site.
Site Location:	Stonecliffe Waste Disposal Site 67 Kenny Rd Lot 21, 22, Concession 11 Head, Clara and Maria Township, County of Renfrew

The Ministry's reference number for your application is 0237-8MEH6V. Please quote this number in any correspondence or enquiries regarding this application.

We have screened your submission for completeness and find that the following additional information/documentation is necessary for us to process your application:

Please provide landowner permission for the proposed works

The applicant must send a **Notice** to all adjacent property (including vacant property) owners and tenants. The Notice must inform the recipients of details of the **proposal**/operation and must request that if they have concerns/objections to the proposal, then they must send written comments to *T. Gebrezghi, P. Eng., Supervisor/Part V Director, Environmental Assessment and Approvals Branch, Ministry of the Environment, 2 St. Clair Avenue West, Floor 12A, Toronto, Ontario, M4V 1L5* within 15 days of receipt of the Notice. A copy of the Notice and list of recipients must be submitted to the Ministry along with

the application.

Also, it appears that in calculating the required application fee, you have overlooked certain aspects of your application for which individual fees are required under the fees regulation, and as a result the fee of $300.00 which you have submitted is inadequate. We have determined that in accordance with the fees regulation, the total fee required for your application is $1400.00. This amount includes the following:

Code	Description	Amount	Quantity	SubTotal
1	Administrative Processing	$200.00	1	$200.00
60	Minor Technical Amendment for Waste Landfilling Site (other than Hazardous/Liquid Industrial)	$1,200.00	1	$1,200.00

Therefore, it is necessary that you submit an additional fee in the amount of $1100.00.

Please be advised that should we not receive the above information/documentation or a response with explanations and the required additional fee within two weeks of the date of this letter, we will consider your application to be withdrawn, and close your file accordingly. The submitted fee would then be refunded in the amount reduced by any applicable non-refundable fee.

Please note that your submission has only been screened with respect to the presence of the supporting documentation normally required for this type of application, and did not include any technical analysis of the documentation, and therefore you may still be requested to provide some additional information during our detailed technical review of the application. In such a case, the Reviewer will contact you and/or your identified Project Technical Information Contact at that time.

Also, please note that a duplicate copy of the application and all supporting information should have been sent to the local District Office of the Ministry. If this has not been done, please do so as soon as possible including the missing information/documentation identified above.

Should you have any questions related to your application, please contact me at the above phone number.

Sincerely,

Sara Sideris
Application Assessment Officer

c: District Manager, MOE Ottawa
Kevin Mooder, Jp2g Consultants Inc.

Jp2g Consultants Inc.
ENGINEERS ▪ PLANNERS ▪ PROJECT MANAGERS

J M Janota P Eng M Sc
J E Hunton MCIP RPP

December 7, 2011

Via Fax
416-314-8452

Ministry of Environment
Operations Division
Floor 12A, 2 St. Clair Avenue West
Toronto, ON M4V 1L5
Attention: Sara Sideris
Application Assessment Officer

Re: **Stonecliffe Waste Disposal Site**
Application for Approval to
Store Municipal Hazardous and Special Wastes MHSW
Township of Head Clara & Maria
MOE Reference No. 0237-8MEH6V
Our Project No. 2006025L

Dear Sara:

We acknowledge receipt of your letter dated November 4, 2011 and several attempts to contact us to discuss the application prior to its pending withdrawal. I would advise that the Township Council was unable to consider your request, due to meeting agenda scheduling and a pending municipal election.

The purpose of the application was to simply establish storage capacity within an existing secure container facility on site to accept a limited quantity of MHSW, to enhance the success of a current waste diversion program with Stewardship Ontario.

It is understood that the MOE requires:

- proof of notification to adjacent landowner which is the Crown
- additional fees to review the application as it is a minor technical amendment
- and assuming a Design and Operations Manual will be requested when the technical review is conducted

If this is the case, the effort and cost does not justify the intent of the application. The municipality will attempt to minimize the landfilling of MHSW through public education as they have in the past, requesting that residents store the materials until the annual Hazardous Waste Collection Day. The proposal may form part of a more comprehensive Application in the future detailing the long term operations strategy for the site.

Trusting this is satisfactory.

Yours very truly,

Jp2g Consultants Inc.
Engineers • Planners • Project Managers

Kevin Mooder, MCIP RPP
Sr. Project Manager

c.c. Melinda Reith, Clerk
Lance Larkin, MOE Ottawa

Janice Potvin

From: Larkin, Lance (ENE) <Lance.Larkin@ontario.ca>
Sent: Thursday, February 23, 2012 8:36 AM
To: twpshcm@xplornet.com
Cc: Kevin Mooder
Subject: Stonecliffe Waste Disposal Site - Leachate Seep
Attachments: Stonecliffe WDS 2010 AMR.pdf

Good morning,

It was noted in the 2010 annual report that there was a leachate seep at the Stonecliff landfill. Please let me know if the leachate seep issue was rectified and if not, please provide a plan that ensures that the landfill will be brought up to standards by April 15, 2012.

Please call me if you have any questions or concerns,

Regards,

Lance Larkin

Senior Environmental Officer
Ministry of the Environment, Ottawa District Office
2430 Don Reid Drive, Ottawa, ON K1H 1E1
tel: 613-521-3450 ext. 229, fax: 613-521-5437
toll free: 1 800-860-219

Agent principal de l'environnement
Ministère de l'Environnement, District d'Ottawa
2430, promenade Don Reid, Ottawa (Ontario) K1H 1E1
tél: 613-521-3450 poste 229, téléc: 613-521-5437
sans frais: 1-800-860-2195

Ministry of the Environment

P.O. Box 22032
Kingston, Ontario
K7M 8S5
613/549-4000 or 1-800/267-0974
Fax: 613/548-6908

Ministère de l'Environnement

C.P. 22032
Kingston (Ontario)
K7M 8S5
613/549-4000 ou 1-800/267-0974
Fax: 613/548-6908

Ontario

MEMORANDUM

February 16, 2012

TO: Lance Larkin
Environmental Officer
Ottawa District Office
Eastern Region

FROM: Mark Phillips
Surface Water Scientist
Technical Support Section
Eastern Region

RE: Annual Monitoring Report (2009/2010)
Stonecliffe WDS CofA # A412405
Lot 21 & 22, Concession 11, Head
Township of Head, Clara and Maria, County of Renfrew
IDS #: 8016-8K4N32

I have reviewed the Annual Monitoring Report (dated May 2011) prepared jointly between Jp2j and AECOM Ltd. as it pertains to surface water impacts and have the following comments.

Background

The site is currently licensed for a .9 hectare landfill site within a 2.43 hectare parcel. The site is licensed to accommodate non-hazardous wastes only. The WDS is designed as a naturally attenuating site.

The landfill is located in a largely non-developed area. Much of the surrounding land is owned by the Crown and is wooded. The only development in the immediate area is a CNR line (220 metres east of the WDS) and a hydro corridor (65 metres south of the site). The consultants have indicated that the nearest watercourse to the WDS is Conway Creek, which is located approximately 550 metres to the southeast. According to the consultants groundwater is in a westerly direction. The Ottawa River is also located approximately 1 km to the north of the WDS. The current monitoring program is comprised of groundwater monitoring only.

Comments

Although there are no identified surface water features in close proximity to the WDS, the consultants have compared the sample collected at the leachate seep to the PWQO. I suggest that measures be taken to prevent the discharge of contaminated water at the seep location.

If you have any questions regarding the above comments please contact me at (613) 540-6854.

Mark Phillips
MP/gl

c: SW RE HC C11 03 06
Groundwater Unit Files

ec: Peter Taylor, Water Resources Unit Supervisor, Eastern Region, MOE
T. MacDonald, District Supervisor (A), Ottawa District, MOE

Ministry of the Environment

P.O. Box 22032
Kingston, Ontario
K7M 8S5
613/549-4000 or 1-800/267-0974
Fax: 613/548-6908

Ministère de l'Environnement

C.P. 22032
Kingston (Ontario)
K7M 8S5
613/549-4000 ou 1-800/267-0974
Fax: 613/548-6908

Ontario

MEMORANDUM

February 16, 2012

TO: Lance Larkin
Environmental Officer
Ottawa District Office
Eastern Region

FROM: Mark Phillips
Surface Water Scientist
Technical Support Section
Eastern Region

RE: Annual Monitoring Report (2009/2010)
Stonecliffe WDS CofA # A412405
Lot 21 & 22, Concession 11, Head
Township of Head, Clara and Maria, County of Renfrew
IDS #: 8016-8K4N32

I have reviewed the Annual Monitoring Report (dated May 2011) prepared jointly between Jp2j and AECOM Ltd. as it pertains to surface water impacts and have the following comments.

Background

The site is currently licensed for a .9 hectare landfill site within a 2.43 hectare parcel. The site is licensed to accommodate non-hazardous wastes only. The WDS is designed as a naturally attenuating site.

The landfill is located in a largely non-developed area. Much of the surrounding land is owned by the Crown and is wooded. The only development in the immediate area is a CNR line (220 metres east of the WDS) and a hydro corridor (65 metres south of the site). The consultants have indicated that the nearest watercourse to the WDS is Conway Creek, which is located approximately 550 metres to the southeast. According to the consultants groundwater is in a westerly direction. The Ottawa River is also located approximately 1 km to the north of the WDS. The current monitoring program is comprised of groundwater monitoring only.

Comments

Although there are no identified surface water features in close proximity to the WDS, the consultants have compared the sample collected at the leachate seep to the PWQO. I suggest that measures be taken to prevent the discharge of contaminated water at the seep location.

If you have any questions regarding the above comments please contact me at (613) 540-6854.

Mark Phillips
MP/gl

c: SW RE HC C11 03 06
Groundwater Unit Files

ec: Peter Taylor, Water Resources Unit Supervisor, Eastern Region, MOE
T. MacDonald, District Supervisor (A), Ottawa District, MOE

Jp2g Consultants Inc.
ENGINEERS ▪ PLANNERS ▪ PROJECT MANAGERS

J.M. Janota, P.Eng., M.Sc.
J.E. Hunton, MCIP, RPP

March 8, 2012

Ministry of the Environment
2430 Don Reid Drive
Ottawa, ON K1H 1E1

Attention: Lance Larkin
Senior Environmental Officer

Re: Stonecliffe Waste Disposal Site
Certificate No. A412405
Our Project No. 2006025M

Dear Sir:

We acknowledge receipt of your email February 23, 2012 and the attached TSS memo by Mark Phillips Surface Water Scientist dated February 16, 2012. This surface water impact review was completed on the AECOM 2009/2010 Groundwater and Surface Water Monitoring Report dated May 2011.

It is understood that due to elevated concentrations of iron and copper in the water from a seep, the MOE recommends that measures be taken to prevent the discharge of contaminated water. This seep location identified as Seep 1 is located approximately 40m downgradient of the approved 0.9m landfilling area and actually more centrally located between monitors BH3 and BH4. A corrected plan will be provided in the 2011/2012 Biennial Report. The seep has been monitored since 2001 and has exhibited variable flow rates from no flow, to flows ranging from 6 to 30 ml/sec and in August 2010 at 100 ml/sec. We would confirm during our 2011 monitoring event July 7, 2011 there was no flow. Concentrations of iron have ranged from 4.22mg/L to 86.20mg/L, and in August 2010 at 137mg/L. The copper concentration above PWQO occurred once during the high flow event in 2010.

The surface water from the seep which ponds at the base of a slope is iron stained in colour, and has stained the vegetation within a 2m x 2m area.

During the 2012 monitoring event scheduled in August as per Condition 41(a) of the Certificate we will review access requirements to the seep and direct the municipality to apply clean, sandy, granular material on the area as evidenced by stained vegetation.

Trusting this is satisfactory

Yours very truly,

Jp2g Consultants Inc.
Engineers • Planners • Project Managers

Kevin Mooder, MCIP RPP
Sr. Project Planner

c.c. Melinda Reith
Patty Wong
Perry Larochelle

Janice Potvin

From: Larkin, Lance (ENE) <Lance.Larkin@ontario.ca>
Sent: Thursday, April 26, 2012 10:21 AM
To: Kevin Mooder
Cc: Townships of Head Clara & Maria; Patty Wong; Perry Larochelle
Subject: RE: Stonecliffe Waste Disposal Site Certificate No A412405

Dear Kevin,

Please provide an updated abatement plan for containing any leachate seeps no later than May 26, 2012. I need confirmation that the leachate seep will be contained.

If you have any questions or concerns, please do not hesitate to contact me at 613-521-3450, ext. 229.

Lance Larkin

Senior Environmental Officer
Ministry of the Environment, Ottawa District Office
2430 Don Reid Drive, Ottawa, ON K1H 1E1
tel: 613-521-3450 ext. 229, fax: 613-521-5437
toll free: 1 800-860-219

Agent principal de l'environnement
Ministère de l'Environnement, District d'Ottawa
2430, promenade Don Reid, Ottawa (Ontario) K1H 1E1
tél: 613-521-3450 poste 229, télec.: 613-521-5437
sans frais: 1-800-860-2195

From: Kevin Mooder [mailto:kmooder@jp2g.com]
Sent: March 8, 2012 10:59 AM
To: Larkin, Lance (ENE)
Cc: Townships of Head Clara & Maria; Patty Wong; Perry Larochelle
Subject: Stonecliffe Waste Disposal Site Certificate No A412405

Lance attached find our response to your February 23rd email.
Trusting this is satisfactory.

Kevin Mooder, MCIP, RPP
Jp2g Consultants Inc.
Engineers - Planners - Project Managers
1150 Morrison Drive, Suite 410
Ottawa, ON K2H 8S9
Tel: (613) 828-7800
Fax: (613) 828-2600

APPENDIX C

TOWNSHIP RECORDS

2011 DISPOSAL SITE STATISTICS

2011	STONECLIFFE	Deliverd to site	Tipping Tickets	BISSETT	Delivered to Site	Tipping Tickets	REGYCABLES	MonthlyTotals	
DEC P/U	266			120				386	
DEC DEL		130			29		65	159	December
NOV P/U	241			145				386	
NOV DEL		146			99		93	245	November
OCT P/U	256			163			131	419	
OCT DEL		249			311		4	560	October
SEP P/U	424			149			164	573	
SEP DEL		287	75		284			646	September
AUG P/U	408			272			132	680	
AUG DEL		432	365		756	100		1653	August
JULY P/U	419			143			116	562	
JULY DEL		616	240		550	25		1431	July
JUN P/U	404			137			121	541	
JUN DEL		278	60		302			640	June
MAY P/U	308			162			96	470	
MAY DEL		296	60		278			634	May
APR P/U	265			95			64	360	
APR DEL		164			49			213	April
MAR P/U	327			140			84	467	
MAR DEL		109			36			145	March
FEB P/U	263			0			74	263	
FEB DEL		78			0			78	February
JAN P/U	214			86			62	300	
JAN DEL		133			48			181	January
TOTAL BAGS	**3795**	**2918**	**800**	**1612**	**2742**	**125**	**1196**	**11992**	**Bags garbage total**

	Stonecliffe		**7513**	**Bissett**		**4479**	**1196**	**Recycling**
Bags	11992							
from recycle	235							
Total	**12227**	2031.01474	Cubic yards (bags times .166109 to obtain cubic yards)					
		416.358022	tonnes of garbage (cubic yards times .205 to obtain tonnes by weight)					

2011		STONECLIFFE Private	STONECLIFFE Business	BISSETT CREEK Private	BISSETT CREEK Business	TOTALS
JANUARY						
Sat	1	0	0	0		0
Sun	2	0	0	0		0
Mon	3	0	0	0		0
Tue	4	0	0	0		0
Wed	5	0	0	0		0
Thu	6	6	1	0		7
Fri	7	0	0	0		0
Sat	8	4	0	4		8
Sun	9	0	0	0		0
Mon	10	0	0	0		0
Tue	11	0	1	1		2
Wed	12	0	0	0		0
Thu	13	5	0	0		5
Fri	14	0	0	0		0
Sat	15	8	0	4		12
Sun	16	0	0	0		0
Mon	17	0	0	0		0
Tue	18	0	0	3		3
Wed	19	0	0	0		0
Thu	20	7	0	0		7
Fri	21	0	0	0		0
Sat	22	8	0	3		11
Sun	23	0	0	0		0
Mon	24	10	0	0		10
Tue	25	0	0	4		4
Wed	26	0	0	0		0
Thu	27	7	0	0		7
Fri	28	0	0	0		0
Sat	29	8	0	4		12
Sun	30	0	0	0		0
Mon	31	0	0	0		0
Totals		63	2	23		88
February						
Tuesday	1	0	0	3	0	3
Wednesday	2	0	0	0	0	0
Thur	3	5	0	0	0	5
Fri	4	0	0	0	0	0
Sat	5	9	0	3	0	12
Sun	6	0	0	0	0	0
Mom	7	0	0	0	0	0
Tuesday	8	0	0	4	0	4
Wed	9	0	0	0	0	0
Thur	10	6	0	0	0	6
Fri	11	0	0	0	0	0
Sat	12	6	0	3	0	9
Sun	13	0	0	0	0	0
Mon	14	0	0	0	0	0
Tuesday	15	0	0	2	0	2

Wed	16	0	0	0	0	0
Thur	17	5	0	0	0	5
Fri	18	0	0	0	0	0
Sat	19	6	0	3	0	9
Sun	20	0	0	0	0	0
Mon	21	0	0	0	0	0
Tuesday	22	0	0	4	0	4
Wed	23	0	0	0	0	0
Thur	24	4	0	0	0	4
Fri	25	0	0	0	0	0
Sat	26	7	0	2	0	9
Sun	27	0	0	0	0	0
Mon	28	0	0	0	0	0
Totals		**48**	**0**	**24**	**0**	**72**
March						
Tue	1	0	0	2	0	2
Wed	2	0	0	0	0	0
Thu	3	6	0	0	0	6
Fri	4	0	0	0	0	0
Sat	5	5	0	0	0	5
Sun	6	0	0	0	0	0
Mon	7	0	0	0	0	0
Tue	8	0	0	2	0	2
Wed	9	0	0	0	0	0
Thu	10	7	0	0	0	7
Fri	11	0	0	0	0	0
Sat	12	10	0	2	0	12
Sun	13	0	0	0	0	0
Mon	14	0	0	0	0	0
Tue	15	0	0	2	0	2
Wed	16	0	0	0	0	0
Thu	17	6	0	0	0	6
Fri	18	0	0	0	0	0
Sat	19	11	0	2	0	13
Sun	20	0	0	0	0	0
Mon	21	0	0	0	0	0
Tue	22	0	0	2	0	2
Wed	23	0	0	0	0	0
Thu	24	8	0	0	0	8
Fri	25	0	0	0	0	0
Sat	26	2	0	7	0	9
Sun	27	0	0	0	0	0
Mon	28	0	0	0	0	0
Tue	29	0	0	1	0	1
Wed	30	4	0	0	0	4
Thurs	31	0	0	0	0	0
Totals		**59**	**0**	**20**	**0**	**79**
April						
Fri	1	0	0	0	0	0
Sat	2	9	0	1	0	10
Sun	3	0	0	0	0	0
Mon	4	0	0	0	0	0

Tue	5	0	0	5	0	5
Wed	6	0	0	0	0	0
Thu	7	3	0	0	0	3
Fri	8	0	0	0	0	0
Sat	9	14	0	2	0	16
Sun	10	0	0	0	0	0
Mon	11	0	0	0	0	0
Tue	12	0	0	1	0	1
Wed	13	0	0	0	0	0
Thu	14	6	0	0	0	6
Fri	15	0	0	0	0	0
Sat	16	16	0	2	0	18
Sun	17	0	0	0	0	0
Mon	18	0	0	0	0	0
Tue	19	0	0	4	0	4
Wed	20	0	0	0	0	0
Thu	21	3	0	0	0	3
Fri	22	0	0	0	0	0
Sat	23	18	0	3	0	21
Sun	24	0	0	0	0	0
Mon	25	0	0	0	0	0
Tue	26	0	0	4	0	4
Wed	27	0	0	0	0	0
Thu	28	7	0	0	0	7
Fri	29	0	0	0	0	0
Sat	30	12	0	0	0	12
Totals		88	0	22	0	110
May						
Sun	1	0	0	0	0	0
Mon	2	0	0	0	0	0
Tue	3	0	0	5	0	5
Wed	4	0	0	0	0	0
Thu	5	9	0	0	0	9
Fri	6	0	0	0	0	0
Sat	7	12	0	3	0	15
Sun	8	0	0	0	0	0
Mon	9	0	0	0	0	0
Tue	10	0	0	9	0	9
Wed	11	0	0	0	0	0
Thu	12	10	0	0	0	10
Fri	13	0	0	0	0	0
Sat	14	12	0	7	0	19
Sun	15	0	0	0	0	0
Mon	16	0	0	0	0	0
Tue	17	0	0	5	0	5
Wed	18	0	0	0	0	0
Thu	19	19	0	0	0	19
Fri	20	0	0	0	0	0
Sat	21	0	0	4	0	4
Sun	22	0	0	0	0	0
Mon	23	0	0	0	0	0
Tue	24	0	0	7	2	9

Wed	25	0	0	0	0	0
Thu	26	10	1	0	0	11
Fri	27	0	0	0	0	0
Sat	28	16	0	4	1	21
Sun	29	0	0	0	0	0
Mon	30	0	0	0	0	0
Tue	31	0	0	5	2	7
Totals		88	1	49	5	143
June		0	0	0	0	0
Wed	1	0	0	0	0	0
Thu	2	12	2	0	0	14
Fri	3	0	0	0	0	0
Sat	4	12	1	4	0	17
Sun	5	0	0	0	0	0
Mon	6	0	0	0	0	0
Tue	7	0	0	7	2	9
Wed	8	0	0	0	0	0
Thu	9	8	2	0	0	10
Fri	10	0	0	0	0	0
Sat	11	12	0	4	0	16
Sun	12	0	0	0	0	0
Mon	13	0	0	0	0	0
Tue	14	0	0	3	1	4
Wed	15	0	0	0	0	0
Thu	16	12	1	0	0	13
Fri	17	0	0	0	0	0
Sat	18	15	0	0	0	15
Sun	19	0	0	0	0	0
Mon	20	0	0	0	0	0
Tue	21	0	0	6	3	9
Wed	22	0	0	0	0	0
Thu	23	6	1	0	0	7
Fri	24	0	0	0	0	0
Sat	25	18	1	2	0	21
Sun	26	0	0	0	0	0
Mon	27	0	0	0	0	0
Tue	28	0	0	5	3	8
Wed	29	0	0	0	0	0
Thurs	30	11	2	0	0	13
Totals		106	10	31	9	156
July						
Fri	1	0	0	0	0	0
Sat	2	14	2	4	0	20
Sun	3	0	0	0	0	0
Mon	4	0	0	0	0	0
Tue	5	0	0	4	4	8
Wed	6	0	0	0	0	0
Thu	7	8	3	0	0	11
Fri	8	0	0	0	0	0
Sat	9	21	2	4	1	28
Sun	10	0	0	0	0	0
Mon	11	0	0	0	0	0

Tue	12	0	0	5	3	8
Wed	13	0	0	0	0	0
Thu	14	12	3	0	0	15
Fri	15	0	0	0	0	0
Sat	16	17	25	1	0	43
Sun	17	0	0	0	0	0
Mon	18	0	0	0	0	0
Tue	19	0	0	4	4	8
Wed	20	0	0	0	0	0
Thu	21	9	4	0	0	13
Fri	22	0	0	0	0	0
Sat	23	23	3	3	0	29
Sun	24	0	0	0	0	0
Mon	25	0	0	0	0	0
Tue	26	0	0	6	4	10
Wed	27	0	0	0	0	0
Thu	28	8	4	0	0	12
Fri	29	0	0	0	0	0
Sat	30	24	3	5	1	33
Sun	31	0	0	0	0	0
Totals		136	49	36	17	238
August						
Mon	1	0	0	0	0	0
Tue	2	0	0	12	4	16
Wed	3	15	3	0	0	18
Thu	4	12	2	5	0	19
Fri	5	0	0	0	0	0
Sat	6	0	0	0	0	0
Sun	7	0	0	0	0	0
Mon	8	0	0	0	0	0
Tue	9	0	0	5	4	9
Wed	10	0	0	0	0	0
Thu	11	9	2	0	0	11
Fri	12	17	3	3	1	24
Sat	13	0	0	0	0	0
Sun	14	0	0	0	0	0
Mon	15	0	0	0	0	0
Tue	16	0	0	0	4	4
Wed	17	0	0	0	0	0
Thu	18	10	3	0	0	13
Fri	19	0	0	0	0	0
Sat	20	26	2	7	0	35
Sun	21	0	0	0	0	0
Mon	22	0	0	0	0	0
Tue	23	0	0	3	3	6
Wed	24	0	0	0	0	0
Thu	25	12	2	0	0	14
Fri	26	0	0	0	0	0
Sat	27	24	3	0	2	29
Sun	28	0	0	0	0	0
Mon	29	0	0	0	0	0
Tue	30	0	0	0	0	0

Wed	31	0	0	0	0	0
Totals		125	20	35	18	198
September						
Thurs	1	10	1	22	1	34
Fri	2	0	0	0	0	0
Sat	3	22	1	0	0	23
Sun	4	0	0	0	0	0
Mon	5	0	0	0	0	0
Tues	6	0	0	5	4	9
Wed	7	0	0	0	0	0
Thurs	8	9	2	0	0	11
Fri	9	0	0	0	0	0
Sat	10	15	1	6	0	22
Sun	11	0	0	0	0	0
Mon	12	0	0	0	0	0
Tues	13	0	0	5	1	6
Wed	14	0	0	0	0	0
Thurs	15	8	2	0	0	10
Fri	16	0	0	0	0	0
Sat	17	14	1	5	0	20
Sun	18	0	0	0	0	0
Mon	19	0	0	0	0	0
Tues	20	0	0	4	1	5
Wed	21	0	0	0	0	0
Thurs	22	6	1	0	0	7
Fri	23	0	0	0	0	0
Sat	24	11	1	5	0	17
Sun	25	0	0	0	0	0
Mon	26	0	0	0	0	0
Tues	27	0	0	4	2	6
Wed	28	0	0	0	0	0
Thru	29	11	1	0	0	12
Fri	30	0	0	0	0	0
Totals		106	11	56	9	182
October						
Sat	1	0	0	0	0	0
Sun	2	8	1	3	0	12
Mon	3	0	0	0	0	0
Tues	4	0	0	5	2	7
Wed	5	0	0	0	0	0
Thurs	6	7	1	0	0	8
Fri	7	0	0	0	0	0
Sat	8	18	1	3	0	22
Sun	9	0	0	0	0	0
Mon	10	0	0	0	0	0
Tues	11	0	0	4	3	7
Wed	12	0	0	0	0	0
Thurs	13	6	1	0	0	7
Fri	14	0	0	0	0	0
Sat	15	17	3	0	0	20
Sun	16	0	0	0	0	0
Mon	17	0	0	0	0	0

Tues	18	0	0	10	1	11
Wed	19	0	0	0	0	0
Thurs	20	5	0	0	0	5
Fri	21	0	0	0	0	0
Sat	22	16	0	7	0	23
Sun	23	0	0	0	0	0
Mon	24	0	0	0	0	0
Tues	25	0	0	3	0	3
Wed	26	0	0	0	0	0
Thurs	27	15	0	0	0	15
Fri	28	0	0	0	0	0
Sat	29	15	0	3	0	18
Sun	30	0	0	0	0	0
Mon	31	0	0	0	0	0
Totals		107	7	38	6	158
November						
Tues	1	0	0	3	0	3
Wed	2	0	0	0	0	0
Thurs	3	4	0	0	0	4
Fri	4	0	0	0	0	0
Sat	5	13	0	2	0	15
Sun	6	0	0	0	0	0
Mon	7	0	0	0	0	0
Tues	8	0	0	4	0	4
Wed	9	0	0	0	0	0
Thurs	10	6	0	0	0	6
Fri	11	0	0	0	0	0
Sat	12	14	0	3	0	17
Sun	13	0	0	0	0	0
Mon	14	0	0	0	0	0
Tues	15	0	0	4	0	4
Wed	16	0	0	0	0	0
Thurs	17	6	0	0	0	6
Fri	18	0	0	0	0	0
Sat	19	13	0	2	0	15
Sun	20	0	0	0	0	0
Mon	21	0	0	0	0	0
Tues	22	0	0	2	1	3
Wed	23	0	0	0	0	0
Thurs	24	7	0	0	0	7
Fri	25	0	0	0	0	0
Sat	26	11	0	2	0	13
Sun	27	0	0	0	0	0
Mon	28	0	0	0	0	0
Tues	29	0	0	5	0	5
Wed	30	0	0	0	0	0
Totals		74	0	27	1	102
December						
Thurs	1	3	0	0	0	3
Fri	2	0	0	0	0	0
Sat	3	6	0	2	0	8
Sun	4	0	0	0	0	0

Mon	5	0	0	0	0	0
Tues	6	0	0	2	0	2
Wed	7	0	0	0	0	0
Thurs	8	5	0	0	0	5
Fri	9	0	0	0	0	0
Sat	10	6	0	1	0	7
Sun	11	0	0	0	0	0
Mon	12	0	0	0	0	0
Tues	13	0	0	4	0	4
Wed	14	0	0	0	0	0
Thrus	15	6	0	0	0	6
Fri	16	0	0	0	0	0
Sat	17	8	0	2	0	10
Sun	18	0	0	0	0	0
Mon	19	0	0	0	0	0
Tues	20	0	0	2	0	2
Wed	21	0	0	0	0	0
Thurs	22	3	0	0	0	3
Fri	23	0	0	0	0	0
Sat	24	7	0	1	0	8
Sun	25	0	0	0	0	0
Mon	26	0	0	0	0	0
Tues	27	0	0	0	0	0
Wed	28	0	0	1	0	1
Thrus	29	7	0	0	0	7
Fri	30	5	0	1	0	6
Sat	31	0	0	0	0	0
Totals		56	0	16	0	72

Annual form to be completed to assist in calculating the volume of material that was actually landfilled and/or diverted to assit with Jp2g in completion of bi-annual reports for MOE and for annual Municipal Datacall for recycling - data collected from form F605.

ITEM	STONECLIFFE SITE		BISSETT SITE	
2011	MATERIAL IN	MATERIAL OUT	MATERIAL IN	MATERIAL OUT
For last column L- Landfilled; R - Removed by recycler; U - reused by ratepayer; B - Burned				
YARD WASTE				
Pine Needles	7		1	
Brush	64	3	15	
Leaves/Hay/Grass				
Ashes	45	23	6	6
TIRES	107		20	
WHITE GOODS				
Refrigerators	9	6	10	9
Stove/Ovens/Ranges	7	7	2	2
Freezers	7	5	3	3
Washers/Dishwashers	11	9	3	3
Dryers	6	5	1	1
Air Conditioners	6	6	2	2
Small Appliances - mixers, fans, toasters, etc.	52	52	19	19
Microwaves	5	5	1	1
COMPUTERS				
Monitors			2	2
Processing Units	3			
Printers	2	1	2	2
ELECTRONICS				
Televisions	22	3	9	1
DVDs, VCRs, Stereos	13	4	4	2
TOYS, LEISURE & SPORTS EQUIPMENT (Treadmills, skis, skates, sewing machines, bikes, large toys, etc.)	11		2	1
ELECTICAL & ELECTRONIC TOOLS	2		1	
Vacuums, Power tools, Power washers etc.	8	8	4	4
TEXTILES (carpets, clothes, rugs, drapes etc.)	24	13	8	1
SCRAP METAL	1280kg	230	989kg	220
BBQs	18	4	5	1
CONSTRUCTION MATERIAL (mixed)	27	27	4	4
Clean Wood 3 lds		3		
Treated wood	650kg	650kg	165kg	165kg
Drywall	545kg	545kg	5 sheet	5
Asphalt shingles	2		2	

Brick & concrete					
Cupboards, shelves, counter tops		5		4	
windows					
doors					
Bathroom fixtures - toilet, tubs, showers, etc.		11	2	3	
FURNITURE					
Couch, love seats, large chairs		33	16	8	1
Bed frames and headboards		1	1	1	1
Mattresses & Box springs		20	11	8	
Other furniture - tables, charis, dressers, lawn furniture/chairs etc.		47	2	6	
VEHCILE ACCIDENT					
BURNT OR DUMPED CONTENTS		4			
NOTES					
Door		1			
Foam		2			
Cardboard		2			
dresser		6			
fire wood		4			
cement laudry tub		1			
stroller		1			
highchair		1			
Plastic Pipe				1 load	
lawn mowers		2			
Boats		4	1	3	
hot water tank		1		1	
canoe		1	1		
window		1	1		
tarps		2			
Bear hides		2			
Pallets				4	
tarps		1	1		
Fire places				1	
hot water tank		1	1		
clean wood	2 loads				
kitchen chairs		4			

	STONECLIFFE				BISSETT & DEUX RIVIERES						
2012	Bags of Garbage Collected	Bags Garbage Deliverd to site	Bags Garbage from Tipping Tickets	Recyclables Tipping Tickets - Info	Bags of Garbage Collected	Bags Garbage Deliverd to site	Bags Garbage from Tipping Tickets	Recyclables Tipping Tickets - Info	B.A.G.S Stats	Bags of Garbage Returned from Recyclers	P/U vs. Delivered Garbage Totals
JAN P/U	189				157				230		**346**
JAN DEL		82				33					**115**
FEB P/U	231				113				254		**344**
FEB DEL		98				38					**136**
MAR P/U	301				119				329		**420**
MAR DEL		134				54					**188**
APR P/U	220				104				499		**324**
APR DEL		142				62					**204**
MAY P/U	255		68	90	133		167	21	480		**623**
MAY DEL		79				49					**128**
JUN P/U	165		196	163	78				512		**439**
JUN DEL		73		244		125	90	14			**288**
JULY P/U	187				119				760		**306**
JULY DEL		124	438	311		119	624	98		46	**1351**
AUG P/U	276				108				574		**384**
AUG DEL		137	575	378		85	397	38		28	**1222**
SEP P/U	202				101				592		**303**
SEP DEL		145	386	200		71				30	**632**
OCT P/U	192		2		136				539		**330**
OCT DEL		126	203	101		58	4			32	**423**
NOV P/U		175	4			78			148		**257**
NOV DEL			71				27			5	**103**
DEC P/U		179				86			627		**265**
DEC DEL			87				52			12	**151**
									5544		

Monthly Garbage Bag Totals			
461	January		
480	February		Number of Bags
		Collected bags	4341
608	March		
		Dropped Off bags	4941
528	April		
751	May		
727	June		
1657	July		
1606	August		
935	September		
753	October		
360	November		
416	December		
9282			

2012		STONECLIFFE Private	STONECLIFFE **Business**	BISSETT CREEK Private	BISSETT CREEK **Business**	TOTALS
January						
Sunday	1	0	0	0	0	0
Monday	2	0	0	0	0	0
Tuesday	3	0	0	2	0	2
Wednesday	4	0	0	0	0	0
Thursday	5	4	0	0	0	4
Friday	6	0	0	0	0	0
Saturday	7	8	0	1	0	9
Sunday	8	0	0	0	0	0
Monday	9	0	0	0	0	0
Tuesday	10	0	0	3	0	3
Wednesday	11	0	0	0	0	0
Thursday	12	4	0	0	0	4
Friday	13	0	0	0	0	0
Saturday	14	8	0	2	0	10
Sunday	15	0	0	0	0	0
Monday	16	0	0	0	0	0
Tuesday	17	0	0	1	0	1
Wednesday	18	0	0	0	0	0
Thursday	19	3	0	0	0	3
Friday	20	0	0	0	0	0
Saturday	21	5	0	1	0	6
Sunday	22	0	0	0	0	0
Monday	23	0	0	0	0	0
Tuesday	24	0	0	2	0	2
Wednesday	25	0	0	0	0	0
Thursday	26	5	0	0	0	5
Friday	27	0	0	0	0	0
Saturday	28	5	0	2	0	7
Sunday	29	0	0	0	0	0
Monday	30	0	0	0	0	0
Tuesday	31	0	0	0	0	0
Totals		**42**	**0**	**14**	**0**	**56**
February						
Wednesday	1	0	0	0	0	0
Thursday	2	3	0	0	0	3
Friday	3	0	0	0	0	0
Saturday	4	9	0	4	0	13
Sunday	5	0	0	0	0	0
Monday	6	0	0	0	0	0
Tuesday	7	0	0	3	0	3
Wednesday	8	0	0	0	0	0
Thursday	9	5	0	0	0	5
Friday	10	0	0	0	0	0
Saturday	11	18	0	1	0	19
Sunday	12	0	0	0	0	0
Monday	13	0	0	0	0	0
Tuesday	14	0	0	1	0	1

Wednesday	15	0	0	0	0	0
Thursday	16	4	0	0	0	4
Friday	17	0	0	0	0	0
Saturday	18	7	0	0	0	7
Sunday	19	0	0	0	0	0
Monday	20	0	0	0	0	0
Tuesday	21	0	0	3	0	3
Wednesday	22	0	0	0	0	0
Thursday	23	6	0	0	0	6
Friday	24	0	0	0	0	0
Saturday	25	8	0	2	0	10
Sunday	26	0	0	0	0	0
Monday	27	0	0	0	0	0
Tuesday	28	0	0	2	0	2
Wednesday	29	0	0	0	0	0
Totals		**60**	**0**	**16**	**0**	**76**
March						
Thursday	1	3	0	0	0	3
Friday	2	0	0	0	0	0
Saturday	3	3	0	0	0	3
Sunday	4	0	0	0	0	0
Monday	5	0	0	0	0	0
Tuesday	6	0	0	2	0	2
Wednesday	7	0	0	0	0	0
Thursday	8	4	0	0	0	4
Friday	9	0	0	0	0	0
Saturday	10	14	0	2	0	16
Sunday	11	0	0	0	0	0
Monday	12	0	0	0	0	0
Tuesday	13	0	0	4	0	4
Wednesday	14	0	0	0	0	0
Thursday	15	8	0	0	0	8
Friday	16	0	0	0	0	0
Saturday	17	11	0	2	0	13
Sunday	18	0	0	0	0	0
Monday	19	0	0	0	0	0
Tuesday	20	0	0	2	0	2
Wednesday	21	0	0	0	0	0
Thursday	22	6	0	0	0	6
Friday	23	0	0	0	0	0
Saturday	24	9	0	2	0	11
Sunday	25	0	0	0	0	0
Monday	26	0	0	0	0	0
Tuesday	27	0	0	0	0	0
Wednesday	28	0	0	0	0	0
Thursday	29	9	0	0	0	9
Friday	30	0	0	0	0	0
Saturday	31	17	0	3	0	20
Totals		**84**	**0**	**17**	**0**	**101**
April						
Sunday	1	0	0	0	0	0
Monday	2	0	0	0	0	0

Tuesday	3	0	0	1	0	1
Wednesday	4	0	0	0	0	0
Thursday	5	13	0	0	0	13
Friday	6	0	0	0	0	0
Saturday	7	28	0	2	0	30
Sunday	8	0	0	0	0	0
Monday	9	0	0	0	0	0
Tuesday	10	0	0	1	0	1
Wednesday	11	0	0	0	0	0
Thursday	12	10	0	0	0	10
Friday	13	0	0	0	0	0
Saturday	14	12	0	4	0	16
Sunday	15	0	0	0	0	0
Monday	16	0	0	0	0	0
Tuesday	17	0	0	4	0	4
Wednesday	18	0	0	0	0	0
Thursday	19	9	0	0	0	9
Friday	20	0	0	0	0	0
Saturday	21	16	0	8	0	24
Sunday	22	0	0	0	0	0
Monday	23	0	0	0	0	0
Tuesday	24	0	0	5	0	5
Wednesday	25	0	0	0	0	0
Thursday	26	11	0	0	0	11
Friday	27	0	0	0	0	0
Saturday	28	24	0	6	0	30
Sunday	29	0	0	0	0	0
Monday	30	0	0	0	0	0
Totals		**123**	**0**	**31**	**0**	**154**
May						
Tuesday	1	0	0	0	0	0
Wednesday	2	0	0	2	0	2
Thursday	3	7	0	0	0	7
Friday	4	0	0	0	0	0
Saturday	5	14	0	3	0	17
Sunday	6	0	0	0	0	0
Monday	7	0	0	0	0	0
Tuesday	8	0	0	1	0	1
Wednesday	9	0	0	0	0	0
Thursday	10	4	0	0	0	4
Friday	11	0	0	0	0	0
Saturday	12	7	0	2	0	9
Sunday	13	0	0	0	0	0
Monday	14	0	0	0	0	0
Tuesday	15	0	0	4	0	4
Wednesday	16	0	0	0	0	0
Thursday	17	9	0	0	0	9
Friday	18	0	0	0	0	0
Saturday	19	16	1	4	0	21
Sunday	20	0	0	0	0	0
Monday	21	0	0	0	0	0
Tuesday	22	0	0	8	2	10

Wednesday	23	0	0	0	0	0
Thursday	24	9	2	0	0	11
Friday	25	0	0	0	0	0
Saturday	26	14	1	3	0	18
Sunday	27	0	0	0	0	0
Monday	28	0	0	0	0	0
Tuesday	29	0	0	3	1	4
Wednesday	30	0	0	0	0	0
Thursday	31	5	2	0	0	7
Totals		**85**	**6**	**30**	**3**	**124**
June						
Friday	1	0	0	0	0	0
Saturday	2	23	0	4	0	27
Sunday	3	0	0	0	0	0
Monday	4	0	0	0	0	0
Tuesday	5	0	0	3	1	4
Wednesday	6	0	0	0	0	0
Thursday	7	3	2	0	0	5
Friday	8	0	0	0	0	0
Saturday	9	7	1	3	0	11
Sunday	10	0	0	0	0	0
Monday	11	0	0	0	0	0
Tuesday	12	0	0	1	1	2
Wednesday	13	0	0	0	0	0
Thursday	14	3	1	0	0	4
Friday	15	0	0	0	0	0
Saturday	16	6	0	1	0	7
Sunday	17	0	0	0	0	0
Monday	18	0	0	0	0	0
Tuesday	19	0	0	1	1	2
Wednesday	20	0	0	0	0	0
Thursday	21	6	2	0	0	8
Friday	22	0	0	0	0	0
Saturday	23	9	0	1	0	10
Sunday	24	0	0	0	0	0
Monday	25	0	0	0	0	0
Tuesday	26	0	0	2	0	2
Wednesday	27	0	0	0	0	0
Thursday	28	5	2	0	0	7
Friday	29	0	0	0	0	0
Saturday	30	9	0	3	0	12
Totals		**71**	**8**	**19**	**3**	**101**
July						
Sunday	1	0	0	0	0	0
Monday	2	4	2	0	2	8
Tuesday	3	0	0	4	3	7
Wednesday	4	0	0	0	0	0
Thursday	5	6	1	0	0	7
Friday	6	0	0	0	0	0
Saturday	7	12	1	3	1	17
Sunday	8	0	0	0	0	0
Monday	9	0	0	0	0	0

Tuesday	10	0	0	2	3	5
Wednesday	11	0	0	0	0	0
Thursday	12	10	3	0	0	13
Friday	13	0	0	0	0	0
Saturday	14	8	1	4	0	13
Sunday	15	0	0	0	0	0
Monday	16	0	0	0	0	0
Tuesday	17	0	0	2	3	5
Wednesday	18	0	0	0	0	0
Thursday	19	5	3	0	0	8
Friday	20	0	0	0	0	0
Saturday	21	18	1	3	1	23
Sunday	22	0	0	0	0	0
Monday	23	0	0	0	0	0
Tuesday	24	0	0	0	4	4
Wednesday	25	0	0	0	0	0
Thursday	26	11	3	0	0	14
Friday	27	0	0	0	0	0
Saturday	28	19	4	5	1	29
Sunday	29	0	0	0	0	0
Monday	30	0	0	0	0	0
Tuesday	31	0	0	3	2	5
Totals		**93**	**19**	**26**	**20**	**158**
August						
Wednesday	1	0	0	0	0	0
Thursday	2	9	0	2	0	11
Friday	3	0	0	0	0	0
Saturday	4	19	2	4	1	26
Sunday	5	0	0	0	0	0
Monday	6	0	4	5	0	9
Tuesday	7	0	0	2	2	4
Wednesday	8	0	0	0	0	0
Thursday	9	9	1	0	0	10
Friday	10	0	0	0	0	0
Saturday	11	17	3	5	0	25
Sunday	12	0	0	0	0	0
Monday	13	0	0	0	0	0
Tuesday	14	0	0	3	3	6
Wednesday	15	0	0	0	0	0
Thursday	16	7	4	0	0	11
Friday	17	0	0	0	0	0
Saturday	18	13	4	4	0	21
Sunday	19	0	0	0	0	0
Monday	20	0	0	0	0	0
Tuesday	21	0	0	3	3	6
Wednesday	22	0	0	0	0	0
Thursday	23	7	2	0	0	9
Friday	24	0	0	0	0	0
Saturday	25	10	2	4	0	16
Sunday	26	0	0	0	0	0
Monday	27	0	0	0	0	0
Tuesday	28	0	0	5	3	8

Wednesday	29	0	0	0	0	0
Thursday	30	3	3	0	0	6
Friday	31	0	0	0	0	0
Totals		**94**	**25**	**37**	**12**	**168**
September						
Saturday	1	19	3	2	0	24
Sunday	2	0	0	0	0	0
Monday	3	6	0	0	3	9
Tuesday	4	0	0	8	2	10
Wednesday	5	0	0	0	0	0
Thursday	6	6	3	0	0	9
Friday	7	0	0	0	0	0
Saturday	8	10	1	4	0	15
Sunday	9	0	0	0	0	0
Monday	10	0	0	0	0	0
Tuesday	11	0	0	2	1	3
Wednesday	12	0	0	0	0	0
Thursday	13	4	3	0	0	7
Friday	14	0	0	0	0	0
Saturday	15	16	2	4	0	22
Sunday	16	0	0	0	0	0
Monday	17	0	0	0	0	0
Tuesday	18	0	0	3	1	4
Wednesday	19	0	0	0	0	0
Thursday	20	5	3	0	0	8
Friday	21	0	0	0	0	0
Saturday	22	11	1	3	0	15
Sunday	23	0	0	0	0	0
Monday	24	0	0	0	0	0
Tuesday	25	0	0	1	1	2
Wednesday	26	0	0	0	0	0
Thursday	27	6	1	0	0	7
Friday	28	0	0	0	0	0
Saturday	29	8	2	5	1	16
Sunday	30	0	0	0	0	0
Totals		**91**	**19**	**32**	**9**	**151**
October						
Monday	1	0	0	0	0	0
Tuesday	2	0	0	5	1	6
Wednesday	3	0	0	0	0	0
Thursday	4	4	3	0	0	0
Friday	5	0	0	0	0	0
Saturday	6	8	0	4	0	4
Sunday	7	0	0	0	0	0
Monday	8	1	2	3	0	3
Tuesday	9	0	0	2	2	4
Wednesday	10	0	0	0	0	0
Thursday	11	4	1	0	0	0
Friday	12	0	0	0	0	0
Saturday	13	17	2	2	0	2
Sunday	14	0	0	0	0	0
Monday	15	0	0	0	0	0

Tuesday	16	0	0	2	1	3
Wednesday	17	0	0	0	0	0
Thursday	18	10	2	0	0	0
Friday	19	0	0	0	0	0
Saturday	20	12	0	4	0	4
Sunday	21	0	0	0	0	0
Monday	22	0	0	0	0	0
Tuesday	23	0	0	2	2	4
Wednesday	24	0	0	0	0	0
Thursday	25	9	0	0	0	0
Friday	26	0	0	0	0	0
Saturday	27	8	0	1	0	1
Sunday	28	0	0	0	0	0
Monday	29	0	0	0	0	0
Tuesday	30	0	0	1	0	1
Wednesday	31	0	0	0	0	0
Totals		**73**	**10**	**26**	**6**	**32**
Nov						
Thrusday	1	6	0	0	0	6
Friday	2	0	0	0	0	0
Saturday	3	7	0	2	0	9
Sunday	4	0	0	0	0	0
Monday	5	0	0	0	0	0
Tuesday	6	0	0	2	0	2
Wednesday	7	0	0	0	0	0
Thursday	8	6	0	0	0	6
Friday	9	0	0	0	0	0
Saturday	10	8	0	1	0	9
Sunday	11	0	0	0	0	0
Monday	12	0	0	0	0	0
Tuesday	13	0	0	2	0	2
Wednesday	14	0	0	0	0	0
Thursday	15	2	0	0	0	2
Friday	16	0	0	0	0	0
Saturday	17	12	0	4	0	16
Sunday	18	0	0	0	0	0
Monday	19	0	0	0	0	0
Tuesday	20	0	0	2	0	2
Wednesday	21	0	0	0	0	0
Thursday	22	5	0	0	0	5
Friday	23	0	0	0	0	0
Saturday	24	6	0	2	0	8
Sunday	25	0	0	0	0	0
Monday	26	0	0	0	0	0
Tuesday	27	0	0	3	0	3
Wednesday	28	0	0	0	0	0
Thursday	29	4	0	0	0	4
Friday	30	0	0	0	0	0
Totals		**56**	**0**	18	0	74
December						
Saturday	1	7	0	2	0	9
Sunday	2	0	0	0	0	0

Monday	3	0	0	0	0	0
Tuesday	4	0	0	0	0	0
Wednesday	5	0	0	3	0	3
Thursday	6	0	0	0	0	0
Friday	7	3	0	0	0	3
Saturday	8	9	0	2	0	11
Sunday	9	0	0	0	0	0
Monday	10	0	0	0	0	0
Tuesday	11	0	0	2	0	2
Wednesday	12	0	0	0	0	0
Thursday	13	3	0	0	0	3
Friday	14	0	0	0	0	0
Saturday	15	10	0	2	0	12
Sunday	16	0	0	0	0	0
Monday	17	0	0	0	0	0
Tuesday	18	0	0	2	0	2
Wednesday	19	0	0	0	0	0
Thursday	20	6	0	0	0	6
Friday	21	0	0	0	0	0
Saturday	22	2	0	1	0	3
Sunday	23	0	0	0	0	0
Monday	24	0	0	2	0	2
Tuesday	25	0	0	0	0	0
Wednesday	26	0	0	0	0	0
Thursday	27	2	0	0	0	2
Friday	28	0	0	0	0	0
Saturday	29	13	0	3	0	16
Sunday	30	0	0	0	0	0
Monday	31	0	0	2	0	2
Totals		55	0	21	0	76

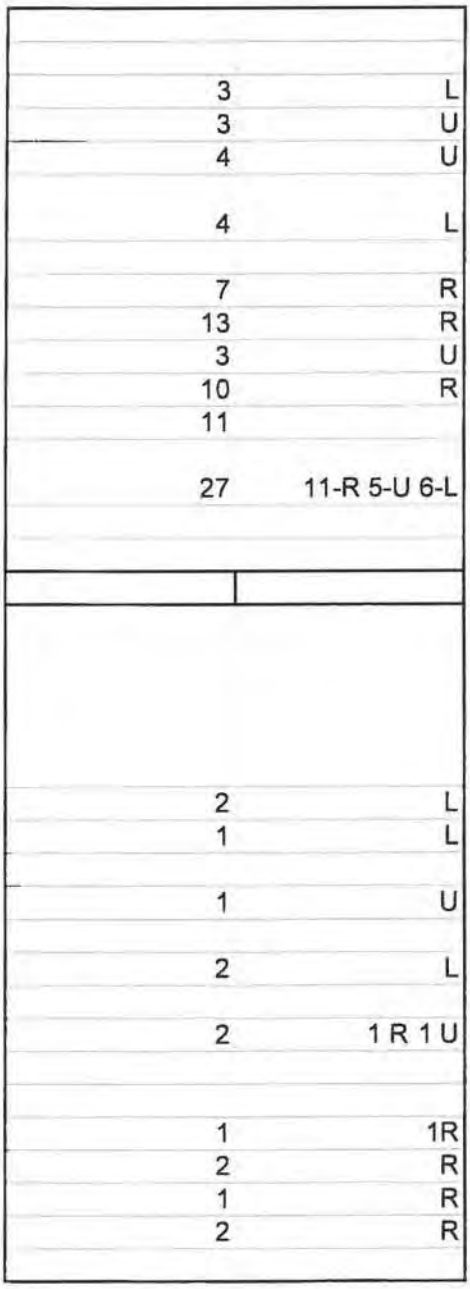
Annual form to be completed to assist in calculating the volume of material that was actually landfilled and/or diverted to assit with Jp2g in completion of bi-annual reports for MOE and for annual Municipal Datacall for recycling - data collected from form F605.

ITEM	STONECLIFFE SITE		BISSETT SITE	
2012	MATERIAL IN	MATERIAL OUT	MATERIAL IN	MATERIAL OUT
For last column L- Landfilled; R - Removed by recycler; U - reused by ratepayer; B - Burned				
YARD WASTE				
Pine Needles	6.5	6.5		
Brush	58.5	58.5	9	9
Leaves/Hay/Grass	1			
Ashes - cans 18 pails = 1 load	186.3	186.3		
TIRES	107	3	80	
WHITE GOODS				
Refrigerators	5		3	
Stove/Ovens/Ranges	5	1	3	2
Freezers	1			
Washers/Dishwashers	3		1	
Dryers			1	1
Air Conditioners	1	1	3	3
Small Appliances - mixers, fans, toasters, etc.	39	39	20	20
Microwaves	2	2	6	6
COMPUTERS	1		1	
Monitors	17	17	3	3
Processing Units	1	1		
Printers	2	2	1	1
ELECTRONICS				
Televisions	25	26	8	8
DVDs, VCRs, Stereos	11	11	3	3
TOYS, LEISURE & SPORTS EQUIPMENT (Treadmills, skis, skates, sewing machines, bikes, large toys, etc.)	12	10		
ELECTICAL & ELECTRONIC TOOLS	4	3		
Vacuums, Power tools, Power washers etc.	6	6		
TEXTILES (carpets, clothes, rugs, drapes etc.)	7rugs	7	5 rugs	5
SCRAP METAL	1485 kg	935kg	840 kg	1230kg
BBQs	11	10	8	3
CONSTRUCTION MATERIAL (mixed)	8	8		
Demolition/construction waste- CY	79.3	76.8		
Clean Wood	50 kg 7 lds	50 kg 2	230kg -3lds	
Treated wood	4.5 loads 90 kg	60		1load
Drywall	200kg	200		
Asphalt shingles (always landfill)	4.1 cy	1.1cy	3.21	
Brick & concrete				

CONTAMINATED FILL				
Suitable for cover	55			
Cupboards, shelves, counter tops	2	2	1	1
Windows	2	2	4	1
Doors	1	1	3	3
Bathroom fixtures - toilet, tubs, showers, etc.	4	4		
FURNITURE				
Upholstered Furniture Large	10		3	3
Upholstered Furniture Small	18	14	1	1
Bed frames and headboards	3			
Mattresses & Box springs Large.	11		4	4
Mattresses & Box springs Small	26	8	3	3
Other furniture - tables, charis, dressers, lawn furniture/chairs etc.	19	16	15	
VEHCILE ACCIDENT				
BURNT OR DUMPED CONTENTS				
NOTES				
Tarps	2	2		
boat	1	1		
Furance Scrap Metal	1			
Truck cap	1	1		
Riding Mower	1		2	
Boat	1		2	
Clean wood	100 kg			
Lawn Mowers	1	1	1	1
Hot Water Tank	1			
railway ties	3			
hot Water Tank			1	1
large speakers	2	2		
paddle boat	1	1		
speakers	2	2		
large window	1			

Cumulative totals

QUANITITY DISPOSED OF		DISPOSAL METHOD	
	6.5		B
	67.5		B
	186.3		L
	3		R
	3		R
	1		R
	5		R
3- L	56R	3-L	56R
	8		R
	20		R
	1		R
	3		R
	34		R
	14		R
1-I 9-U		1L	9U
	3		R
	3	1- U 3-L	2-R
	12		L
	2165 kg		R
	5		R
	8		L
			76.8
50 kg	4		b
5.5 loads	90 kg		L
	200		L
	4.21cy		L


3 L
3 U
4 U
4 L
7 R
13 R
3 U
10 R
11
27 11-R 5-U 6-L
2 L
1 L
1 U
2 L
2 1 R 1 U
1 1R
2 R
1 R
2 R

Part 2

2011/2012 Monitoring Report

AECOM

Jp2g Consultants Inc.

Stonecliffe Landfill Site – 2011/2012 Groundwater and Surface Water Monitoring Report

Report

Environment AECOM

Jp2g Consultants Inc.

Stonecliffe Landfill Site – 2011/2012 Groundwater and Surface Water Monitoring Report

Prepared by:
AECOM
300 – 300 Town Centre Boulevard 905 477 8400 tel
Markham, ON, Canada L3R 5Z6 905 477 1456 fax
www.aecom.com

Project Number:
60285244

Date:
May, 2013

Statement of Qualifications and Limitations

The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("Consultant") for the benefit of the client ("Client") in accordance with the agreement between Consultant and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations");
- represents Consultant's professional judgement in light of the Limitations and industry standards for the preparation of similar reports;
- may be based on information provided to Consultant which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.

Consultant shall be entitled to rely upon the accuracy and completeness of information that was provided to it and has no obligation to update such information. Consultant accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

Consultant agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but Consultant makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

Without in any way limiting the generality of the foregoing, any estimates or opinions regarding probable construction costs or construction schedule provided by Consultant represent Consultant's professional judgement in light of its experience and the knowledge and information available to it at the time of preparation. Since Consultant has no control over market or economic conditions, prices for construction labour, equipment or materials or bidding procedures, Consultant, its directors, officers and employees are not able to, nor do they, make any representations, warranties or guarantees whatsoever, whether express or implied, with respect to such estimates or opinions, or their variance from actual construction costs or schedules, and accept no responsibility for any loss or damage arising therefrom or in any way related thereto. Persons relying on such estimates or opinions do so at their own risk.

Except (1) as agreed to in writing by Consultant and Client; (2) as required by-law; or (3) to the extent used by governmental reviewing agencies for the purpose of obtaining permits or approvals, the Report and the Information may be used and relied upon only by Client.

Consultant accepts no responsibility, and denies any liability whatsoever, to parties other than Client who may obtain access to the Report or the Information for any injury, loss or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report or any of the Information ("improper use of the Report"), except to the extent those parties have obtained the prior written consent of Consultant to use and rely upon the Report and the Information. Any injury, loss or damages arising from improper use of the Report shall be borne by the party making such use.

This Statement of Qualifications and Limitations is attached to and forms part of the Report and any use of the Report is subject to the terms hereof.

AECOM: 2012-01-06

AECOM Signatures

Report Prepared By:

Spencer Bootsma, B.Sc., P.Geo.
Geoscientist

Report Reviewed By:

Terry La Chapelle, B.Sc., P.Geo.
Senior Geologist

Table of Contents

Statement of Qualifications and Limitations
Letter of Transmittal

Figures

Appendices

1. Introduction

This report presents the 2011 and 2012 monitoring results from the Stonecliffe Landfill Site in the Township of Head, approximately 3 km west of the village of Mackey[1]. The Stonecliffe Landfill Site is a relatively small landfill situated in a remote area (Figure 1). It occupies a 2.43 ha parcel of land, 0.9 ha of which is authorized to be used as a waste disposal fill area under the Ministry of Environment (MOE) Certificate of Approval (C of A) #A412405 amended April 28, 2008. This report has been prepared to satisfy Conditions 54 (g) to (j) and (n) of the Certificate.

The site is located on the northeastern flank of a hill. This area is characterized by sandy soils over Precambrian bedrock of the Canadian Shield. On-site drilling intersected surficial fine sand and silt underlain by silty sand till. The bedrock was found to be 14 m deep at the uphill end of the site, and 18 m deep downhill near the railway tracks. The original site hydrogeology study (Gartner Lee Limited, 2002) estimated that this small site produced only 0.05 L/s of leachate on average. A complete description of the site's location, background, and physical setting is documented in the Stonecliffe Landfill Site Hydrogeology and Monitoring Report (Gartner Lee Limited, 2002).

2. Methodology

Groundwater levels and samples were collected from the existing on-site monitors on July 7, 2011 and August 29, 2012 as per the C of A. At these times the monitoring wells were inspected in consideration of Conditions 42, 53 and 44 (photographs can be found in Appendix A). A water sample and flow measurement from the leachate seep (Seep 1 located downgradient of the fill area), were not collected in 2011 and 2012, as the seep was not flowing on the dates of sampling. The locations of the boreholes and the leachate seep are shown on Figures 2 and 3 (groundwater flow maps).

An experienced Jp2g Consultants Inc. (Jp2g) technician conducted the field work based on AECOM Canada Ltd. (AECOM) [formerly Gartner Lee Limited] established field methodologies. Laboratory analyses were conducted by Exova Canada Inc., Ottawa, Ontario.

Groundwater samples were placed in a chilled cooler immediately after collection for transport to the laboratory. Field measurements of pH, conductivity and water temperature were collected at the time of sampling. All water level and water quality data are appended to this report.

This monitoring report provides an interpretation of the 2011 and 2012 monitoring results. The MOE Monitoring and Screening Checklist for the site is provided in Appendix F.

3. Groundwater Flow

The groundwater elevations (Appendix B) measured during July 2011 and August 2012 are plotted on an air photo of the site (Figures 2 and 3 respectively). Also shown on the figure is the interpreted direction of groundwater flow. Both figures show groundwater flow moving from the southwest to the northeast across the site, similar to previous years.

---

1. *The Stonecliffe Landfill is also referred to locally as the Mackey Landfill for this reason. It has also been occasionally referred to as the Head Township Landfill in earlier correspondence.*

Vertical hydraulic gradients calculated using the 2011 and 2012 groundwater elevations are consistent with historical results, with downward gradients at monitoring nests 1, 2 and 4 ranging between 0.08 and 1.03, and a slight upward gradient at monitoring nest 3 during both years of about -0.06. No significant changes in the groundwater flow system have occurred at this site.

At the groundwater seep (Seep 1), located near monitoring nest 3, no flow was observed during the 2011 and 2012 monitoring events.

As noted in the 2001 hydrogeology and monitoring report (Gartner Lee, 2002), groundwater will continue to flow in a northeasterly direction until reaching the groundwater divide approximately 420 m downgradient of the site, where it will then flow to the southeast toward Conway Creek. Horizontal shallow flow dominates the flow system in the landfill area as the surficial sands have a greater hydraulic conductivity than the underlying till and bedrock. Groundwater will tend to move down vertically through the sands and travel horizontally at the sand/sand till interface. The limited amount of groundwater that does move slowly down through the till will subsequently move horizontally at the till/bedrock interface.

4. Groundwater Quality

The complete tabulated groundwater quality results for the 2011 and 2012 monitoring events, as well as historical data and VOC results are found in Appendix C. The results for Seep 1 are found in Appendix D. The groundwater quality results for the site are discussed below.

Two groundwater monitoring wells are installed at each of the four monitoring nests at the site. The four nests are located around the landfill area to represent the background and downgradient groundwater conditions, as well as the groundwater quality within the 3 major geologic formations at the site consisting of surficial sands, intermediate till unit and underlying bedrock. Borehole logs and monitor construction details are included in Appendix A. Monitoring nest 2 is located upgradient of the landfill area and is representative of background water quality. Monitoring nests 1, 3, and 4 are all downgradient of the landfill area and are indicative of the degree of leachate effects along the groundwater flow path. Monitors 1-II, 3-II, and 4-II are screened within the surficial fine sands, monitors 1-I and 2-II are screened within the silty sand till, and monitors 2-I, 3-I, and 4-I are screened within the granitic bedrock[2].

Eleven (11) parameters were selected as leachate indicator parameters based on our experience with similar sized landfills in similar settings. These leachate indicator parameters include sodium, chloride, sulphate, potassium, alkalinity, strontium, boron, iron, manganese, conductivity and total dissolved solids (TDS). Although elevated values of these parameters can indicate leachate effects in the groundwater, the downgradient values must also be compared to the background water quality to ensure that naturally occurring effects are considered. The groundwater quality results are compared to the Ontario Drinking Water Standards (ODWS).

4.1 Background Groundwater Quality

Monitors 2-I and 2-II-represent background water quality. These monitors are located upgradient of the landfill area as confirmed by the groundwater flow maps (Figure 2 and Figure 3), which show strong horizontal gradients from monitoring nest 2 towards the landfill area. Table 1 summarizes the range of background water quality for the overburden till unit (2-II) and the bedrock (2-I) for the selected leachate indicator parameters between 2000 and 2012.

2. *The term "screened" refers to the location of the monitoring well screen, which is the finely slotted end of the groundwater monitor that permits entry of groundwater from the desired geologic layer. A "screened" unit is one from which groundwater is derived.*

Table 1. Background Water Quality Range Comparison to ODWS

Parameter	Units	ODWS	Background Overburden (2-II)	Background Bedrock (2-I)
Sodium	mg/L	200	3 - 10	9 - 35
Chloride	mg/L	250	<1 - 3	<1 - 14
Sulphate	mg/L	500	6 - 13	13 - 92
Potassium	mg/L		<1 - 3	2 - 7
Alkalinity	mg/L	30 - 500	**15 - 29**	56 - 81
Strontium	mg/L		0.044 - 0.079	0.065 - 0.133
Boron	mg/L	5.0	**<0.01 - 0.13**	**<0.01 - 1.80**
Iron	mg/L	0.3	<0.03 **-1.82**	<0.03 **- 0.76**
Manganese	mg/L	0.05	**<0.01 - 0.120**	**<0.01 - 0.06**
Conductivity	µS/cm		47 - 96	108 - 200
TDS	mg/L	500	**36 - 64**	**93 - 212**

Note: Monitoring well 2-II was dry at the time of sampling in Aug. 2003 and 2004 and Sept. 2005. Therefore the background overburden range is based on the results from 2000 to 2002 and 2006 to 2012 inclusive.
Bold values exceed the ODWS.

The 2011 and 2012 groundwater results in the bedrock and overburden till unit are consistent with the historical data. Background concentrations of iron and manganese naturally exceed the ODWS in groundwater. Also, alkalinity was outside of the ODWS range during the reporting period at monitor 2-II, which is consistent with past results.

As shown in Table 1 above and stated in previous reports, the bedrock and overburden water quality differ. The background bedrock water quality has higher concentrations for almost all of the leachate indicator parameters as well as pH, indicating more alkaline conditions. The overburden water quality values are indicative of diluted conditions with a more neutral pH and higher water temperature, suggesting greater precipitation infiltration compared to the bedrock system.

4.2 Leachate

Leachate is formed by the dissolution of the more soluble elements within the landfill waste by infiltrated water from precipitation and snowmelt. Leachate is also produced at this site from groundwater flowing through the small area on the western portion of the site where the landfill extends below the water table. There are no monitors installed within the waste at this site for leachate sampling. This is due to the restricted size of the landfill and the high probability that a monitor within the waste would be damaged or destroyed by vehicular activity on the site. However, the groundwater seep (Seep 1) located near monitoring nest 3 has been sampled and compared to the leachate indicator parameters and the ODWS. This comparison has provided a relative idea of the effect of the landfill on groundwater quality for leachate characterization, although it is expected that concentrations measured at the seep are generally lower than those that would be measured in leachate within the waste. Seep 1 water quality is also compared to the Provincial Water Quality Objectives (PWQO), since overland flow further downgradient would be considered surface water.

Seep 1 was not flowing during the 2011 and 2012 monitoring events and therefore not sampled. Table 2 below shows a comparison of the 2001 to 2008 data to background overburden water quality. The 2010 data was not included in the historical range, as elevated iron, manganese, strontium and boron in 2010 compared to the previous results suggest a significant amount of sediment may have been collected with the sample. It is also possible that sediment entering the sample may have been an issue historically due to the low flow conditions of the seep. The sampling methodology for this location will be reviewed and addressed if necessary.

Table 2. Leachate Water Quality Comparison to ODWS and PWQO

Parameter	Units	PWQO	ODWS	Background Overburden (2-II)	2001 - 2008 Leachate Historical Range (Seep 1)
Sodium	mg/L		200	3 - 10	26 - 38
Chloride	mg/L		250	<1 - 3	14 - 48
Sulphate	mg/L		500	6 - 13	3 - 32
Potassium	mg/L			<1 - 3	5 - 9
Alkalinity	mg/L		30 - 500	**15 - 29**	238 - 429
Strontium	mg/L			0.044 - 0.079	0.529 – 0.787
Boron	mg/L	0.2	5.0	<0.01 - 0.13	0.12 - **0.24**
Iron	mg/L	0.3	0.3	<0.03 - **1.82**	**6.89 – 86.2**
Manganese	mg/L		0.05	**<0.01 - 0.120**	**5.68 – 9.52**
Conductivity	µS/cm			47 - 96	500 - 867
TDS	mg/L		500	36 - 64	340 - **564**

Note: Bold values exceed the ODWS and/or PWQO

Leachate impacts are apparent at Seep 1 from the elevated concentrations of the indicator parameters compared to the background water quality. All parameters exceed the background concentrations. Iron, manganese and TDS exceed the ODWS, and iron and boron exceed the PWQO. Overall, the leachate strength is relatively weak, as is expected for a landfill of this size.

Following a review of the 2009/2010 Stonecliffe monitoring report, the MOE surface water reviewer expressed concern regarding flow from the seep and suggested that measures should be taken to prevent discharge from it (letter dated February 16, 2012 and provided in Appendix G). In response, Jp2g provided a letter dated March 8, 2012 to the MOE (see Appendix G) indicating that the municipality would be directed to apply clean, sandy, granular material to the seep area. There was no flow from the seep in 2012 and the granular material has not yet been applied. The issue will be reviewed in 2013.

4.3 Downgradient Monitors

4.3.1 Monitoring Nest 4

Monitoring nest 4 is located approximately 40 m downgradient of the waste. Monitor 4-I is screened within the bedrock and monitor 4-II is screened within the surficial sands. Table 3 summarizes the water quality in monitor 4-I compared to background bedrock and leachate concentrations.

Table 3. Water Quality Comparison at Monitor 4-I

Parameter	Units	ODWS	Monitor 4-I									Background Bedrock (2-I)	2001 – 2008 Leachate (Seep 1)
			2004	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*		
Sodium	mg/L	200	11	7	10	12	9	13	7	7	7	9 - 35	26 - 38
Chloride	mg/L	250	2	2	2	3	<1	<1	3	<1	<1	<1 - 14	14 - 48
Sulphate	mg/L	500	15	17	16	16	16	16	16	16	16	13 - 92	3 - 32
Potassium	mg/L		4	5	4	6	5	4	5	4	4	2 - 7	5 - 9
Alkalinity	mg/L	30 - 500	56	59	57	58	58	61	57	60	59	56 - 81	238 - 429
Strontium	mg/L		0.166	0.167	0.176	0.176	0.163	0.147	0.191	0.177	0.153	0.065 - 0.133	0.529 – 0.787
Boron	mg/L	5.0	0.08	0.06	0.06	0.05	0.03	0.04	0.09	0.08	0.02	<0.01 - 1.80	0.12 - 0.24
Iron	mg/L	0.3	0.01	<0.03	<0.03	0.03	0.06	0.08	0.12	**0.59**	0.10	<0.03 - **0.76**	**6.89 – 86.2**
Manganese	mg/L	0.05	**0.06**	0.05	0.03	0.03	**0.08**	**0.07**	**0.08**	0.05	0.05	<0.01 - **0.06**	**5.68 – 9.52**
Conductivity	µS/cm		117	134	119	110	151	156	148	151	150	108 - 200	500 - 867
TDS	mg/L	500	97	93	98	101	98	101	96	98	98	93 - 212	340 - **564**

Note: Bold values exceed the ODWS

The 2011 and 2012 sampling results show that leachate indicator parameter concentrations for this period are similar to historical values and are within the ranges shown for background bedrock water quality (monitor 2-I), except for strontium. The only leachate indicator parameter to exceed the ODWS during the reporting period was iron in 2011. The similarity in water quality between background bedrock and monitor 4-I, suggests this location is not impacted by leachate, and that downward groundwater movement is restricted by the overlying till layer.

Table 4 summarizes the water quality in monitor 4-II compared to background overburden and leachate concentrations.

Table 4. Water Quality Comparison at Monitor 4-II

Parameter	Units	ODWS	Monitor 4-II									Background Overburden (2-II)	2001 – 2008 Leachate (Seep 1)
			2004	2005	2006	2007	2008	2009	2010	2011	2012		
Sodium	mg/L	200	10	11	13	10	15	21	26	20	16	3 - 10	26 - 38
Chloride	mg/L	250	26	29	63	17	19	11	10	6	3	<1 - 3	14 - 48
Sulphate	mg/L	500	11	14	13	26	13	11	12	10	8	6 - 13	3 - 32
Potassium	mg/L		2	2	3	2	3	3	3	2	2	<1 - 3	5 - 9
Alkalinity	mg/L	30 - 500	**26**	36	32	58	83	96	116	125	122	**15 - 29**	238 - 429
Strontium	mg/L		0.115	0.152	0.273	0.219	0.195	0.196	0.222	0.238	0.209	0.044 - 0.079	0.529 – 0.787
Boron	mg/L	5.0	0.01	<0.01	0.01	0.01	0.06	0.05	0.05	0.06	0.06	<0.01 - 0.13	0.12 - 0.24
Iron	mg/L	0.3	<0.01	<0.03	<0.03	<0.03	0.09	0.07	0.16	0.07	**0.38**	<0.03 -**1.82**	**6.89 – 86.2**
Manganese	mg/L	0.05	<0.01	<0.01	<0.01	<0.01	**0.06**	0.04	0.03	0.04	0.04	<0.01 - **0.120**	**5.68 – 9.52**
Conductivity	µS/cm		163	193	316	229	252	245	283	270	257	47 - 96	500 - 867
TDS	mg/L	500	106	125	205	149	164	159	184	176	167	36 - 64	340 - **564**

Note: Bold values exceed the ODWS

At monitor 4-II, sodium, chloride, alkalinity, strontium, conductivity, and TDS are elevated with respect to background overburden water quality in 2011 and 2012, indicating some leachate influence at this location. Only iron exceeded the ODWS during the reporting period in 2012. Monitor 4-II is interpreted as having minor leachate impacts.

4.3.2 Monitoring Nest 3

Monitoring nest 3 is located approximately 42 m downgradient of the waste. Monitor 3-I is screened within the bedrock and monitor 3-II is screened within the surficial silty fine sand. As discussed in Section 2, there is a slight upward gradient at this location. Table 5 summarizes the water quality in monitor 3-I compared to background bedrock and leachate concentrations.

Table 5. Water Quality Comparison at Monitor 3-I

Parameter	Units	ODWS	Monitor 3-I									Background Bedrock (2-I)	2001 – 2008 Leachate (Seep 1)
			2004	2005	2006	2007	2008	2009	2010	2011	2012		
Sodium	mg/L	200	7	6	7	7	7	6	7	6	6	9 - 35	26 - 38
Chloride	mg/L	250	1	3	<1	<1	<1	<1	1	12	<1	<1 - 14	14 - 48
Sulphate	mg/L	500	15	16	15	15	15	15	16	17	15	13 - 92	3 - 32
Potassium	mg/L		5	5	5	6	5	5	4	4	5	2 - 7	5 - 9
Alkalinity	mg/L	30 - 500	56	58	57	54	57	57	56	58	57	56 - 81	238 - 429
Strontium	mg/L		0.196	0.192	0.226	0.191	0.211	0.183	0.199	0.190	0.173	0.065 - 0.133	0.529 – 0.787
Boron	mg/L	5.0	0.02	0.02	0.02	0.01	<0.01	0.01	<0.01	0.01	<0.01	<0.01 - 1.80	0.12 - 0.24
Iron	mg/L	0.3	0.02	0.03	<0.03	<0.03	<0.03	0.06	<0.03	0.12	<0.03	<0.03 - **0.76**	**6.89 – 86.2**
Manganese	mg/L	0.05	0.03	0.04	0.03	0.03	0.03	0.07	0.04	0.03	0.04	<0.01 - **0.06**	**5.68 – 9.52**
Conductivity	µS/cm		140	142	146	145	145	148	146	146	147	108 - 200	500 - 867
TDS	mg/L	500	91	92	95	94	94	96	95	95	96	93 - 212	340 - **564**

Note: Bold values exceed the ODWS

The 2011 and 2012 sampling results for the indicator parameters at monitor 3-I are very similar to the historical results except for higher chloride and iron in 2011. Water quality at this location is similar to background bedrock and Table 5 shows no exceedances of the ODWS during the reporting period. The results indicate that monitor 3-I is not affected by leachate, which is consistent with the upward gradient observed at this location.

Table 6 below summarizes the water quality in monitor 3-II compared to background overburden and leachate concentrations.

Table 6. Water Quality Comparison at Monitor 3-II

Parameter	Units	ODWS	Monitor 3-II									Background Overburden (2-II)	2001 – 2008 Leachate (Seep 1)
			2004	2005	2006	2007	2008	2009	2010	2011	2012		
Sodium	mg/L	200	8	5	5	6	3	4	2	5	5	3 - 10	26 - 38
Chloride	mg/L	250	3	3	3	3	1	3	2	1	1	<1 - 3	14 - 48
Sulphate	mg/L	500	11	10	11	10	11	10	10	10	9	6 - 13	3 - 32
Potassium	mg/L		7	2	2	3	2	2	2	1	2	<1 - 3	5 - 9
Alkalinity	mg/L	30 - 500	52	50	45	33	33	30	32	38	47	**15 - 29**	238 - 429
Strontium	mg/L		0.090	0.081	0.074	0.078	0.067	0.048	0.054	0.062	0.068	0.044 - 0.079	0.529 – 0.787
Boron	mg/L	5.0	0.01	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01 - 0.13	0.12 - 0.24
Iron	mg/L	0.3	<0.01	<0.03	<0.03	**1.46**	<0.03	0.12	0.16	0.12	0.21	<0.03 - **1.82**	**6.89 – 86.2**
Manganese	mg/L	0.05	<0.01	<0.01	<0.01	**0.11**	<0.01	0.05	0.02	0.02	0.03	**<0.01 - 0.120**	**5.68 – 9.52**
Conductivity	µS/cm		125	114	112	91	89	87	89	98	115	47 - 96	500 - 867
TDS	mg/L	500	81	74	73	59	58	57	58	64	75	36 - 64	340 - **564**

Note: Bold values exceed the ODWS

The 2011 and 2012 sampling results for monitor 3-II show that concentrations of leachate indicator parameters are within or below the range of historical values, with no exceedances of the ODWS. Alkalinity, conductivity and TDS were slightly above background concentrations during the reporting period. This monitor shows no discernible leachate effects.

4.3.3 Monitoring Nest 1

Monitoring nest 1 is located approximately 200 m downgradient of the fill. Monitor 1-I is screened within the deep silty sand till and monitor 1-II is screened within the surficial fine sand. Table 7 summarizes the water quality in monitor 1-I compared to background overburden and leachate concentrations.

Table 7. Water Quality Comparison at Monitor 1-I

Parameter	Units	ODWS	Monitor 1-I									Background Overburden (2-II)	2001 – 2008 Leachate (Seep 1)
			2004	2005	2006	2007*	2008	2009	2010	2011	2012		
Sodium	mg/L	200	5	4	5	5	4	5	5	4	5	3 - 10	26 - 38
Chloride	mg/L	250	4	5	3	3	4	4	4	4	3	<1 - 3	14 - 48
Sulphate	mg/L	500	12	13	13	13	14	16	19	15	17	6 - 13	3 - 32
Potassium	mg/L		2	2	2	2	2	2	2	1	2	<1 - 3	5 - 9
Alkalinity	mg/L	30 - 500	34	37	36	32	32	34	33	29	35	**15 - 29**	238 - 429
Strontium	mg/L		0.059	0.09	0.067	0.069	0.056	0.066	0.080	0.056	0.064	0.044 - 0.079	0.529 – 0.787
Boron	mg/L	5.0	0.02	0.04	0.01	0.01	<0.01	<0.01	0.03	<0.01	<0.01	<0.01 - 0.13	0.12 - 0.24
Iron	mg/L	0.3	0.02	<0.03	<0.03	0.19	<0.03	0.05	0.08	0.05	<0.03	<0.03 - **1.82**	**6.89 – 86.2**
Manganese	mg/L	0.05	<0.01	<0.01	<0.01	<0.01	0.04	0.04	0.02	0.03	0.02	**<0.01 - 0.120**	**5.68 – 9.52**
Conductivity	µS/cm		96	106	103	99	105	117	122	100	120	47 - 96	500 - 867
TDS	mg/L	500	62	69	67	64	68	76	79	65	78	36 - 64	340 - **564**

*Note: * Incorrectly labelled as sample 1-II on original laboratory data sheet. Bold values exceed the ODWS*

Monitor 1-I leachate indicator results for 2011 and 2012 were similar to historical values. The leachate indicator parameters had values similar to background overburden during the reporting period. Historically, this monitor was interpreted as being unaffected by leachate and we feel this is still the case.

Table 8 summarizes the water quality in monitor 1-II compared to background overburden and leachate concentrations.

Table 8. Water Quality Comparison at Monitor 1-II

Parameter	Units	ODWS	Monitor 1-II									Background Overburden (2-II)	2001 – 2008 Leachate (Seep 1)
			2004	*2005*	*2006*	*2007**	*2008*	*2009*	*2010*	*2011*	*2012*		
Sodium	mg/L	200	14	9	12	13	12	15	15	10	12	3 - 10	26 - 38
Chloride	mg/L	250	20	14	13	16	12	17	17	12	11	<1 - 3	14 - 48
Sulphate	mg/L	500	21	15	21	26	23	10	14	17	12	6 - 13	3 - 32
Potassium	mg/L		2	2	2	2	2	2	2	1	2	<1 - 3	5 - 9
Alkalinity	mg/L	30 - 500	84	55	67	61	72	88	96	73	76	15 - 29	238 - 429
Strontium	mg/L		0.172	0.07	0.156	0.159	0.139	0.186	0.202	0.156	0.117	0.044 - 0.079	0.529 – 0.787
Boron	mg/L	5.0	0.05	<0.01	0.06	0.06	0.05	0.07	0.15	0.06	0.07	<0.01 - 0.13	0.12 - 0.24
Iron	mg/L	0.3	0.01	<0.03	<0.03	0.06	<0.03	0.05	0.09	0.06	0.07	<0.03 - 1.82	6.89 – 86.2
Manganese	mg/L	0.05	<0.01	<0.01	<0.01	<0.01	0.05	0.03	<0.01	0.02	0.02	<0.01 - 0.120	5.68 – 9.52
Conductivity	µS/cm		266	168	223	229	227	278	267	212	200	47 - 96	500 - 867
TDS	mg/L	500	173	109	145	149	148	181	174	138	130	36 - 64	340 - 564

*Note: * incorrectly labelled as sample 1-I on original laboratory data sheet [illegible]*

The 2011 and 2012 leachate indicator parameter concentrations for groundwater at monitor 1-II are similar to the historical data with no ODWS exceedances. More than half of the indicator parameters are above the background overburden concentrations, although still very low. Monitor 1-II is interpreted as having slight leachate effects.

4.4 VOC Sampling Results

In addition to the parameters listed in Schedule "A" of the site C of A (see Appendix E), the groundwater samples were also analyzed for VOCs in 2011 and 2012 in the deep and shallow wells at monitoring nests 2 and 4, to fulfill Condition 41(b) and Condition 41(c) of the Certificate. The sampling results are presented in Appendix C, and indicate that all VOC parameters were below the detection limits. The sampling results indicate that VOCs do not represent a health threat at the Stonecliffe landfill site, and therefore, we respectfully recommend that the requirement for continued VOC sampling (Condition 41(c) in the C of A) be removed from the monitoring program going forward.

4.5 Summary

Similar patterns in groundwater flow direction and water quality were observed in 2011 and 2012 compared to the historical results. Groundwater flows beneath the Stonecliffe Landfill from southwest to northeast, resulting in minor leachate effects at monitor 4-II. Slight leachate effects are also noted at monitor 1-II. None of the bedrock monitors show leachate effects.

5. Groundwater Compliance

A site is considered to be in compliance with MOE Guideline B-7 when parameter concentrations are within maximum concentration levels at the site boundaries or edge of the designated Contaminant Attenuation Zone (CAZ). Calculated Guideline B-7 limits (MOEE, 1994) were compared to the 2011 and 2012 water quality results for downgradient monitor nests 1, 3, and 4, to examine the degree of impairment of the groundwater just beyond the property boundaries. The median concentrations between 2000 and 2012 from background monitor nest 2 (C_b) were used to calculate the maximum allowable concentration levels (C_m) in Tables 9 and 10. Where concentrations were below the laboratory detection limit, the detection limit was assumed as the parameter concentration.

The maximum concentration (C_m) of a particular parameter that would be acceptable in the groundwater beneath the adjacent property is calculated in accordance with the following relationship: $C_m = C_b + F (C_{OWDS}-C_b)$. C_b is the background concentration of the particular parameter in the groundwater before it has been affected by human activity. C_{ODWS} is the maximum concentration of the parameter that should, in accordance with OWDS, be present in the groundwater. F is a constant that reduces the permitable impact to a level that is considered by the Ministry to have only a negligible effect on the downgradient use of the water. For drinking water, F is 0.5 for non-health related parameters, and F is 0.25 for health related parameters.

Table 9. Guideline B-7 Maximum Concentrations (C_m) in the Bedrock

Parameter	C_b	F	C_{ODWS}	C_m
Nitrate	0.1	0.25	10	2.58
Boron	0.02	0.25	5	1.27
Sodium	17	0.5	200	109
Chloride	3.0	0.5	250	127
Sulphate	15	0.5	500	258
Manganese	0.02	0.5	0.05	0.04
Iron	0.16	0.5	0.3	0.23
TDS	95	0.5	500	298

Note: All concentrations in Table 9 are mg/L.

Table 10. Guideline B-7 Maximum Concentrations (C_m) in the Overburden

Parameter	C_b	F	C_{ODWS}	C_m
Nitrate	0.1	0.25	10	2.58
Boron	0.01	0.25	5	1.26
Sodium	4	0.5	200	102
Chloride	2	0.5	250	126
Sulphate	8	0.5	500	254
Manganese	0.03	0.5	0.05	0.04
Iron	0.1	0.5	0.3	0.20
TDS	40	0.5	500	270

Note: All concentrations in Table 10 are mg/L. Since there are ten sets of results for Sr, the average of the median two results was used to calculate the maximum overburden Guideline B-7 concentrations.

Tables 11 and 12 compare the maximum concentrations (C_m) to the groundwater quality results for the downgradient bedrock and overburden monitors. To be conservative, C_m values were compared to the maximum concentration for each listed parameter of the 2011 to 2012 water quality results.

Table 11. Comparison of 2011 to 2012 Bedrock Concentrations to Guideline B-7 Maximum Concentrations

Parameter		C_m	Monitor 4-I	Monitor 3-I
Health Related Parameters	Nitrate	2.58	<0.1	<0.1
	Boron	1.27	0.08	0.01
Aesthetic Parameters	Sodium	109	7	6
	Chloride	127	<1	12
	Sulphate	258	16	17
	Manganese	0.04	**0.05**	0.04
	Iron	0.23	**0.59**	0.12
	TDS	298	98	96

Note: All concentrations in Table 11 are mg/L, concentrations in bold exceed Guideline B-7 limits

Table 12. Comparison of 2011 and 2012 Overburden Concentrations to Guideline B-7 Maximum Concentrations

Parameter		C_m	Monitor 4-II	Monitor 3-II	Monitor 1-I	Monitor 1-II
Health Related Parameters	Nitrate	2.58	0.98	0.74	0.25	0.16
	Boron	1.26	0.06	<0.01	<0.01	0.07
Aesthetic Parameters	Sodium	102	20	5	5	12
	Chloride	126	6	1	4	12
	Sulphate	254	10	10	17	17
	Manganese	0.04	0.04	0.03	0.03	0.02
	Iron	0.20	**0.38**	**0.21**	0.05	0.07
	TDS	270	176	75	78	138

Note: All concentrations in Table 12 are expressed as mg/L, concentrations in bold exceed Guideline B-7 limits

There are no exceedances of health related parameters in any of the bedrock or overburden monitors. Slight exceedances of the Guideline B-7 maximum concentrations for iron and manganese occurred at bedrock monitor 4-I, and for manganese at overburden monitors 3-II and 4-II. However, the historical data shows that the background overburden and bedrock monitors also exceed Guideline B-7 limits occasionally for iron and manganese. These results suggest that elevated iron and manganese concentrations are natural and unrelated to the landfill. At downgradient monitors 1-I and 1-II, no exceedances of Guideline B-7 were observed during the reporting period.

There are currently no downgradient water well users in the vicinity of the site and no mitigation action is presently necessary. Section 13 of the amended site C of A issued on April 28, 2008 (Appendix E) requires the Township to acquire a buffer area downgradient of the landfill site for use as a Contaminant Attenuation Zone (CAZ). The limits of the proposed CAZ are shown on Figure 2.

6. Trigger Mechanism

Section 45 (b) of the amended C of A outlines the trigger mechanism that would govern the installation of additional monitoring locations at the site. Additional monitoring locations are to be installed within one year from the date of exceedance if:

> *"concentrations of four (4) of the parameters tested for in the groundwater monitoring wells BH1-I and BH1-II in any one sampling/testing event exceed 75% of the concentration values for the said parameters listed in the Ministry's Guideline B-7."*

Table 13 summarizes the maximum water quality concentrations in monitors 1-I and 1-II during the 2011 and 2012 monitoring events and compares them to 75% of the overburden Guideline B-7 maximum concentrations listed in Table 12.

Table 13. Trigger Mechanism

Parameter		Trigger Value (0.75 x C_m)	Maximum 2011-2012 Concentration	
			Monitor 1-I	Monitor 1-II
Health Related Parameters	**Nitrate**	1.93	0.25	0.16
	Boron	0.94	<0.01	0.07
Aesthetic Parameters	**Sodium**	76	5	12
	Chloride	94	4	12
	Sulphate	191	17	17
	Manganese	0.03	0.03	0.02
	Iron	0.15	0.05	0.07
	TDS	202	78	138

Note: All concentrations in Table 13 are expressed as mg/L; concentrations in bold exceed trigger limits.

Table 13 shows that the water quality results for monitors 1-I and 1-II for 2011 and 2012 are generally well below the trigger values. Additional monitoring wells proposed under Condition 45 (b) are not required or anticipated in the near future.

7. Proposed 2011 and 2012 Monitoring Program

The proposed 2013 and 2014 monitoring programs is in accordance with Condition 41 (a) in the C of A (Item #1 of Schedule "A"), and includes water level measurements at all existing groundwater monitors at the same time as groundwater sampling, as well as a flow measurement at Seep 1. Groundwater samples should be collected during a dry period of the summer season (August) from all existing groundwater monitors and Seep 1, if it is flowing. Table 14 outlines the proposed 2013 and 2014 monitoring program.

Table 14. Proposed 2013 and 2014 Groundwater Monitoring Program

Location	Task	Frequency	Analytical Parameters
All existing monitors plus Seep 1	Measure water levels (flow at Seep 1)	Once per year (August)	
All existing monitors plus Seep 1	Sample groundwater*	Once per year (August)	• Major and minor ions (Ca, Na, Cl, SO_4, B, K, Mg) • Trace metals (Fe, Mn, Cu, Sr) • Nitrogen species (NO_3, NO_2, NH_3, TKN) • General chemistry (alkalinity, COD, phenols, ion balance, TDS) • Field measurements (pH, conductivity, water temperature)
Monitors 2-I, 2-II, 4-I, and 4-II*	Volatile organic compounds (VOC)	Once per year (August)	• VOC (benzene, 1,4-dichlorobenzene, dichloromethane, toluene and vinyl chloride)

Note: All samples are to be field filtered, except Seep 1. Metal samples are to be filtered prior to preservation in the field. Laboratory detection limits should be to ODWS.

**As per Condition 41 (c) in the C of A, VOC analysis is required at wells 2-I, 2-II and 4-II until MOE approval is given to remove it from the monitoring program.*

8. Conclusions and Recommendations

8.1 Conclusions

Based on the above discussion of the results, we provide the following conclusions:

a) Groundwater beneath the site flows laterally to the northeast in the surficial sands, with little movement to depth. The impacts on the groundwater system from the landfill are minor. Vertical gradients were found to be downward except at monitoring nest 3 where slight upward gradients were measured.

b) The Stonecliffe Landfill is functioning as a natural attenuation site and no mitigation measures are required at this time. The leachate plume is moving slowly downgradient, with dilute impacts noted at monitors 4-II and 1-II. Leachate strength is low, as is expected for a small landfill site such as this. Continued monitoring is required to determine if the leachate is increasing in strength over time.

c) The 2011 and 2012 groundwater quality results were well below the trigger criteria specifying the need for additional monitor installations.

d) The 2011 and 2012 groundwater quality results indicate that VOC concentrations are below the laboratory detection limits and do not pose a health threat at the Stonecliffe Landfill Site.

8.2 Recommendations

Based on the above conclusions, we provide the following recommendations:

a) Complete the 2013 and 2014 annual groundwater monitoring event outlined in Table 14.

b) A contaminant attenuation zone (CAZ), as shown in Figure 2, should be established by the Township as a requirement of the amended C of A.

c) VOC sampling at the Stonecliffe landfill site should be discontinued. The Township should forward a copy of this report, along with a cover letter requesting the deletion of the VOC sampling to the MOE District Manger before the change is implemented as per Condition 41(d) of the Certificate of Approval.

9. References

AECOM, 2009:
Stonecliffe Landfill Site – 2008 Groundwater and Surface Water Monitoring Report. AECOM 111035. Prepared for Jp2g Consultants Inc., May 2009.

AECOM, 2011:
Stonecliffe Landfill Site – 2009/2010 Groundwater and Surface Water Monitoring Report. AECOM 60195731. Prepared for Jp2g Consultants Inc., May 2011.

Environment Canada:
Rapide Des Joachims, Quebec Climate Station. Climate ID: 7086380.

Gartner Lee Limited, 2002:
Stonecliffe Landfill Site – Hydrogeology and Monitoring Report. GLL 21-432. Prepared for Jp2g Consultants Inc., October 2002. 26 pp.

Gartner Lee Limited, 2003:
Stonecliffe Landfill Site – 2002 Groundwater and Surface Water Monitoring Report. GLL 22-755. Prepared for Jp2g Consultants Inc., June 2003.

Gartner Lee Limited, 2004:
Stonecliffe Landfill Site – 2003 Groundwater and Surface Water Monitoring Report. GLL 22-755. Prepared for Jp2g Consultants Inc., June 2004.

Gartner Lee Limited, 2005:
Stonecliffe Landfill Site – 2004 Groundwater and Surface Water Monitoring Report. GLL 50-153. Prepared for Jp2g Consultants Inc., May 2005.

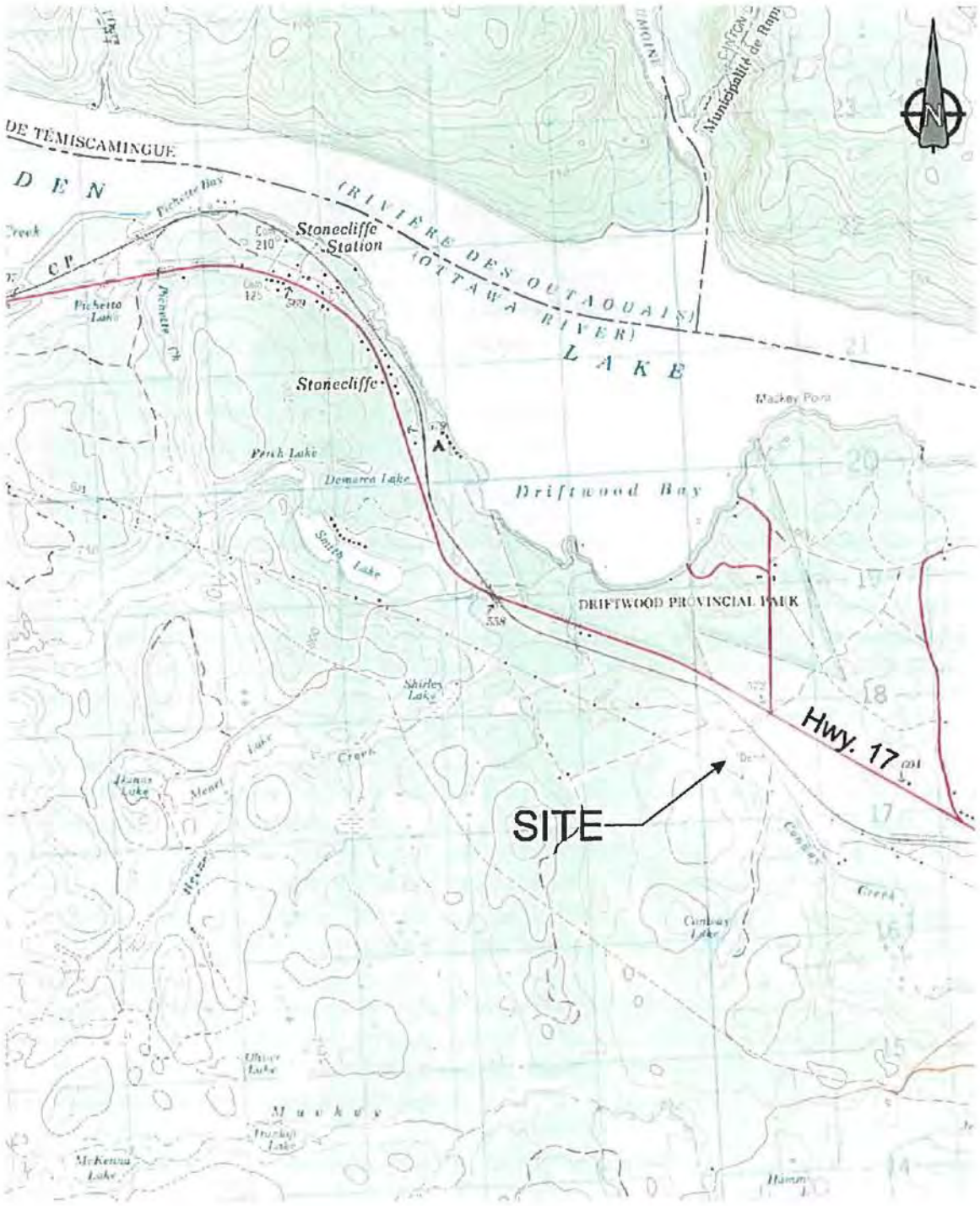
Gartner Lee Limited, 2008:
Stonecliffe Landfill Site – 2005/2006/2007 Groundwater and Surface Water Monitoring Report. GLL 80-073. Prepared for Jp2g Consultants Inc., September 2008.

Ministry of Environment (MOE), 2000:
Ontario Drinking Water Standards, August 2000. 68 pp.

Ministry of Environment and Energy (MOEE), 1994:
Guideline B-7 (formerly 15-08): Incorporation of the Reasonable Use Concept into MOEE Groundwater Management Activities, April 1994. 7 pp.

Ministry of Environment and Energy (MOEE), 1994:
Procedure B-7-1 (formerly referenced by 15-08): Determination of Contaminant Limits and Attenuation Zones, April 1994. 8 pp.

Figures



A SIZE 8.5" x 11" (215.9mm x 279.4mm)

PLOT: 5/24/2013 12:34:09 PM

FILE NAME: 60285244-7-FIG01.DWG

AECOM

Stonecliffe Landfill Site for Jp2g Consultants

Site Location Map

0 250 500 1000 1500 2000 m

1 : 50,000

PROJECT NUMBER **60285244-7.2**

DATE **May 2013**

FIGURE **1**

\\calrt3fs001\prod\AecomPrjs\60285244\000-CADD\040 CADD-BIM WIP\7 – Stonecliffe\60285244-7-Fig01.dwg Layout:8-5x11 Portrait Plotted: May 24, 2013 @ 12:34pm by jiangr

Legend

- Borehole Location
- Limit of Waste
- Proposed CAZ Limits
- Groundwater Seep Location
- (78.10) Groundwater Elevation (July 2011)
- 95 Groundwater Contour
- Groundwater Flow Direction

0 20 40 80 120 160 m
1 : 4000

DO NOT SCALE THIS DOCUMENT.
ALL MEASUREMENTS MUST BE OBTAINED FROM STATED DIMENSIONS.

AECOM

Stonecliffe Landfill Site
for Jp2g Consultants

Groundwater Flow (July 2011)

PROJECT NUMBER	DATE	FIGURE
60285244-7.2	May 2013	2

Legend

- Borehole Location
- Limit of Waste
- Proposed CAZ Limits
- Groundwater Seep Location
- (77.24) Groundwater Elevation (August, 2012)
- 95 Groundwater Contour
- Groundwater Flow Direction

0 20 40 80 120 160 m
1 : 4000

AECOM

Stonecliffe Landfill Site
for Jp2g Consultants

Groundwater Flow (August 2012)

PROJECT NUMBER	DATE	FIGURE
60285244-7.2	May 2013	3

AECOM

Appendix A

Borehole Logs
Monitor Construction Details
Photo Log

- Borehole Logs

GRAPHICS, SYMBOLS AND ABBREVIATIONS ON LOGS

SAMPLE TYPES and TESTS

SS	Split Spoon Sample		
SN	Non-Standard Split Spoon Sample		
ST	Shelby Tube Sample : (unconfined compression or unconsolidated undrained test)	-	◆
DS	Denision Type Sample		
PS	Piston Type Sample		
CS	Continuous Sample		
GS	Grab Sample		
WS	Wash Sample		
BQ	BQ Core Sample		
HQ	HQ Core Sample		
NQ	NQ Core Sample		
DT	Dynamic Penetration Test		
VT	Field Vane Test (undisturbed)	-	⊙
VT	Field Vane Test (remoulded)	-	⊕

PENETRATION RESISTANCES

Standard Penetration Resistance(N Value)

The number of blows by a 63.6 kg (140 lb) hammer dropped 760 mm (30 in.) required to drive a 50 mm (2 in.) Split Spoon Sampler for a distance of 300 mm (12 in.).

ABBREVIATIONS

DTPL: Drier Than Plastic Limit
APL: About Plastic Limit
WTPL: Wetter Than Plasic Limit
K: Hydraulic Conductivity (m/s)
C_u: Undrained Shear Strength (kPa)
% REC : Percentage of Sample Recovered
% RQD : Indirect Measure of the Number of Fractures and Soundness of Rock Mass
▼ Approximate Water Table

GRAIN SIZE CLASSIFICATION

	%
trace, "eg. trace sand"	1 - 10
some, "eg. some sand"	10 - 20
adjective, "eg. sandy"	20 - 35
and, "eg. and sand"	35 - 50
noun, "eg. sand"	>50

Note: Classification Divisions Based on Modified M.I.T. Grain Size Scale

SOIL DESCRIPTIONS

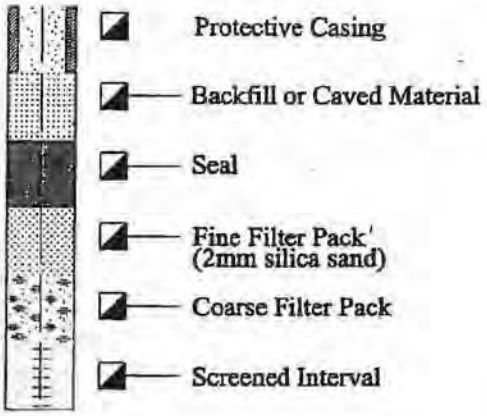
Cohesionless Soils

Relative Density	N Value
Very loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	over 50

Cohesive Soils

Consistency	C_u(kPa)	N Value
Very soft	0 to 12	0 to 2
Soft	12 to 25	2 to 4
Firm	25 to 50	4 to 8
Stiff	50 to 100	8 to 15
Very Stiff	100 to 200	15 to 30
Hard	over 200	over 30

MONITOR DETAILS



Gartner Lee Limited

BOREHOLE LOG	PROJECT: 20-231	BOREHOLE: 1-I 1 of 2
HYDROGEOLOGICAL INVESTIGATION Stonecliffe Landfill FOR: Townships of Head, Clara and Maria		DATE: 25 July 2000 GEOLOGIST BJS ELEVATION 82.0 m Above Datum

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
0		**SAND** Medium brown fine sand, trace silt, moist, loose to compact.		1		SS	8		90			
1				2		SS	8		65			
2				3		SS	6		60			
3				4		SS	7		70			
4		-Becoming saturated below about 3.9 m.		5		SS	6		70			
5				6		SS	12		90			
6				7		SS	15		75			
7				8		SS	15		70			
8				9		SS	16		80			
9				10		SS	22		95			
10				11		SS	49		90			
10.8		**SAND AND SILT** Grey brown silty fine sand with occasional lenses of silt, subtle laminations, saturated, compact to dense.										
11												
12												

Printed: 22 Oct 02

Gartner Lee Limited

BOREHOLE LOG	PROJECT: 20-231	BOREHOLE: 1-I 2 of 2
HYDROGEOLOGICAL INVESTIGATION Stonecliffe Landfill FOR: Townships of Head, Clara and Maria		DATE: 25 July 2000 GEOLOGIST BJS ELEVATION 82.0 m Above Datum

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
13												
13.6		**SILTY SAND TILL** Grey silty fine sand till, some medium to coarse sand, gravel and cobbles, saturated, very dense.		12		HQ			100			
14				13		HQ			61			
15				14		HQ			95			
16				15		HQ			10			
17.0		Borehole terminated at 16.96 m in silty fine sand till.										

BOREHOLE LOG	PROJECT: 20-231	BOREHOLE: 1-II 1 of 1
HYDROGEOLOGICAL INVESTIGATION Stonecliffe Landfill **FOR:** Townships of Head, Clara and Maria		**DATE:** 26 July 2000 **GEOLOGIST** BJS **ELEVATION** 82.1 m Above Datum

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
1		**SAND** Medium brown fine sand, trace silt, moist, loose to compact.										
2												
3												
4		-Becoming saturated about below 3.9 m.										
5												
6												
7												
7.5		Borehole terminated at 7.47 m in sand. Borehole augered directly to 7.47 m without sampling. Stratigraphy inferred from adjacent borehole 1-I.										

Printed: 22 Oct 02

Gartner Lee Limited

BOREHOLE LOG	PROJECT: 20-231	BOREHOLE: 2-I 1 of 2
HYDROGEOLOGICAL INVESTIGATION Stonecliffe Landfill FOR: Townships of Head, Clara and Maria		DATE: 28 July 2000 GEOLOGIST BJS ELEVATION 110.3 m Above Datum

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL TYPE	N VALUE	% WATER	% REC	% RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
0.8		**SILT AND SAND** Rust and dark brown silt and fine sand, trace cobbles and boulders, moist, dense.									
1		**SILTY SAND TILL** Medium brown silty fine sand till, trace medium sand, gravel, cobbles and boulders, moist, very dense.		1	SS	19/0.15m		100			
				2	SS	61		75		>>	
2		-Becoming saturated below about 2.3 m.		3	SS	64		75		>>	
3				4	SS						
4				5	SS						
				6	SS	75		70		>>	
5											
6				7	SS	100/0.28m		90			
				8	HQ						
7											
				9	SS	80		65		>>	
8				10	HQ			35			
9				11	HQ			30			
10											
11				12	SS	114		90		>>	
				13	HQ			13			
12											

BOREHOLE LOG	PROJECT: 20-231	BOREHOLE: 2-I 2 of 2
HYDROGEOLOGICAL INVESTIGATION Stonecliffe Landfill FOR: Townships of Head, Clara and Maria		DATE: 28 July 2000 GEOLOGIST BJS ELEVATION 110.3 m Above Datum

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
13		**SILTY SAND TILL** (Continued)		14		HQ			0			
14				15		SS	99/		95			
				16		HQ	0.25m		11			
15												
				17		SS	138/		100			
16				18		HQ	0.23m		18			
17												
17.9												
18		**GRANITIC GNEISS BEDROCK** Grey, pink and black finely grained granitic gneiss bedrock.		19		HQ			86	21		
19				20		HQ			90	53		
20												
20.5		Borehole terminated at 20.45 m in granitic gneiss bedrock.										

BOREHOLE LOG	PROJECT: 20-231	BOREHOLE: 2-II 1 of 1
HYDROGEOLOGICAL INVESTIGATION Stonecliffe Landfill FOR: Townships of Head, Clara and Maria		DATE: 27 July 2000 GEOLOGIST BJS ELEVATION 110.4 m Above Datum

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
0.8		**SILT AND SAND** Rust and dark brown silt and fine sand, trace cobbles and boulders, moist, dense.										
1		**SILTY SAND TILL** Medium brown silty fine sand till, trace medium sand, gravel, cobbles and boulders, moist, very dense.										
2		-Becoming saturated below about 2.3 m.										
3												
4												
4.7		Borehole terminated at 4.65 m in silty fine sand till. Borehole augered directly to 4.65 m without sampling. Stratigraphy inferred from adjacent borehole 2-I.										

Printed: 22 Oct 02

Gartner Lee Limited

BOREHOLE LOG	PROJECT: 20-231	BOREHOLE: 3-I 1 of 2
HYDROGEOLOGICAL INVESTIGATION Stonecliffe Landfill FOR: Townships of Head, Clara and Maria		DATE: 10 August 2000 GEOLOGIST BJS ELEVATION 93.5 m Above Datum

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
0		**SILTY FINE SAND** Mottled medium brown and grey silty fine sand, trace medium to coarse sand, gravel and cobbles, saturated, compact.		1		SS	26		60			
1				2		SS	16		60			
2				3		SS	66		50		>>	
3.1		**SILTY SAND TILL** Grey silty fine sand till, trace medium to coarse sand, gravel and cobbles, saturated, very dense.		4		SS						
4				5		SS	101		100		>>	
5				6		SS	115/0.15m		100			
				7		HQ			29			
6												
7				8		SS	151		100		>>	
				9		HQ						
8				10		SS	120		100		>>	
				11		HQ			0			
9				12		HQ						
10												
11				13		SS	76		90		>>	
				14		HQ						
12												

Printed: 22 Oct 02

Gartner Lee Limited

BOREHOLE LOG	PROJECT: 20-231	BOREHOLE: 3-I 2 of 2
HYDROGEOLOGICAL INVESTIGATION Stonecliffe Landfill FOR: Townships of Head, Clara and Maria		DATE: 10 August 2000 GEOLOGIST BJS ELEVATION 93.5 m Above Datum

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
13		SILTY SAND TILL (Continued)		15		SS	50		50			
				16		HQ						
14				17		SS	76/0.13m		90			
14.8												
15		GRANITIC GNEISS BEDROCK Grey, pink and black finely grained granitic gneiss bedrock.		18		HQ			88	11		
				19		HQ			100	17		
16												
17				20		HQ			92	51		
17.8		Borehole terminated at 17.75 m in granitic gneiss bedrock.										

BOREHOLE LOG	PROJECT: 20-231	BOREHOLE: 3-II 1 of 1
HYDROGEOLOGICAL INVESTIGATION Stonecliffe Landfill FOR: Townships of Head, Clara and Maria		DATE: 10 August 2000 GEOLOGIST BJS ELEVATION 93.4 m Above Datum

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
1		**SILTY FINE SAND** Mottled medium brown and grey silty fine sand, trace medium to coarse sand, gravel and cobbles, saturated, compact.										
2												
2.6		Borehole terminated at 2.60 at auger refusal. Borehole augered directly to 2.60 m without sampling. Stratigraphy inferred from adjacent borehole 3-I.										

Printed: 22 Oct 02

Gartner Lee Limited

BOREHOLE LOG	PROJECT: 20-231	BOREHOLE: 4-I 1 of 2
HYDROGEOLOGICAL INVESTIGATION Stonecliffe Landfill FOR: Townships of Head, Clara and Maria		DATE: 14 August 2000 GEOLOGIST BJS ELEVATION 96.7 m Above Datum

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
1		**SAND** Medium brown fine sand, trace medium to coarse sand, gravel and cobbles, some silt, minor oxidation noted throughout, wet becoming saturated, compact to very dense.		1		SS	20		40		■	
				2		SS	46		60		■	
2				3		SS	38		45		■	
3				4		SS	35		70		■	
4				5		SS	39		70		■	
5				6		SS	76		100		>>■	
6				7		SS	68		55		>>■	
7												
7.7		**SILTY SAND TILL** Grey silty fine sand till, some medium to coarse sand, gravel, cobbles, saturated, very dense.		8		SS	104/0.20m		100			
8												
9				9		HQ			75			
10				10		SS	100/0.15m		90			
				11		HQ			85			
11				12		HQ	140/0.23m		100			
				13		HQ						
12												

Printed: 22 Oct 02

Gartner Lee Limited

BOREHOLE LOG	PROJECT: 20-231	BOREHOLE: 4-I 2 of 2
HYDROGEOLOGICAL INVESTIGATION Stonecliffe Landfill FOR: Townships of Head, Clara and Maria		DATE: 14 August 2000 GEOLOGIST BJS ELEVATION 96.7 m Above Datum

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
13		SILTY SAND TILL (Continued)		14		SS	52		65		■	
				15		HQ			44			
14.2 14		BRECCIA BEDROCK Reddish brown fine grained breccia bedrock.		16		HQ			51	23		
15												
16				17		SS	125/		100			
				18		HQ	0.13m		100	20		
17				19		HQ			87	53		
18.1 18		Borehole terminated at 18.13 m in breccia bedrock.										

Printed: 22 Oct 02

Gartner Lee Limited

BOREHOLE LOG	PROJECT: 20-231	BOREHOLE: 4-II 1 of 1
HYDROGEOLOGICAL INVESTIGATION Stonecliffe Landfill FOR: Townships of Head, Clara and Maria		DATE: 15 August 2000 GEOLOGIST BJS ELEVATION 96.5 m Above Datum

DEPTH (m)	STRATIGRAPHY	STRATIGRAPHIC DESCRIPTION	MONITOR DETAILS & NUMBER	SAMPLE NUMBER	SAMPLE INTERVAL	SAMPLE TYPE	SAMPLE N VALUE	SAMPLE % WATER	SAMPLE % REC	SAMPLE % RQD	N VALUE 15 30 45 60	WATER CONTENT (%) 10 20 30 40
1		**SAND** Medium brown fine sand, trace medium to coarse sand, gravel and cobbles, some silt, minor oxidation throughout, wet becoming saturated, compact to very dense.										
2												
3												
4.3		Borehole terminated at 4.26 m in sand. Borehole augered directly to 4.26 m without sampling. Stratigraphy inferred from adjacent borehole 4-I.										

AECOM

- Monitor Construction Details

SUMMARY OF MONITOR DETAILS

Project Name: Stonecliffe Landfill
Project No.: 21-432

Monitor No	Monitor					Screened Interval (m)	Filter Pack (m)	Seal (m)	Backfill (m)
	Type	Diameter (mm)	Stick-up (m)	Ground Elevation (mASD)*	Top of Pipe Elevation (mASD)				
BH1-I	Piezometer	51	0.75	82.04	82.79	15.19-16.7	14.94-16.96	0-14.94	
BH1-II	Standpipe	51	0.68	82.14	82.83	2.74-5.89	2.44-5.89	1.83-2.44 0.00-0.91	0.91-1.83
BH2-I	Piezometer	51	0.66	110.30	110.96	18.62-20.29	18.44-20.29	0.00-18.44	
BH2-II	Standpipe	51	0.64	110.38	111.02	1.52-4.65	1.22-4.65	0.00-1.22	
BH3-I	Piezometer	51	0.58	93.46	94.04	16.07-17.75	15.7-17.75	0.91-15.7 0.00-0.31	0.3-0.91
BH3-II	Standpipe	51	0.55	93.36	93.91	1.07-2.6	0.91-2.6	0.00-0.91	
BH4-I	Piezometer	51	0.68	96.68	97.36	15.32-17.00	15.09-17.37	0.00-15.09	
BH4-II	Standpipe	51	0.85	96.47	97.32	0.91-3.96	0.76-3.96	0.00-0.76	

* mASD metres Above Site Datum

AECOM

- Photo Log

July 2011 Photos

BH 1-I & 1-II

BH 2-I & 2-II

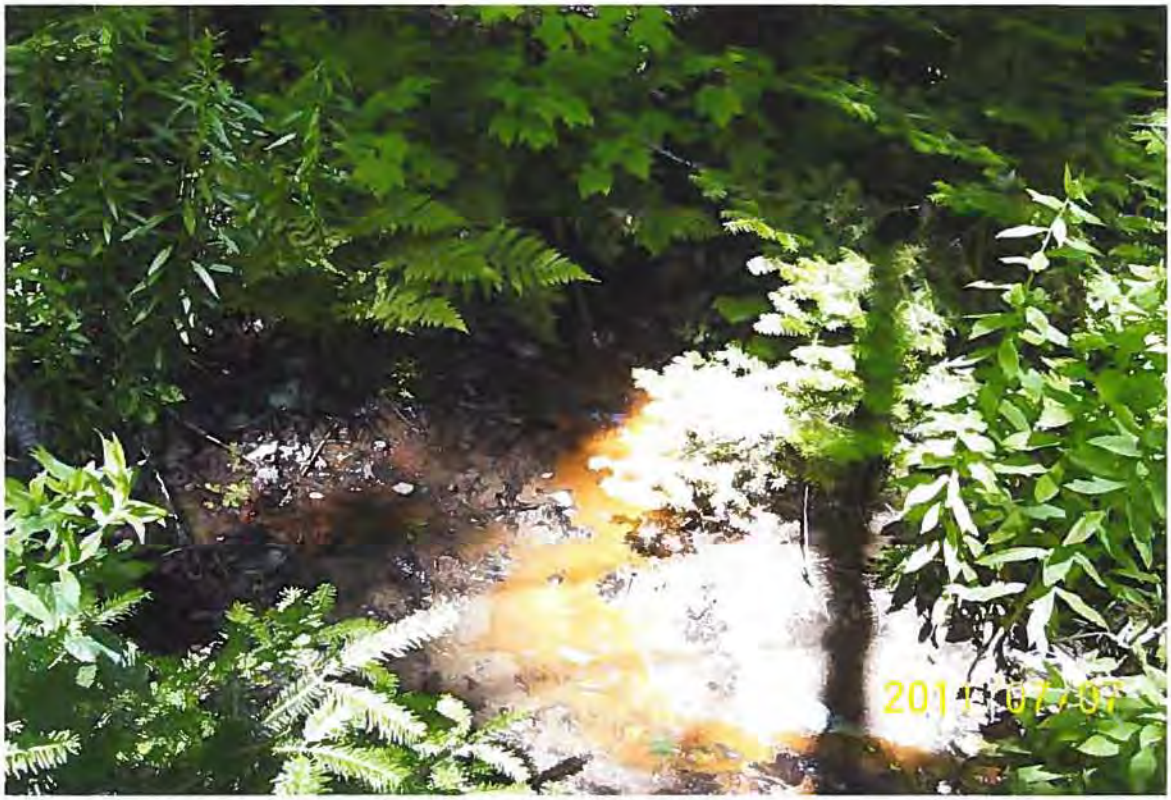
July 2011 Photos

BH 3-I & 3-II

BH 4-I & 4-II

July 2011 Photos

Seep 1 Location (Not Flowing)



Seep 1 (Not Flowing)

August 2012 Photos

BH 1-I

BH 1-II

August 2012 Photos

BH 2-I

BH 2-II

August 2012 Photos

BH 3-I

BH 3-II

August 2012 Photos

BH 4-I

BH 4-II

August 2012 Photos

SEEP 1

AECOM

Appendix B

Groundwater Elevations

Groundwater Elevations
Stonecliffe Landfill Site

AECOM

Monitor	Top of Pipe Elevation (m) (Assumed Datum)	Ground Elevation (m) (Assumed Datum)	Date	Water Depth From Top of Pipe (m)	Water elevation (m) (Assumed Datum)
1-I	82.794	82.044	12-Oct-00	15.140	67.654
	82.794	82.044	16-May-01	14.720	68.074
	82.794	82.044	12-Jun-02	14.300	68.494
	82.794	82.044	26-Aug-02	14.950	67.844
	82.794	82.044	19-Aug-03	15.050	67.744
	82.794	82.044	18-Aug-04	15.060	67.734
	82.794	82.044	21-Sep-05	15.210	67.584
	82.794	82.044	06-Sep-06	15.100	67.694
	82.794	82.044	15-Aug-07	14.770	68.024
	82.794	82.044	05-Sep-08	14.790	68.004
	82.794	82.044	04-Aug-09	14.760	68.034
	82.794	82.044	17-Aug-10	15.110	67.684
	82.794	82.044	07-Jul-11	14.100	68.694
	82.794	82.044	29-Aug-12	15.160	67.634
1-II	82.827	82.144	12-Oct-00	5.520	77.307
	82.827	82.144	16-May-01	4.890	77.937
	82.827	82.144	12-Jun-02	4.750	78.077
	82.827	82.144	26-Aug-02	5.520	77.307
	82.827	82.144	19-Aug-03	5.550	77.277
	82.827	82.144	18-Aug-04	5.500	77.327
	82.827	82.144	21-Sep-05	5.340	77.487
	82.827	82.144	06-Sep-06	5.280	77.547
	82.827	82.144	15-Aug-07	5.090	77.737
	82.827	82.144	05-Sep-08	5.720	77.107
	82.827	82.144	04-Aug-09	5.020	77.807
	82.827	82.144	17-Aug-10	5.340	77.487
	82.827	82.144	07-Jul-11	4.730	78.097
	82.827	82.144	29-Aug-12	5.590	77.237
2-I	110.961	110.300	12-Oct-00	6.420	104.541
	110.961	110.300	16-May-01	7.050	103.911
	110.961	110.300	12-Jun-02	5.940	105.021
	110.961	110.300	26-Aug-02	6.050	104.911
	110.961	110.300	19-Aug-03	7.400	103.561
	110.961	110.300	18-Aug-04	6.080	104.881
	110.961	110.300	21-Sep-05	7.690	103.271
	110.961	110.300	06-Sep-06	6.910	104.051
	110.961	110.300	15-Aug-07	5.470	105.491
	110.961	110.300	05-Sep-08	5.420	105.541
	110.961	110.300	04-Aug-09	5.270	105.691
	110.961	110.300	17-Aug-10	6.850	104.111
	110.961	110.300	07-Jul-11	4.240	106.721
	110.961	110.300	29-Aug-12	7.020	103.941

Groundwater Elevations
Stonecliffe Landfill Site

AECOM

Monitor	Top of Pipe Elevation (m) (Assumed Datum)	Ground Elevation (m) (Assumed Datum)	Date	Water Depth From Top of Pipe (m)	Water elevation (m) (Assumed Datum)
2-II	111.015	110.379	12-Oct-00	4.310	106.705
	111.015	110.379	16-May-01	5.110	105.905
	111.015	110.379	12-Jun-02	3.860	107.155
	111.015	110.379	26-Aug-02	4.110	106.905
	111.015	110.379	19-Aug-03	Dry	<105.565
	111.015	110.379	18-Aug-04	Dry	<105.565
	111.015	110.379	21-Sep-05	Dry	<105.565
	111.015	110.379	06-Sep-06	4.920	106.095
	111.015	110.379	15-Aug-07	3.100	107.915
	111.015	110.379	05-Sep-08	3.060	107.955
	111.015	110.379	04-Aug-09	2.910	108.105
	111.015	110.379	17-Aug-10	4.750	106.265
	111.015	110.379	07-Jul-11	1.840	109.175
	111.015	110.379	29-Aug-12	4.990	106.025
3-I	94.037	93.460	12-Oct-00	0.800	93.237
	94.037	93.460	16-May-01	0.200	93.837
	94.037	93.460	12-Jun-02	0.150	93.887
	94.037	93.460	26-Aug-02	0.370	93.667
	94.037	93.460	19-Aug-03	0.400	93.637
	94.037	93.460	18-Aug-04	0.320	93.717
	94.037	93.460	21-Sep-05	0.640	93.397
	94.037	93.460	06-Sep-06	0.480	93.557
	94.037	93.460	15-Aug-07	0.390	93.647
	94.037	93.460	05-Sep-08	0.260	93.777
	94.037	93.460	04-Aug-09	0.290	93.747
	94.037	93.460	17-Aug-10	0.250	93.787
	94.037	93.460	07-Jul-11	0.156	93.881
	94.037	93.460	29-Aug-12	0.440	93.597
3-II	93.906	93.359	12-Oct-00	1.030	92.876
	93.906	93.359	16-May-01	1.030	92.876
	93.906	93.359	12-Jun-02	0.920	92.986
	93.906	93.359	26-Aug-02	1.030	92.876
	93.906	93.359	19-Aug-03	1.150	92.756
	93.906	93.359	19-Aug-03	1.060	92.846
	93.906	93.359	21-Sep-05	1.110	92.796
	93.906	93.359	06-Sep-06	1.060	92.846
	93.906	93.359	15-Aug-07	1.030	92.876
	93.906	93.359	05-Sep-08	0.960	92.946
	93.906	93.359	04-Aug-09	0.940	92.966
	93.906	93.359	17-Aug-10	0.940	92.966
	93.906	93.359	07-Jul-11	0.900	93.006
	93.906	93.359	29-Aug-12	0.980	92.926

Groundwater Elevations
Stonecliffe Landfill Site

AECOM

Monitor	Top of Pipe Elevation (m) (Assumed Datum)	Ground Elevation (m) (Assumed Datum)	Date	Water Depth From Top of Pipe (m)	Water elevation (m) (Assumed Datum)
4-I	97.360	96.677	12-Oct-00	3.090	94.270
	97.360	96.677	16-May-01	2.940	94.420
	97.360	96.677	12-Jun-02	2.730	94.630
	97.360	96.677	26-Aug-02	3.050	94.310
	97.360	96.677	19-Aug-03	3.270	94.090
	97.360	96.677	19-Aug-03	3.030	94.330
	97.360	96.677	21-Sep-05	3.400	93.960
	97.360	96.677	06-Sep-06	3.150	94.210
	97.360	96.677	15-Aug-07	2.920	94.440
	97.360	96.677	05-Sep-08	2.830	94.530
	97.360	96.677	04-Aug-09	2.730	94.630
	97.360	96.677	17-Aug-10	2.920	94.440
	97.360	96.677	07-Jul-11	2.500	94.860
	97.360	96.677	29-Aug-12	3.110	94.250
4-II	97.321	96.467	12-Oct-00	1.950	95.371
	97.321	96.467	16-May-01	1.830	95.491
	97.321	96.467	12-Jun-02	1.360	95.961
	97.321	96.467	26-Aug-02	1.870	95.451
	97.321	96.467	19-Aug-03	2.420	94.901
	97.321	96.467	19-Aug-03	2.900	94.421
	97.321	96.467	21-Sep-05	2.250	95.071
	97.321	96.467	06-Sep-06	2.020	95.301
	97.321	96.467	15-Aug-07	1.800	95.521
	97.321	96.467	05-Sep-08	1.720	95.601
	97.321	96.467	04-Aug-09	1.630	95.691
	97.321	96.467	17-Aug-10	1.710	95.611
	97.321	96.467	07-Jul-11	1.530	95.791
	97.321	96.467	29-Aug-12	2.030	95.291

AECOM

Appendix C

Groundwater Quality Results

Groundwater Quality Data
Stonecliffe Landfill Site

AECOM

Monitor Number		BH 1-I														
Date Sampled	ODWS	12-Oct-00	16-May-01	29-Aug-02	19-Aug-03	18-Aug-04	21-Sep-05	06-Sep-06	15-Aug-07 *	05-Sep-08	04-Aug-09	17-Aug-10	17-Aug-10	07-Jul-11	29-Aug-12	29-Aug-12
Parameters													BH 5 Duplicate of BH 1-I			BH 6 Duplicate of BH 1-I
Fluoride	1.50															
Chloride	250	3	3	2	3	4	5	3	3	4	4	4	17	4	3	3
Nitrite	1	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrate	10	<0.10	<0.10	<0.10	<0.10	0.10	0.15	<0.10	<0.10	<0.10	<0.10	<0.10	0.15	<0.10	0.25	0.26
Bromide																
Phosphate																
Sulphate	500	12	13	12	18	12	13	13	13	14	16	19	14	15	17	16
Calcium		9	8	10	8	8	9	9	10	9	9	11	25	7	10	10
Magnesium		4	4	3	3	3	4	4	4	4	4	4	9	3	3	3
Sodium	200	5	4	4	5	5	4	5	5	4	5	5	14	4	5	5
Potassium		2	1	3	2	2	2	2	2	2	2	2	2	1	2	2
Aluminum	0.100															
Barium	1.00															
Beryllium																
Boron	5.00	0.03	0.12	<0.05	<0.05	0.02	0.04	0.01	0.01	<0.01	<0.01	0.03	0.15	<0.01	<0.01	<0.01
Cadmium	0.005															
Chromium	0.050															
Cobalt																
Conductivity us/cm					87	96	106	103	99	105	117	122	254	100	120	119
Copper	1.000	0.001	0.005	<0.001	<0.001	<0.001	0.004	0.002	0.002	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001
Iron	0.30	0.37	0.24	<0.01	<0.01	0.02	<0.03	<0.03	0.19	<0.03	0.05	0.06	0.06	0.05	<0.03	<0.03
Lead	0.010															
Manganese	0.050	0.010	<0.01	<0.005	<0.005	<0.01	<0.01	<0.01	<0.01	0.040	0.040	0.020	0.020	0.03	0.02	<0.01
Molybdenum																
Nickel																
Phosphorus																
Silicon																
Silver																
Strontium		0.069	0.070	0.057	0.059	0.059	0.060	0.067	0.069	0.059	0.066	0.060	0.208	0.056	0.064	0.064
Sulphur																
Thallium																
Tin																
Titanium																
Vanadium																
Zinc	5.00															
Hardness	80 - 100															
Alkalinity as CaCO3	30 - 500	34	36	36	35	34	37	36	32	32	34	33	91	29	35	35
TKN		0.130	0.080	<0.05	<0.05	0.16	<0.05	0.20	<0.10	<0.10	<0.10	<0.10	0.18	<0.10	<0.10	<0.10
Ammonia		<0.02	<0.02	<0.02	<0.02	0.06	0.03	0.03	<0.02	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02
Organic Nitrogen	0.15	<0.13	<0.08	<0.05	<0.05	0.10	<0.02	0.17	<0.1	<0.1	<0.06	<0.10	< 0.18	<0.10	<0.10	<0.10
Phenols		0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
COD		78	<5	5	<5	<5	<5	<5	<5	5	<5	5	10	<5	<5	<5
DOC	5															
Total Phosphorous																
TDS	500	84	72	65	63	62	69	67	64	68	76	79	165	65	78	77
Ion Balance		1.03	0.87	0.97												
Field Measured																
Water Temp. (°C)	15.0	7.2	7.8	8.2	8.3	8.4	7.9	7.4	7.5	9.0	7.5	7.1		7	8	
Conductivity (microS/cm)		105	100	97	105	81	95	83	73	90	103	93		78	101	
pH (pH units)	6.5 - 8.5	7.27	6.88	8.40	7.96	7.34	8.47	7.64	7.31	7.81	7.80	7.60		7.5	8.6	

Notes: All values reported in mg/L unless otherwise noted
ODWS = Ontario Drinking Water Standard
Shaded values exceed ODWS
* Incorrectly labeled as sample 1-II on original lab data sheet

Groundwater Quality Data
Stonecliffe Landfill Site

AECOM

Monitor Number		BH 1-II												
Date Sampled	ODWS	12-Oct-00	16-May-01	29-Aug-02	19-Aug-03	18-Aug-04	21-Sep-05	06-Sep-06	15-Aug-07 *	05-Sep-08	04-Aug-09	17-Aug-10	07-Jul-11	29-Aug-12
Parameters														
Fluoride	1.50													
Chloride	250	12	15	11	15	20	14	13	16	12	17	17	12	11
Nitrite	1.00	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrate	10.00	<0.10	0.18	0.69	1.11	0.33	0.33	0.32	0.12	<0.10	<0.10	0.15	0.13	0.16
Bromide														
Phosphate														
Sulphate	500	21	22	13	18	21	15	21	26	23	10	14	17	12
Calcium		13	12	17	17	22	15	19	21	20	24	26	19	18
Magnesium		6	8	6	8	10	7	8	9	8	9	9	7	5
Sodium	200	14	21	9	10	14	9	12	13	12	15	15	10	12
Potassium		2	2	1	2	2	2	2	2	2	2	2	1	2
Aluminum	0.100													
Barium	1.00													
Beryllium														
Boron	5.00	0.07	0.15	<0.05	<0.05	0.05	<0.01	0.06	0.06	0.05	0.07	0.15	0.06	0.07
Cadmium	0.005													
Chromium	0.050													
Cobalt														
Conductivity us/cm					195	266	168	223	229	227	276	267	212	200
Copper	1.000	0.003	0.003	0.002	0.004	0.001	0.003	0.003	0.003	0.002	0.002	0.002	0.001	0.002
Iron	0.30	0.48	0.25	0.15	0.02	0.01	<0.03	<0.03	0.06	<0.03	0.05	0.09	0.06	0.07
Lead	0.010													
Manganese	0.050	0.030	0.010	0.006	<0.005	<0.01	<0.01	<0.01	<0.01	0.050	0.030	<0.01	0.020	0.020
Molybdenum														
Nickel														
Phosphorus														
Silicon														
Silver														
Strontium		0.107	0.155	0.089	0.100	0.172	0.070	0.156	0.159	0.139	0.186	0.202	0.156	0.117
Sulphur														
Thallium														
Tin														
Titanium														
Vanadium														
Zinc	5.00													
Hardness	80 - 100													
Alkalinity as CaCO3	30 - 500	50	75	56	64	64	55	67	61	72	88	96	73	76
TKN		0.350	0.210	<0.05	0.20	0.18	0.09	0.20	0.15	0.12	<0.10	0.11	0.25	0.10
Ammonia		<0.02	<0.02	<0.02	<0.02	0.14	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Organic Nitrogen	0.15	<0.35	<0.210	<0.05	≤0.20	0.04	≤0.09	≤0.20	≤0.15	≤0.12	≤0.10	≤0.11	≤0.25	≤0.10
Phenols		0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
COD		76	8	12		<5	<5	7	<5	13	6	10	5	8
DOC	5				8									
Total Phosphorous														
TDS	500	140	148	112	127	173	109	145	149	148	181	174	136	130
Ion Balance		1.01	0.93	1.00	0.92	0.95		1.01	1.08	0.99	1.08	1.01	0.92	0.90
Field Measured														
Water Temp. (°C)	15.0	8.1	7.6	8.6	7.8	8.0	7.8	7.8	7.5	8.2	7.9	8.8	8.3	7.8
Conductivity (microS/cm)		180	220	131	185	216	158	183	170	207	250	206	156	163
pH (pH units)	6.5 - 8.5	7.72	7.05	9.19	7.72	7.42	8.40	7.54	7.28	7.23	7.70	7.30	7.40	8.70

Notes: All values reported in mg/L unless otherwise noted
ODWS = Ontario Drinking Water Standard
Shaded values exceed ODWS
* Incorrectly labeled as sample 1-I on original lab data sheet

Groundwater Quality Data
Stonecliffe Landfill Site

AECOM

Monitor Number		BH 2-I												
Date Sampled	ODWS	12-Oct-00	16-May-01	29-Aug-02	19-Aug-03	18-Aug-04	21-Sep-05	06-Sep-06	15-Aug-07	05-Sep-08	04-Aug-09	17-Aug-10	07-Jul-11	29-Aug-12
Parameters														
Fluoride	1.50													
Chloride	250	7	<1	<1	3	7	14	6	4	<1	<1	3	1	<1
Nitrite	1 00	<0 10	<0 10	<0 10	<0 10	<0 10	<0 10	<0 10	<0 10	<0 10	<0 10	<0 10	<0 10	<0 10
Nitrate	10 00	<0 10	<0 10	<0 10	<0 10	0 100	0 240	<0 10	<0 10	<0 10	<0 10	<0 10	<0 10	<0 10
Bromide														
Phosphate														
Sulphate	500	26	30	14	19	15	92	66	34	13	14	14	15	14
Calcium		11	8	11	13	15	9	11	16	13	13	18	12	15
Magnesium		4	4	4	2	10	3	2	3	2	2	3	2	2
Sodium	200	35	26	19	19	20	25	17	11	9	10	10	9	9
Potassium		7	2	3	4	4	3	4	5	5	5	5	4	5
Aluminum	0 100													
Barium	1 00													
Beryllium														
Boron	5 00	1 80	0 38	0 07	<0 05	0 04	0 02	0 02	0 01	<0 01	0 02	0 04	0 02	<0 01
Cadmium	0 005													
Chromium	0 050													
Cobalt														
Conductivity us/cm					146	143	144	147	145	145	146	145	145	148
Copper	1 000	<0 001	0 001	0 002	<0 001	<0 001	<0 001	0 001	0 004	<0 001	0 001	0 001	<0 001	<0 001
Iron	0 30	0.55	0.76	0.66	0 02	0 04	0 05	<0 03	<0 03	0 11	0.39	0 26	0 22	0 16
Lead	0 010													
Manganese	0 050	0 03	0 030	0 029	0 012	0 010	0 010	0 010	<0 01	0.060	0 050	0 020	0 020	<0 01
Molybdenum														
Nickel														
Phosphorus														
Silicon														
Silver														
Strontium		0.125	0 082	0.074	0 073	0 080	0 065	0 118	0 115	0.105	0 114	0 133	0 117	0.109
Sulphur														
Thallium														
Tin														
Titanium														
Vanadium														
Zinc	5 00													
Hardness	80 - 100													
Alkalinity as CaCO3	30 - 500	61	65	67	64	60	62	59	56	57	58	56	60	59
TKN		0.22	0.37	0.10	0.13	0.11	0.10	0.08	0.13	<0.10	<0.10	<0.10	1.54	<0.10
Ammonia		0.08	<0.02	0.07	0.09	0 07	0.11	0.06	0.07	0.03	0.02	<0.02	0.04	<0.02
Organic Nitrogen	0 15	0.14	<0.37	0.03	0.04	0 04	0.00	0 02	0 06	<0 07	<0 10	<0.10	1.50	<0.10
Phenols		0.004	<0 001	<0 001	<0 001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
COD		76	43	<5	<5	<5	<5	<5	<5	<5	<5	<5	5	<5
DOC	5													
Total Phosphorous														
TDS	500	212	168	100	95	93	94	96	94	94	95	94	94	96
Ion Balance		1 09	0 99	1 09	0.99									
Field Measured														
Water Temp (°C)	15 0	9 8	8 2	9.8	10.5	9.3	10.6	8.2	9.5	8.5	9.2	7.8	8.9	9.6
Conductivity (microS/cm)		200	160	179	160	120	144	119	108	126	142	110	124	120
pH (pH units)	6.5 - 8.5	8 44	8.96	9.04	8.35	8 43	8 15	7 84	7.57	7.29	8.80	7.80	8 30	7.00

Notes: All values reported in mg/L unless otherwise noted
ODWS = Ontario Drinking Water Standard
Shaded values exceed ODWS

Groundwater Quality Data
Stonecliffe Landfill Site

AECOM

Monitor Number		BH 2-II												
Date Sampled	ODWS	12-Oct-00	16-May-01	29-Aug-02	19-Aug-03	16-Aug-04	21-Sep-05	06-Sep-06	15-Aug-07	05-Sep-08	04-Aug-09	17-Aug-10	07-Jul-11	29-Aug-12
Parameters														
Fluoride	1.50													
Chloride	250	2	1	1	DRY	DRY	DRY	2	3	<1	2	2	<1	<1
Nitrite	1.00	<0.10	<0.10	<0.10				<0.10 -	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrate	10.00	<0.10	<0.10	<0.10				<0.10	<0.10	<0.10	<0.10	0.120	<0.10	<0.10
Bromide														
Phosphate														
Sulphate	500	8	13	8				8	8	8	7	6	7	8
Calcium		7	5	5				6	7	5	4	6	6	6
Magnesium		2	3	2				2	2	2	1	2	2	1
Sodium	200.0	3.0	10.0	8.0				4.0	4.0	4.0	3.0	3.0	3.0	3.0
Potassium		3	3	2				2	2	2	1	2	<1	1
Aluminum	0.100													
Barium	1.00													
Beryllium														
Boron	5.00	0.04	0.13	0.05				<0.01	<0.01	<0.01	0.01	0.03	0.01	<0.01
Cadmium	0.005													
Chromium	0.050													
Cobalt														
Conductivity us/cm								64	60	58	55	59	60	62
Copper	1.000	0.006	0.006	<0.001				0.002	0.001	<0.001	0.007	0.002	<0.001	<0.001
Iron	0.30	**1.53**	**1.23**	0.04				<0.03	<0.03	0.05	**1.82**	0.28	0.15	0.03
Lead	0.010													
Manganese	0.050	**0.100**	0.040	0.025				<0.01	<0.01	0.050	**0.120**	0.020	0.030	0.020
Molybdenum														
Nickel														
Phosphorus														
Silicon														
Silver														
Strontium		0.079	0.073	0.061				0.071	0.061	0.044	0.048	0.057	0.063	0.053
Sulphur														
Thallium														
Tin														
Titanium														
Vanadium														
Zinc	5.00													
Hardness	80 - 100													
Alkalinity as CaCO3	30 - 500	**27**	**29**	**29**				**24**	**24**	**21**	**18**	**18**	**23**	**22**
TKN		0.13	0.35	<0.05				<0.05	0.16	<0.10	<0.10	<0.10	0.22	0.12
Ammonia		<0.02	<0.02	<0.02				<0.02	0.050	<0.02	<0.02	<0.02	<0.02	<0.02
Organic Nitrogen	0.15	<0.130	<0.35	<0.05				<0.05	0.11	<0.10	<0.10	<0.10	≤0.22	≤0.12
Phenols		0.007	<0.001	<0.001				<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
COD		70	38	<5				5	<5	<5	<5	<5	15	<5
DOC	5													
Total Phosphorous														
TDS	500	44	64	46				42	39	38	38	38	39	40
Ion Balance		0.95	1.15	1.06										
Field Measured														
Water Temp. (°C)	15.0	10.0	9.0	11.0				12.2	10.6	10.9	9.2	9.3	9.2	10.9
Conductivity (micro$/cm)		80	90	58				75	47	46	96	44	54	6
pH (pH units)	6.5 - 8.5	7.08	8.51	7.65				**8.72**	7.93	7.73	7.80	8.70	**8.90**	**8.20**

Notes: All values reported in mg/L unless otherwise noted
ODWS = Ontario Drinking Water Standard
Shaded values exceed ODWS

Groundwater Quality Data
Stonecliffe Landfill Site

AECOM

Monitor Number		BH 3-I												
Date Sampled	ODWS	12-Oct-00	16-May-01	29-Aug-02	19-Aug-03	18-Aug-04	21-Sep-05	06-Sep-06	15-Aug-07	05-Sep-08	04-Aug-09	17-Aug-10	07-Jul-11	29-Aug-12
Parameters														
Fluoride	1.50													
Chloride	250	1	<1	<1	1	1	3	<1	<1	<1	<1	1	12	<1
Nitrite	1.00	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrate	10.00	<0.10	<0.10	<0.10	<0.10	<0.10	0.12	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Bromide														
Phosphate														
Sulphate	500	20	15	15	13	15	16	15	15	15	15	16	17	15
Calcium		12	14	20	16	13	16	16	19	16	15	16	15	16
Magnesium		4	3	2	3	3	3	3	3	3	3	3	3	2
Sodium	200	16	7	6	7	7	6	7	7	7	6	7	6	6
Potassium		3	4	5	5	5	5	5	6	5	5	4	4	5
Aluminum	0.100													
Barium	1.00													
Beryllium														
Boron	5.00	0.04	<0.01	<0.05	<0.05	0.02	0.02	0.02	0.01	<0.01	0.01	<0.01	0.01	<0.01
Cadmium	0.005													
Chromium	0.050													
Cobalt														
Conductivity us/cm					142	140	142	146	145	145	148	146	146	147
Copper	1.000	0.001	<0.001	<0.001	0.007	<0.001	0.002	0.002	0.002	0.002	<0.001	<0.001	<0.001	<0.001
Iron	0.30	0.49	<0.01	<0.01	0.01	0.02	0.03	<0.03	<0.03	<0.03	0.08	<0.03	0.12	<0.03
Lead	0.010													
Manganese	0.050	0.030	0.030	0.037	0.039	0.030	0.040	0.030	0.030	0.030	0.070	0.040	0.030	0.040
Molybdenum														
Nickel														
Phosphorus														
Silicon														
Silver														
Strontium		0.152	0.186	0.172	0.192	0.196	0.192	0.226	0.191	0.211	0.183	0.199	0.190	0.173
Sulphur														
Thallium														
Tin														
Titanium														
Vanadium														
Zinc	5.00													
Hardness	80 - 100													
Alkalinity as CaCO3	30 - 500	57	57	84	57	56	58	57	54	57	57	56	58	57
TKN		0.17	0.35	0.12	0.07	0.18	<0.05	0.26	0.15	0.23	<0.10	<0.10	0.21	0.10
Ammonia		0.08	0.05	0.07	0.06	0.18	0.08	0.11	0.08	0.05	0.04	0.04	0.03	0.04
Organic Nitrogen	0.15	0.09	0.30	0.05	0.01	0.00	0.00	0.15	0.07	0.18	<0.06	<0.06	0.18	0.06
Phenols		0.007	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
COD		70	46	<5	<5	<5	<5	<5	<5	<5	<5	<5	5	<5
DOC	5													
Total Phosphorous														
TDS	500	116	100	97	92	91	92	95	94	94	96	95	95	96
Ion Balance		1.08	0.93	0.98	1.03									
Field Measured														
Water Temp. (°C)	15.0	8.8	9.1	8.6	9.2	9.2	9.8	8.5	10.1	11.9	8.8	8.8	8.8	10.1
Conductivity (micro$/cm)		125	140	129	167	117	131	117	112	131	130	110	113	123
pH (pH units)	6.5 - 8.5	8.77	8.55	8.63	7.49	8.09	8.52	7.80	7.68	7.28	8.40	8.40	7.70	7.10

Notes: All values reported in mg/L unless otherwise noted
ODWS = Ontario Drinking Water Standard
Shaded values exceed ODWS

Groundwater Quality Data
Stonecliffe Landfill Site

AECOM

Monitor Number		BH 3-II												
Date Sampled	ODWS	12-Oct-00	16-May-01	29-Aug-02	19-Aug-03	18-Aug-04	21-Sep-05	06-Sep-06	15-Aug-07	05-Sep-08	04-Aug-09	17-Aug-10	07-Jul-11	29-Aug-12
Parameters														
Fluoride	1.50													
Chloride	250	1	5	2	5	3	3	3	3	1	3	2	1	1
Nitrite	1.00	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrate	10.00	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.170	0.510	0.740	0.350
Bromide														
Phosphate														
Sulphate	500	12	9	12	15	11	10	11	10	11	10	10	10	9
Calcium		9	18	12	21	12	11	10	9	7	6	7	7	10
Magnesium		3	7	4	6	7	4	4	3	3	3	3	3	3
Sodium	200	8	10	11	8	8	5	5	6	3	4	2	5	5
Potassium		3	3	2	4	7	2	2	3	2	2	2	1	2
Aluminum	0.100													
Barium	1.00													
Beryllium														
Boron	5.00	0.03	0.04	<0.05	<0.05	0.01	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	0.005													
Chromium	0.050													
Cobalt														
Conductivity us/cm					196	125	114	112	91	88	87	89	98	115
Copper	1.000	0.003	0.003	<0.001	<0.001	<0.001	0.003	0.059	0.018	0.002	<0.001	<0.001	<0.001	<0.001
Iron	0.30	0.81	0.49	<0.01	<0.01	<0.01	<0.03	<0.03	1.46	<0.03	0.12	0.16	0.12	0.21
Lead	0.010													
Manganese	0.050	0.06	0.440	0.009	0.015	<0.01	<0.01	<0.01	0.110	<0.01	0.050	0.020	0.020	0.030
Molybdenum														
Nickel														
Phosphorus														
Silicon														
Silver														
Strontium		0.078	0.148	0.095	0.143	0.090	0.081	0.074	0.078	0.067	0.048	0.054	0.062	0.068
Sulphur														
Thallium														
Tin														
Titanium														
Vanadium														
Zinc	5.00													
Hardness	80 - 100													
Alkalinity as CaCO3	30 - 500	47	86	84	94	52	50	45	33	33	30	32	38	47
TKN		0.17	0.15	<0.05	0.07	0.16	<0.05	<0.05	0.23	<0.10	<0.10	<0.10	0.26	<0.10
Ammonia		0.04	<0.02	<0.02	<0.02	0.02	0.03	<0.02	0.14	<0.02	<0.02	<0.02	0.06	<0.02
Organic Nitrogen	0.15	0.13	<0.15	<0.05	<0.07	0.14	<0.02	<0.05	0.12	<0.1	<0.10	<0.10	0.20	<0.10
Phenols		0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
COD		70	88	<5	<5	<5	<5	<5	<5	<5	<5	5	15	<5
DOC	5													
Total Phosphorous														
TDS	500	52	132	94	127	81	74	73	59	58	57	58	64	75
Ion Balance		0.92	0.97	0.92	0.92									
Field Measured														
Water Temp. (°C)	15.0	10.6	7.1	13.1	14.3	13.3	13.5	12.7	12.5	13.4	12.2	13.0	10.9	13.5
Conductivity (micro5/cm)		100	170	135	184	104	108	91	87	78	84	72	76	98
pH (pH units)	6.5 - 8.5	7.43	7.08	7.50	8.07	7.47	7.95	7.55	7.89	7.40	8.20	8.30	7.40	8.30

Notes: All values reported in mg/L unless otherwise noted
ODWS = Ontario Drinking Water Standard
Shaded values exceed ODWS

Groundwater Quality Data
Stonecliffe Landfill Site

AECOM

Monitor Number		BH 4-I												
Date Sampled	ODWS	12-Oct-00	15-May-01	16-Aug-02	19-Aug-03	18-Aug-04	21-Sep-05	06-Sep-06	15-Aug-07	05-Sep-08	04-Aug-09	17-Aug-10	07-Jul-11	29-Aug-12
Parameters														
Fluoride	1.50													
Chloride	250	37	5	1	2	2	2	2	3	<1	<1	3	<1	<1
Nitrite	1.00	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Nitrate	10.00	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.200	<0.10	<0.10
Bromide														
Phosphate														
Sulphate	500	92	31	18	21	15	17	18	16	18	16	18	16	16
Calcium		14	4	11	17	12	16	15	19	17	13	16	15	17
Magnesium		17	3	10	5	3	4	3	4	3	3	3	3	2
Sodium	200	114	45	31	10	11	7	10	12	9	13	7	7	7
Potassium		12	4	7	4	4	5	4	6	5	4	5	4	4
Aluminum	0.100													
Barium	1.00													
Beryllium														
Boron	5.00	**16.90**	2.92	0.41	0.07	0.08	0.08	0.06	0.05	0.03	0.04	0.09	0.08	0.02
Cadmium	0.005													
Chromium	0.050													
Conductivity us/cm					141	149	143	151	155	151	156	148	151	150
Cobalt														
Copper	1.000	0.005	0.002	<0.001	<0.001	<0.001	<0.001	0.002	0.002	<0.001	<0.001	<0.001	0.001	<0.001
Iron	0.30	**2.78**	**1.05**	0.02	0.01	0.01	<0.03	<0.03	0.03	0.06	0.08	0.12	**0.89**	0.10
Lead	0.010													
Manganese	0.050	**0.090**	0.040	0.008	**0.052**	**0.060**	0.050	0.030	0.030	**0.080**	**0.070**	**0.080**	0.050	0.050
Molybdenum														
Nickel														
Phosphorus														
Silicon														
Silver														
Strontium		0.108	0.070	0.066	0.159	0.166	0.167	0.176	0.178	0.163	0.147	0.191	0.177	0.153
Sulphur														
Thallium														
Tin														
Titanium														
Vanadium														
Zinc	5.00													
Hardness	80 - 100													
Alkalinity as CaCO3	30 - 500	120	83	79	59	56	59	57	58	58	61	57	60	59
TKN		0.61	1.40	0.34	0.14	0.20	0.09	<0.05	0.11	0.25	<0.10	<0.10	0.19	<0.10
Ammonia		0.25	0.17	0.29	0.13	0.08	0.09	0.07	0.04	0.04	0.03	0.03	<0.02	<0.02
Organic Nitrogen	0.15	**0.56**	**1.23**	0.05	0.01	0.12	0.00	<0.05	0.07	**0.21**	<0.07	<0.07	**<0.19**	<0.10
Phenols		0.005	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001
COD		70	<5	6	<5	<5	<5	<5	<5	5	<5	<5	10	<5
DOC	5													
Total Phosphorous														
TDS	500	**2396**	220	111	92	97	93	96	101	98	101	96	98	98
Ion Balance		1.24	1.03	1.47	1.08									
Field Measured														
Water Temp. (°C)	15.0	9.3	8.2	9.0	9.4	9.2	9.2	8.5	8.8	9.2	9.5	8.7	9.8	9.0
Conductivity (microS/cm)		510	210	159	147	117	134	119	110	120	130	111	121	127
pH (pH units)	6.5 - 8.5	**9.14**	**9.78**	**8.98**	7.43	8.10	8.11	7.91	7.39	7.53	8.50	**8.70**	7.40	**8.70**

Notes: All values reported in mg/L unless otherwise noted
ODWS = Ontario Drinking Water Standard
Shaded values exceed ODWS

Groundwater Quality Data
Stonecliffe Landfill Site

AECOM

Monitor Number		BH 4-II												
Date Sampled	ODWS	12-Oct-00	16-May-01	29-Aug-02	19-Aug-03	18-Aug-04	21-Sep-05	06-Sep-06	15-Aug-07	05-Sep-08	04-Aug-09	17-Aug-10	07-Jul-11	29-Aug-12
Parameters														
Fluoride	1.50													
Chloride	250	36	18	57	21	26	29	63	17	19	11	10	6	3
Nitrite	1.00	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.140	<0.10	<0.10
Nitrate	10.00	<0.10	0.590	1.170	0.42	0.42	0.62	0.95	0.13	0.42	0.19	0.55	0.98	0.18
Bromide														
Phosphate														
Sulphate	500	15	11	8	17	11	14	13	26	13	11	12	10	8
Calcium		12	9	19	9	10	15	27	23	22	20	21	22	26
Magnesium		4	4	7	4	4	5	9	7	7	6	6	6	7
Sodium	200	24	13	14	12	10	11	13	10	15	21	26	20	16
Potassium		3	2	2	2	2	2	3	2	3	3	3	2	2
Aluminum	0.100													
Barium	1.00													
Beryllium														
Boron	5.00	0.09	0.02	<0.05	<0.05	0.01	<0.01	0.01	0.01	0.06	0.05	0.05	0.06	0.06
Cadmium	0.005													
Chromium	0.050													
Conductivity us/cm					137	163	193	316	229	252	245	283	270	257
Cobalt														
Copper	1.000	0.002	<0.001	<0.001	0.001	<0.001	0.002	0.001	0.011	0.002	0.001	0.002	0.001	0.003
Iron	0.30	0.16	0.05	0.02	0.01	<0.01	<0.03	<0.03	<0.03	0.09	0.07	0.16	0.07	0.38
Lead	0.010													
Manganese	0.050	0.100	0.040	<0.005	<0.005	<0.01	<0.01	<0.01	<0.01	0.060	0.040	0.030	0.040	0.040
Molybdenum														
Nickel														
Phosphorus														
Silicon														
Silver														
Strontium		0.128	0.106	0.190	0.088	0.115	0.152	0.273	0.219	0.195	0.196	0.222	0.238	0.209
Sulphur														
Thallium														
Tin														
Titanium														
Vanadium														
Zinc	5.00													
Hardness	80 - 100													
Alkalinity as CaCO3	30 - 500	41	38	29	27	28	36	32	58	83	96	116	125	122
TKN		0.22	0.15	0.20	<0.05	0.10	<0.05	0.05	<0.10	0.30	<0.10	<0.10	0.26	<0.10
Ammonia		0.04	<0.02	<0.02	<0.02	0.08	0.04	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Organic Nitrogen	0.15	0.18	<0.15	<0.20	<0.05	0.02	<0.01	0.00	<0.1	<0.3	<0.10	<0.10	<0.26	<0.10
Phenols		0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
COD		62	60	6	<5	<5	<5	<5	<5	10	<5	<5	15	<5
DOC	5													
Total Phosphorous														
TDS	500	172	108	174	89	106	125	205	149	164	159	184	176	167
Ion Balance		0.96	0.91	0.90				0.89	1.01	0.96	1.00	0.95	0.91	0.97
Field Measured														
Water Temp. (°C)	15.0	10.6	7.1	9.1	9.8	9.2	11.5	10.8	10.1	10.8	9.3	10.8	9.4	11.5
Conductivity (microSiem)		190	160	294	250	128	180	266	185	225	211	207	226	216
pH (pH units)	6.5 - 8.5	7.69	6.43	7.91	6.82	7.25	7.66	7.29	7.13	6.63	7.60	6.90	6.90	6.90

Notes: All values reported in mg/L unless otherwise noted
ODWS = Ontario Drinking Water Standard
Shaded values exceed ODWS

AECOM

- VOC Results

Groundwater Quality Data (VOC Results)
Stonecliffe Landfill Site

Monitor Number			BH 2-I				
Date Sampled	UNITS	Limit	04-Aug-09	07-Jul-11	29-Aug-12		
Parameters							
VOLATILE ORGANIC COMPOUNDS							
1,4-Dichlorobenzene	ug/L	5	<0.4	<0.4	<0.4		
Benzene	ug/L	5	<0.5	<0.5	<0.5		
Dichloromethane	ug/L	50	<10	<4.0	<4.0		
Toluene	ug/L	24	<0.5	<0.5	<0.5		
Vinyl Chloride	ug/L	2	<0.2	<0.2	<0.2		
VOC SURROGATES							
1,2-dichlorethane-d4	%		115	94	113		
4-bromofluorobenzene	%		101	82	116		
Toluene-d8	%		105	116	99		

Groundwater Quality Data (VOC Results)
Stonecliffe Landfill Site

Monitor Number			BH 2-II				
Date Sampled	UNITS	Limit	04-Aug-09	17-Aug-10	7-Jul-11	29-Aug-12	
Parameters							
VOLATILE ORGANIC COMPOUNDS							
1,4-Dichlorobenzene	ug/L	5	<0.4	<0.4	<0.4	<0.4	
Benzene	ug/L	5	<0.5	<0.5	<0.5	<0.5	
Dichloromethane	ug/L	50	10	<4.0	<4.0	<4.0	
Toluene	ug/L	24	<0.5	<0.5	<0.5	<0.5	
Vinyl Chloride	ug/L	2	<0.2	<0.2	<0.2	<0.2	
VOC SURROGATES							
1,2-dichlorethane-d4	%		93	97	86	114	
4-bromofluorobenzene	%		96	114	84	116	
Toluene-d8	%		102	102	116	101	

Groundwater Quality Data (VOC Results)
Stonecliffe Landfill Site

Monitor Number			BH4-I				
Date Sampled	UNITS	Limit	07-Jul-11	29-Aug-12			
Parameters							
VOLATILE ORGANIC COMPOUNDS			Not Collected				
1,4-Dichlorobenzene	ug/L	5		<0.4			
Benzene	ug/L	5		<0.5			
Dichloromethane	ug/L	50		<4.0			
Toluene	ug/L	24		<0.5			
Vinyl Chloride	ug/L	2		<0.2			
VOC SURROGATES							
1,2-dichlorethane-d4	%			111			
4-bromofluorobenzene	%			111			
Toluene-d8	%			98			

Groundwater Quality Data (VOC Results)
Stonecliffe Landfill Site

Monitor Number			BH4-II				
Date Sampled	UNITS	Limit	04-Aug-09	17-Aug-10	07-Jul-11	29-Aug-12	
Parameters							
VOLATILE ORGANIC COMPOUNDS							
1,4-Dichlorobenzene	ug/L	5	<0.4	<0.4	<0.4	<0.4	
Benzene	ug/L	5	<0.5	<0.5	<0.5	<0.5	
Dichloromethane	ug/L	50	10	<4.0	<4.0	<4.0	
Toluene	ug/L	24	<0.5	<0.5	<0.5	<0.5	
Vinyl Chloride	ug/L	2	<0.2	<0.2	<0.2	<0.2	
VOC SURROGATES							
1,2-dichlorethane-d4	%		96	94	97	116	
4-bromofluorobenzene	%		98	114	82	113	
Toluene-d8	%		106	101	116	98	

Groundwater Quality Data (VOC Results)
Stonecliffe Landfill Site

Monitor Number			Trip Blanks				
Date Sampled	UNITS	Limit	29-Aug-12				
Parameters							
VOLATILE ORGANIC COMPOUNDS							
1,4-Dichlorobenzene	ug/L	5	<0.4				
Benzene	ug/L	5	<0.5				
Dichloromethane	ug/L	50	<4.0				
Toluene	ug/L	24	<0.5				
Vinyl Chloride	ug/L	2	<0.2				
VOC SURROGATES							
1,2-dichlorethane-d4	%		111				
4-bromofluorobenzene	%		112				
Toluene-d8	%		99				

Groundwater Quality Data (VOC Results)
Stonecliffe Landfill Site

AECOM

Monitor Number		BH 1-I	BH1-II	BH 2-I	BH 2-II	BH 3-I	BH 3-II	BH 4-I	BH 4-II
Date Sampled	Units	05-Sep-08	05-Sep-08	05-Sep-08	05-Sep-08	05-Sep-08	05-Sep-08	05-Sep-08	05-Sep-08
PARAMETERS									
VOLATILE ORGANIC COUMPOUNDS									
1, 1, 1, 2-tetrachloroethane	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,1,1-trichloroethane	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1, 1, 2, 2-tetrachloroethane	ug/L	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
1,1,2-trichloroethane	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1, 1-dichloroethane	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1, 1-dichloroethylene	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1, 2-dibromoethane	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1, 2-dichlorobenzene	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1, 2-dichloroethane	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1, 2-dichloroepropane	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1, 3, 5-trimethylbenzene	ug/L								
1,3-dichlorobenzene	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1,4-dichlorobenzene	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1,2,4-Trichlorobenzene	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Benzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromodichloromethane	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bromoform	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bromomethane	ug/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
c-1, 2-Dichloroethylene	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.8
c-1,3-Dichloropropylene	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Carbon Tetrachloride	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Chloroethane	ug/L								
Chloroform	ug/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chloromethane	ug/L								
Dibromochloromethane	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Dichloromethane	ug/L	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Ethylbenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
m/p-xylene	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Monochlorobenzene	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Naphthalene	ug/L	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7	<0.7
o-xylene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	ug/L	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
T-1, 2-Dichloroethylene	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
t-1,3-Dichloropropylene	ug/L	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Tetrachloroethylene	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethylene	ug/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Trichlorofluoromethane	ug/L								
Vinyl Chloride	ug/L	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
VOC SURROGATES									
1, 2-dichloroethane-d4	%	103	107	105	103	102	102	102	101
Bromofluorobenzene	%	96	99	98	94	100	98	97	105
Toluene-d8	%	100	93	95	93	95	98	97	95

AECOM

Appendix D

Surface Water Quality Results

Surface Water Quality Data
Stonecliffe Landfill Site

AECOM

Monitor Number		SEEP 1											
Date Sampled	PWQO	16-May-01	29-Aug-02	19-Aug-03	18-Aug-04	21-Sep-05	06-Sep-06	15-Aug-07	05-Sep-08	04-Aug-09	17-Aug-10	07-Jul-11	29-Aug-12
Parameters										Not Active		Not Active	Not Active
Fluoride													
Chloride		44	42	48	30	33	14	19	44		43		
Nitrite		<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10		<0.10		
Nitrate		<0.10	<0.10	<0.10	<0.10	0.10	<0.10	<0.10	0.25		<0.10		
Sulphate		32	3	14	4	17	14	12	17		4		
Calcium		89	100	122	92	77	60	66	76		87		
Magnesium		25	29	31	22	18	14	16	18		18		
Sodium		30	26	38	31	31	27	28	31		35		
Potassium		5	6	9	5	9	5	7	9		11		
Aluminum	0.075												
Barium													
Boron	0.20	0.14	0.12	0.19	0.19	0.15	0.18	**0.24**	**0.20**		**0.47**		
Cadmium	0.0001												
Chromium													
Cobalt	0.0009												
Conductivity us/cm				867	767	657	525	523	669		751		
Copper	0.005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001		**0.028**		
Iron	0.30	**23.20**	**8.52**	**29.00**	**6.89**	**86.20**	**35.50**	**69.80**	**4.22**		**137.00**		
Lead	0.005												
Manganese		9.23	7.20	8.71	6.89	9.52	9.03	5.68	5.46		35.30		
Nickel	0.250												
Silicon													
Silver	0.0001												
Strontium		0.746	0.788	0.784	0.738	0.757	0.529	0.675	0.787		2.450		
Zinc	0.03												
Hardness													
Alkalinity as CaCo3		335	396	429	391	315	248	238	284		334		
TKN		1.10	0.84	1.32	0.89	0.69	0.83	0.89	0.81		0.65		
Ammonia	f(pH, Temp)	0.53	0.31	0.57	0.41	0.33	0.13	0.23	0.18		0.31		
Organic Nitrogen		0.57	0.53	0.75	0.48	0.36	0.70	0.66	0.63		0.34		
Phenols	0.001	**0.026**	<0.001	<0.001	<0.001	**0.003**	<0.001	**0.003**	<0.001		0.001		
Ion Balance		0.92	0.95	1.03	0.90	0.91	0.97	1.09	0.94		0.96		
COD		49	32	39	25	34	26	32	25		40		
DOC													
Total Phosphorous	0.03												
TDS		460	525	564	499	427	341	340	435		488		
Field Measured													
Water Temp. (°C)		12.8	17.1	22.0	22.3	18.0	14.1	17.6	18.0		18.1		
Conductivity (microS/cm)		951	1277	1110	698	652	458	508	649		500		
pH (pH units)	6.5 - 8.5	7.34	7.56	6.80	7.09	7.32	7.28	6.79	6.85		7.20		
Disolved Oxygen (DO)	f(Temp)	5.87	2.89	2.87		5.02	5.96	2.30	6.66		not measured		
Flow (liters/sec)		0.023	0.009	0.008	0.010	0.010	0.030	0.030	0.030		0.100		

Notes: All values reported in mg/L unless otherwise noted
PWQO = Provincial Water Quality Objectives
Shaded values exceed PWQO

AECOM

Appendix E

C of A

Ontario

Ministry of the Environment | Ministère de l'Environnement

AMENDED PROVISIONAL CERTIFICATE OF APPROVAL
WASTE DISPOSAL SITE
NUMBER A412405
Issue Date: April 28, 2008

The Corporation of the Township of Head, Clara and Maria
15 Township Hall Road
Stonecliffe, Ontario
K0J 2L0

Site Location: 67 Kenny Road
Head, Clara and Maria Township, County of Renfrew

You have applied in accordance with Section 27 of the Environmental Protection Act for approval of:

0.9-hectare landfilling site and a transfer station within a 2.43-hectares total site area.

For the purpose of this Certificate of Approval and the terms and conditions specified below, the following definitions apply:

a. "Owner" means any person that is responsible for the establishment or operation of the site being approved by this *Certificate* , and includes the The Corporation of the Township of Head, Clara & Maria, its successors and assigns;

b. "Ministry" means the Ministry of the Environment;

c. "Director" means the one or more persons who from time to time are so designated for the purpose of Section 37 of the *Environmental Protection Act* ;

d. "Regional Director" means the Director, Eastern Region, Ministry of the Environment;

e. "Certificate" means this Provisional Certificate of Approval No. A412405, as amended from time to time, including all schedules attached to and forming part of this Certificate;

f. "Site" means Stonecliffe Waste Disposal Site with its associated buildings and storage facilities located on Lot 21 and 22, Concession XI, Geographic Township of Head, Renfrew County;

g. "*EPA* " mean the *Environmental Protection Act* , R.S.O. 1990, C. E-19 as amended;

h. "*O.Reg. 558* " means Ontario Regulation 558/00 issued to amend O.Reg. 347;

i. "*O.Reg. 347* " means Ontario Regulation 347 (General-Waste Management Regulation), R.R.O. 1990, as amended;

j. "summer season" means the time period between May 15 to September 15;

k. "winter season" means the time period between September 16 to May 14;

l. "District Manager" means the District Manager, Ottawa District Office, Eastern Region;

m. "white goods which contain refrigerants" means white goods which contain, or may contain refrigerants, and which include, but are not restricted to refrigerators, freezers and air-conditioning systems;

n. "*O. Reg. 903* " means Regulation 903, R.R.O. 1990, made under the *OWRA* , as amended from time to time;

o. "*OWRA* " means the *Ontario Water Resources Act* , R.S.O. 1990, c. O.40, as amended;

p. "*PA* " means the *Pesticides Act* , R.S.O. 1990, c. P-11, as amended from time to time;

q. "*NMA* " means *Nutrient Management Act* , 2002, S.O. 2002, c. 4, as amended from time to time;

r. "*SDWA* " means *Safe Drinking Water Act* , 2002, S.O. 2002, c. 32, as amended from time to time;

s. "*O. Reg. 189* " means Ontario Regulation 189/94, amended to Ontario Regulation 238/01, entitled "Refrigerants";

You are hereby notified that this approval is issued to you subject to the terms and conditions outlined below:

TERMS AND CONDITIONS

GENERAL

1. (a) The Owner shall ensure compliance with all the conditions of this Certificate and shall ensure that any person authorized to carry out work on or operate any aspect of the Site is notified of this Certificate and the conditions herein and shall take all reasonable measures to ensure any such person complies with the same.

   (b) Any person authorized to carry out work on or operate any aspect of the Site shall comply with the conditions of this Certificate.

2. (a) Except as otherwise provided by this Certificate, the Site shall be designed, developed, built, operated and maintained in accordance with the documentation listed in the attached Schedule "A" and in a way that ensures the health and safety of all persons and prevents adverse effects on the natural environment or on any persons.

(b) Where there is a conflict between a provision of any document, including the application referred to in this Certificate and the conditions of this Certificate, the conditions in this Certificate shall take precedence.

(c) Where there is a conflict between the application and a provision in any documents listed in Schedule "A", the application shall take precedence, unless it is clear that the purpose of the document was to amend the application and that the Ministry approved the amendment.

(d) Where there is a conflict between any two documents listed in Schedule "A", other than the application, the document bearing the most recent date shall take precedence.

3. The issuance of, and compliance with the conditions of this Certificate does not:

(a) relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement; or

(b) limit in any way the authority of the Ministry to require certain steps be taken or to require the Owner to furnish any further information related to compliance with this Certificate.

4. The requirements of this Certificate are severable. If any requirement of this Certificate, or the application of any requirement of this Certificate to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this Certificate shall not be affected thereby.

5. The Owner shall ensure that all communications/correspondence made pursuant to this Certificate includes reference to this Certificate number.

NOTIFICATION OF CHANGES

6. The Owner shall notify the Director in writing, and forward a copy of the notification to the District Manager, within thirty (30) days of the occurrence of any changes:

(a) the ownership of the Site;
(b) the operator of the Site;
(c) the address of the Owner;
(d) the partners, where the Owner is or at any time becomes a partnership and a copy of the most recent declaration filed under the *Business Names Act*, R.S.O. 1990, c. B.17, as amended, shall be included in the notification;
(e) the name of the corporation where the Owner is or at any time becomes a corporation, other than a municipal corporation, and a copy of the most current information filed under the *Corporations Information Act* , R.S.O. 1990, c. C.39, as amended, shall be included in the notification.

7. No portion of this Site shall be transferred or encumbered prior to or after closing of the Site

unless the Director is notified in advance. In the event of any change in ownership of the Site, other than change to a successor municipality, the Owner shall notify the successor of and provide the successor with a copy of this Certificate, and the Owner shall provide a copy of the notification to the District Manager and the Director.

INSPECTIONS

8. No person shall hinder or obstruct a Provincial Officer from carrying out any and all inspections authorized by the *OWRA* , the *Act* , the *PA* , the *SDWA* or the *NMA* of any place to which this Certificate relates, and without limiting the foregoing:

(a) to enter upon the premises where the approved processing is undertaken, or the location where the records required by the conditions of this Certificate are kept;
(b) to have access to, inspect, and copy any records required to be kept by the conditions of this Certificate;
(c) to inspect the Site, related equipment and appurtenances;
(d) to inspect the practices, procedures, or operations required by the conditions of this Certificate; and
(e) to sample and monitor for the purposes of assessing compliance with the terms and conditions of this Certificate or the *Act* , the *OWRA* , the *PA* , the *SDWA* or the *NMA*.

INFORMATION and RECORD RETENTION

9. (a) Any information requested by the Ministry, concerning the operation of the Site and its operation under this Certificate, including but not limited to any records required to be kept by this Certificate shall be provided to the Ministry, immediately upon request. Records shall be retained for two (2) years except as otherwise authorized in writing by the Director.

(b) The receipt of any information by the Ministry or the failure of the Ministry to prosecute any person or to require any person to take any action, under this Certificate or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as:

(i) an approval, waiver, or justification by the Ministry of any act or omission of any person that contravenes any term or condition of this Certificate or any statute, regulation or other legal requirement; or

(b) acceptance by the Ministry of the information's completeness or accuracy.

10. The Owner shall ensure that a copy of this Certificate, in its entirety and including all its Notices of Amendment, and documentation listed in Schedule "A", are retained at the Owner's office at all times and at the Site during the operating hours approved in this Certificate.

CERTIFICATE OF REQUIREMENT

11. Pursuant to Section 197 of the *Act* , neither the Owner nor any person having an interest in the property that the Site is on, shall deal with the property in any way without first giving a copy of this Certificate to each person acquiring an interest in the property as a result of the dealing.

12. The Owner shall:

(a) within sixty (60) days of the date of the acquisition of the land for the Site and the Contaminant Attenuation Zone, submit to the Director for the Director's signature two (2) copies of a completed Certificate of Requirement containing a registerable description of the property that the Site is on, in accordance with Form 4 of Regulation 688 under *Land Registration Reform Act* , R.R.O. 1990 c. L.4, as amended.

(b) Section (8) of Form 4, above, shall be completed in accordance with the wording in Schedule "B" of this Certificate.

(c) Within ten (10) calendar days of receiving the Certificate of Requirement signed by the Director, the Owner shall register the Certificate of Requirement in the appropriate Land Registry Office on title to the Site and submit to the Director immediately following registration the duplicate registered copy.

(d) Within ten (10) calendar days of receiving the Certificate of Requirement signed by the Director, the Owner shall submit a copy of the Certificate of Requirement to the District Manager. A photocopy is acceptable.

CONTAMINANT ATTENUATION ZONE

13. (a) Within twenty four (24) months from the date of this Certificate, the Owner shall purchase land necessary to establish the Contaminant Attenuation Zone in accordance with Item #1 of Schedule "A". Upon acquisition of the land for the Contaminant Attenuation Zone, the Owner shall amend this Certificate to include the additional land in the total Site area.

(b) The Owner shall obtain from Canadian Pacific Railway and/or Ottawa Valley Railway a written agreement for the use of their property as the Contaminant Attenuation Zone.

(i) The Owner shall establish and maintain a record of negotiations with Canadian Pacific Railway and/or Ottawa Valley Railway required by Condition 13(b), above. This record shall be in the form of a log or a dedicated electronic file and shall include as a minimum:

- details on correspondence between the negotiating parties; and/or
- date and time of the meeting;
- persons attending the meeting; and
- conclusions reached and decisions made at the meeting.

(ii) The record required by Condition 13(b)(i) shall be made available to the District Manager upon a request.

(c) The Owner must continue to own the property rights to the Contaminant Attenuation Zone for duration of the contaminating life span of the Site.

(d) The Owner shall notify the Director in writing within thirty (30) days after any change in the ownership of the property rights in the Contaminant Attenuation Zone.

SERVICE AREA

14. The approved service area for the Site is the Township of Head, Clara & Maria.

WASTE TYPES

15. (a) Only solid non-hazardous waste shall be accepted at the Site for landfilling.

(b) Only clean woodwaste, scrap metal and tires shall be accepted at the Site for bulking and subsequent transfer off-site for further processing. Re-use items shall accepted and stored in a designated area until removal to the landfilling area. Re-use items should be landfilled after ninety (90) days if not removed from Site.

(c) No liquid industrial wastes or hazardous wastes as defined under *O.Reg. 347* and *O.Reg. 558* shall be accepted at the Site.

SITE CAPACITY

16. The total waste disposal volume of the Site, including the waste, daily cover and intermediate cover, but excluding final cover, is 26,680 cubic metres. This capacity includes 13,654 cubic metres of the existing waste and 13,026 cubic metres of the waste proposed to be landfilled at the Site.

WASTE PLACEMENT

17. No additional waste shall be placed below existing ground within the fill area to maintain a vertical separation between the groundwater table and the waste.

18. (a) Disposal of waste shall only occur within the areas as delineated on Drawing No. 2 of 3, entitled "Operations Plan" dated September 22, 2003, Item 1(c) of Schedule "A".

(b) No waste shall be placed above the final contours shown on Drawing No. 3 of 3, entitled "Final Contours and Section, Item 1(d) of Schedule "A".

DAILY AND INTERIM COVER

19. (a) Daily and interim cover material shall consist of a permeable material and it shall be applied in accordance with Item 1(a) of Schedule "A".

(b) The Owner shall keep records of the cover application activities in accordance with Condition 51.

(c) Daily cover and interim cover shall be applied as follows:

(i) At least once weekly during the summer season, at end of the working day, the entire working face shall be covered with a minimum thickness of 150 mm of daily cover.

(ii) At least once monthly during the winter season, at end of the working day, the entire working face shall be covered with a minimum thickness of 150 mm of daily cover.

(iii) In areas where landfilling has been temporarily discontinued for twelve (12) months or more, a minimum thickness of 300 mm of interim cover shall be placed.

(d) The frequency of application and the cover thickness in subsections (i), (ii) and (iii) are minimum requirements, and may have to be increased if environmental adverse effects have been found to occur as per written instructions of the District Manager.

OPERATIONAL ISSUES

20. (a) The normal operating hours of the Site shall be as follows:

Summer Season:		Winter Season:	
daily:	7:30 p.m. - 8:30 p.m.	daily:	3:00 p.m. - 4:00 p.m

(b) The Owner may provide alternative hours of operation providing that they are correctly posted at the Site gate, that suitable public notice is given of any change and that there are no objections or complaints from the public regarding the hours of operation.

21. The Owner shall ensure that all loads of waste are properly inspected by trained Site personnel prior to acceptance at the Site and that the vehicles are directed to the appropriate areas for disposal or transfer of the waste. The Owner shall notify the District Manager, in writing, of load rejections at the Site within three (3) days from their occurrence.

22. Waste shall be deposited in a manner that minimizes the exposure area at the landfill working face and shall be compacted before cover material is applied in accordance with the procedure listed in Item 1(a) of Schedule "A".

23. (a) The Owner shall ensure that no burning of waste is taking place at the Site.

(b) The Owner shall ensure that burning of clean wood waste approved to take place at the Site, is done in accordance with the Ministry's Guideline C-7, entitled "Burning at Landfill Sites", dated April 1994, and updated from time to time.

(c) The Owner shall ensure that burning of clean wood waste is done only when absolutely necessary and when the wood waste cannot be chipped to create a re-usable wood product.

24. The Owner shall ensure that no scavenging is taking place at the Site. Re-use items may be removed from the Site under strict supervision of the Site attendant.

25. The Owner shall ensure that all buildings or structures at the Site are free of any possible landfill gas accumulation. If necessary, the Owner shall provide adequate ventilation systems to relieve landfill gas accumulations in the buildings or structures at the Site.

26. The access road and on-site roads shall be provided and maintained so that vehicles hauling waste to and from the Site may travel readily and safely on any operating day.

SIGNS

27. The Owner shall maintain a sign at the main entrance/exit to the Site on which the following information is legibly displayed:

(a) name of the Site and Owner;
(b) this Certificate number;
(c) normal hours of operation;
(d) allowable and prohibited waste types;
(e) telephone number to which complaints may be directed;
(f) twenty-four hour emergency telephone number (if different from above);
(g) a warning against unauthorized access; and
(h) a warning against dumping outside the Site.

28. The Owner shall install and maintain signs at the Site to direct vehicles to the working face and the disposal/storage areas designated for wastes requiring special handling procedures.

SITE SECURITY

29. The Owner shall maintain the entrance/exit gate to provide control of the Site access.

30. During non-operating hours, the Owner shall ensure that the Site entrance/exit gate is locked and the Site is secured against access by unauthorized persons.

31. No waste shall be received at the Site except during the operating hours when the Site is under the supervision of trained Site personnel.

SURFACE WATER MANAGEMENT

32. (a) Temporary berms and ditches shall be constructed around the active waste disposal area, as necessary, to prevent extraneous surface water from contacting the active working face.

(b) The Owner shall ensure that any discharge of surface water to the natural environment is undertaken in accordance with the Ministry's requirements.

BIRD, ANIMAL, VECTOR AND VERMIN CONTROL

33. Scavenging birds and animals shall be adequately controlled at the Site to prevent any environmental adverse effects.

34. Vector and vermin shall be adequately controlled at the Site using a licensed exterminator to prevent any environmental adverse effects.

LITTER CONTROL

35. The Owner shall take all practical steps to prevent the escape of litter from the Site. At minimum, monthly pick-up of litter at the Site and along the access road in the vicinity of the Site shall be carried out. Litter fencing shall be erected around the working area of the landfill as required.

DUST CONTROL

36. The Owner shall control fugitive dust emissions from the on-site sources including, but not be limited to the on-site roads, stockpiled cover material and closed landfill areas. If necessary, the major sources of dust shall be treated with water and/or dust suppression materials to minimize the overall dust emissions from the Site.

37. The Owner shall ensure that reasonable efforts are made to keep the access road used by vehicles to leave the Site, free of waste or excess mud or dirt.

NOISE

38. Noise from or related to the operation of the Site shall be kept to a minimum and in any event, the Owner shall comply with the criteria set out in the Ministry's guideline entitled "Noise Guidelines for Landfill Sites".

TRAFFIC CONTROL

39. The Owner shall post visible signs along the traffic route providing clear directions to the Site.

VISUAL SCREENING

40. The Owner shall maintain adequate screening of the waste disposal activities undertaken at the Site from the traffic on Kenny Road and the surrounding properties.

ENVIRONMENTAL MONITORING

41. (a) Groundwater monitoring shall be undertaken in accordance with the monitoring program included in Item #1 of Schedule "A".

(b) In addition to the groundwater monitioring parameters included in Item #1 of Schedule "A", all existing monitors will be analyzed on a one-time basis for the for the following volatile organic compounds in 2008:

(i) benzene
(ii) 1,4 dichlorobenzene
(iii) dichloromethane
(iv) toluene
(v) vinyl chloride

(c) Subsequent monitoring for the volatile organic compounds listed in Condition 41(b), above, shall be continued as per the groundwater sampling schedule approved in this Certificate in the background groundwater monitoring well BH2 and in the monitoring well that shows the highest concentrations of the volatile organic compounds during the 2008 sampling event(s).

(d) No changes to the groundwater monitoring program shall be implemented prior to receiving a written approval from the District Manager.

(e) A certified Professional Geoscientist or Engineer possessing appropriate hydrogeologic training and experience will execute or directly supervise the execution of the groundwater monitoring and reporting program.

(f) The monitoring results and the analysis of the results shall be submitted to the District Manager, by May 31, 2009. Subsequent monitoring results shall be included in the Annual Report, as per Condition 54.

GROUNDWATER WELLS/MONITORS

42. The Owner shall ensure that all groundwater monitoring wells which form part of the monitoring program are properly capped, locked and protected from damage.

43. Where landfilling is to proceed around monitoring wells, suitable extensions shall be added to the wells, and the wells shall be properly re-secured.

44. Any groundwater monitoring wells included in the on-going monitoring program that are damaged shall be assessed, repaired, replaced or decommissioned by the Owner, as required.

(a) The Owner shall repair or replace any monitoring well which is destroyed or in any way made to be inoperable for sampling such that no more than one regular sampling event is missed.

(b) All monitoring wells which are no longer required as part of the groundwater monitoring program, and have been approved by the Director for abandonment, shall be decommissioned by the Owner, as required, in accordance with *O. Reg. 903* , that will prevent contamination through the abandoned well. A report on the decommissioning of the well shall be included in the annual monitoring report for the period during which the well was decommissioned.

45. (a) The Owner shall install and maintain additional monitoring well nests to complete the groundwater monitoring network which fully delineates the horizontal and vertical extend of leachate migration resulting from the landfilling activities at the Site. The design of the additional wells and their locations shall be as shown on Item #1 of Schedule "A".

(b) The additional monitoring well nests shall be installed within one (1) year of the first exceedance of the following trigger:

(i) concentrations of four (4) of the parameters tested for in the groundwater monitoring wells BH1-I and BH1-II in any one sampling/testing event exceed 75% of the concentration values for the said parameters listed in the Ministry's Guideline B-7 entitled "Incorporation of the Reasonable Use Concept into MOE Groundwater Management Activities", dated April 1994, as amended.

INSPECTIONS

46. (a) The Owner shall ensure that monthly Site inspections are undertaken by trained Site personnel.

(b) The areas to be inspected shall include, but not be limited to the following:

(i) condition of the active disposal areas, the tire pile, the scrap metal pile and the re-use area and the woodwaste pile;

(ii) condition of the surface water drainage works, presence of flow in the swale constructed to collect and direct the run-off around the waste landfilling area, visual inspection of the water for signs of contamination, and an indication whether or not the flow is discharged on or off-site;

(iii) presence of any ponded water at the Site;

(iv) condition of the on-site roads for evidence of excessive erosion and fugitive dust emissions;

(v) presence of litter at the Site's perimeter and litter fences;

(vi) condition of the interim cover and of the final cover;

(vii) presence of birds, vector, vermin and animals;

(viii) condition of the on-site facilities, the gate and its lock and the signs required by this Certificate;

(ix) condition of the groundwater monitoring wells required for the groundwater monitoring program approved by this Certificate;

(x) amount of the cover material to ensure that sufficient daily cover is available at all times that the Site is in operation; and

(xi) presence of leachate springs.

(c) Records of inspections shall be created in accordance with Condition 50.

TRAINING

47. All operators of the Site shall be trained in the following areas:

(a) terms, conditions and operating requirements of this Certificate;

(b) operation and management of the landfill and the other waste storage areas as described in the documents in Schedule "A" attached to this Certificate unless otherwise required by the conditions of this Certificate;

(c) outline of the responsibilities of the operators of the Site;

(d) any environmental concerns pertaining to wastes being handled at the Site;

(e) proper inspection, receiving and recording procedures and the activities to be undertaken during and after a load rejection;

(f) occupational health and safety concerns pertaining to the wastes to be handled at the Site;

(g) relevant environmental legislation and regulations, including but not limited to the *Act* and O. Reg. 347; and

(j) operation of equipment and procedures to be followed in the event of an emergency situation.

RECORDS KEEPING

48. (a) The Owner shall retain all documentation listed in Schedule "A" for as long as this Certificate is valid.

(b) The Owner shall retain at the Site or at the municipal office, all records required by this Certificate, for a minimum of two (2) years from the date of their creation.

(c) The Owner shall retain the employee training records for as long as the employee is working at the Site.

(d) The Owner shall make all of the above documents and records available for inspection upon request by the staff of the Ministry.

COMPLAINTS

49. The Owner shall establish and maintain a written record of the complaints regarding the operation of the Site. This record shall be in the form of a log or a dedicated electronic file and it shall include, as a minimum, the following information:

(a) name, address and the telephone number of the complainant;
(b) time and date of the complaint;
(c) waste management activities undertaken and the types and amounts of waste stored at the time of the complaint;
(d) general meteorological conditions including, but not limited to the ambient temperature, approximate wind speed and direction and sunny versus cloudy, inversion versus clear and windy, etc. at the time of the complaint;
(e) details of the complaint;
(f) actions taken to remediate the cause of the complaint; and
(g) proposed actions to be taken to prevent reoccurrence in the future.

INSPECTIONS

50. The Owner shall establish and maintain a written record of the Site inspections as required by Condition 46. This record shall be in the form of a log or a dedicated electronic file and it shall include, as a minimum, the following information:

(a) date and time of inspection;
(b) name, title and signature of trained personnel conducting the inspection;
(c) a listing of all the areas inspected and any deficiencies observed; and
(d) recommendations for remedial action and the completion date of such action.

COVER APPLICATION

51. The Owner shall establish and maintain a written record of the cover application activities as required by Condition 19. This record shall be in the form of a log or a dedicated electronic file and it shall include, as a minimum, the following information:

(a) date and time of cover application; and
(b) type of cover and thickness applied.

WHITE GOODS

52. The Owner shall establish and maintain a written record of the white goods handling activities as required by Condition 59. This record shall be in the form of a log or a dedicated electronic file and it shall include, as a minimum, the following information:

(a) date of the record;
(b) types, quantities and source of white goods which contain refrigerants received;
(c) details on removal of refrigerants as required by *O. Reg. 189* ; and
(d) the quantities and destination of the white goods and/or refrigerants transferred.

LITTER CONTROL ACTIVITIES

53. The Owner shall establish and maintain a written record of the litter control activities as required by Condition 35. This record shall be in the form of a log or a dedicated electronic file and it shall include, as a minimum, the following information:

(a) date and time of litter pick-up; and
(b) name, title and signature of trained personnel conducting the litter pick-up.

ANNUAL REPORT

54. The Owner shall prepare and submit an Annual Report to the District Manager by May 31, 2010. The subsequent Annual Reports shall be submitted on a biennial basis by May 31 and they shall cover the previous two (2) calendar years. The Annual Report shall include at a minimum, the following:

(a) calculations of the volume of waste landfilled, the daily and interim covers, the final cover and the overall volume of the Site capacity used during the reporting period;

(b) a comparison of the actual capacity used to the estimates of the capacity estimated;

(c) an estimate of the remaining Site life;

(d) amount of the scrap metal, tires, woodwaste transferred off-site for further processing;

(e) summary of activities related to handling of white goods;

(f) any changes in operations, equipment, or procedures used at the Site, any operating problems encountered and corrective actions taken;

(g) indication whether there has been flow observed in the swale and the destination of this flow;

(h) details on the monitoring program undertaken, outlining monitor locations, analytical parameters sampled, and frequency of sampling;

(i) an analysis and interpretation of the groundwater monitoring data, a review of the adequacy of the monitoring program, conclusions of the monitoring data, and recommendations for any changes that may be necessary;

(j) summary of inspections undertaken at the Site, including the results of the surface water drainage works;

(k) summary of any public complaints received and the responses made;

(l) a discussion of cover stockpile activities including use, timing, locations and erosion protection;

(m) status update on the final cover placement, and seeding activities undertaken in the closed sections of the landfill;

(n) a statement as to compliance with all conditions of this Certificate and the other relevant Ministry's groundwater and surface water requirements;

(o) recommendations respecting any proposed changes in the operation of the Site;

(p) any other information that the Regional Director or the District Manager may require.

55. The frequency or timing of the submission of the Annual Report from Condition 54 may changed with the written approval from the District Manager.

EMERGENCY SITUATIONS

56. Any spills, fires or other emergency situations shall be forthwith reported directly to the Ministry's Spills Action Centre (1-800-268-6060) and shall be cleaned up immediately.

In addition, the Owner shall submit, to the District Manager a written report within three (3) days of any spill or incident, outlining the nature of the incident, remedial measures taken and the measures taken to prevent future occurrences at the Site.

57. The Owner shall ensure that adequate fire fighting and contingency spill clean-up equipment is

available and that the emergency response personnel are familiar with the use of such equipment and its location(s).

LANDFILL CLOSURE

58. At least two (2) years prior to the anticipated date of closure of the landfill at this Site or the date when 90 per cent of the total waste disposal volume is reached, whichever occurs first, the Owner shall submit to the Director for approval, with a copy to the District Manager, a detailed Site Closure Plan pertaining to the termination of the landfilling operations at the Site, post-closure inspection, maintenance and monitoring and the end use. The plan shall include, but not be limited to the following:

(a) plan showing Site appearance after closure;

(b) description of the proposed end use for the Site;

(c) descriptions of the procedures for closure of the Site, including but not be limited to, the following:

(i) advance notification of the public of the Site closure;
(ii) posting a sign at the Site entrance indicating the landfill is closed and identifying any alternative waste disposal arrangements;
(iii) completion, inspection and maintenance of the final cover and landscaping;
(iv) Site security after landfill closure;
(v) removal of unnecessary landfill-related structures, buildings and facilities; and
(vi) final construction of any necessary control, treatment, disposal and monitoring facilities for ground and surface water and for landfill gas.

(d) description of the procedures for post-closure care of the Site, including:
(i) operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas, if applicable;
(ii) record keeping and reporting; and
(iii) complaint contact and response procedures.

(e) an assessment of the adequacy of and need to implement the contingency plans; and

(f) an estimate of the contaminating life span of the Site, based on the results of the monitoring programs to-date.

WHITE GOODS HANDLING

59. With respect to accepting white goods containing refrigerants, the Owner shall ensure that:

(a) all white goods which contain refrigerants which have not been tagged by a licensed

technician to verify that the equipment no longer contains refrigerants, are stored in a separate area in an upright position; and

(b) white goods which contain refrigerants received on-site shall be shipped off-site in order to have the refrigerants removed by a licensed technician in accordance with *O. Reg. 189* ; or

(c) the refrigerant is removed on-site from white goods by a licensed technician, in accordance with *O. Reg. 189* , prior to shipping white goods off-site; and

(d) records of white goods handling shall be created in accordance with Condition 52.

COMPLAINT RESPONSE PROCEDURE

60. If at any time, the Owner receives complaints regarding the operation of the Site, the Owner shall respond to these complaints according to the following procedure:

(a) The Owner shall record each complaint in a log book or through a computerized tracking system as described in Condition 49.

(b) The Owner upon receipt of the complaint shall initiate appropriate steps to determine all possible causes of the complaint and proceed to take the necessary actions to eliminate the cause of the complaint and forward a formal reply to the complainant.

(c) The Owner shall submit, within seven (7) days of the occurrence, a written report to the District Manager identifying the source(s) of the complaint and details of what action was taken to rectify the problem and prevent a recurrence.

SCHEDULE "A"

1. Application for a Certificate of Approval for a Waste Disposal Site, signed by Diane Beauchamp, Clerk Treasurer, The Corporation of the Township of Head, Clara & Maria, and dated December 4, 2002, and the supporting documentation prepared by Jp2g Consultants Inc. consisting of the following documents:

(a) Report entitled "Stonecliffe Waste Disposal Site, Site Development and Operations Plan", dated September 2003, including the groundwater monitoring program.

(b) Drawing No. 1 of 3, entitled "Site Plan" dated December 16, 2003

(c) Drawing No. 2 of 3, entitled "Operations Plan" dated September 22, 2003

(d) Drawing No. 3 of 3, entitled "Final Contours and Section" dated September 4, 2003

2. Letter dated May 13, 2004 from Lauree J. Armstrong and Mark A. Bruce, Jp2g Consultants Inc.

to Margaret Wojcik, Ministry of Environment, providing the following additional information:

-clarification on the amount of the existing waste at the site
-proposed use of the chipped clean wood
-location of the closest sensitive receptors
-clarification of the zoning of the site
-description of the road leading to the site
-estimated life of each of the landfilling stages
-clarification on fire handling procedures at the site
-confirmation that the owner will accept the recommendations in the report

3. Letter dated March 17, 2008 from Kevin Mooder, Jp2g Consultants Inc. to Margaret Wojcik, Ministry of Environment, providing the following additional clarification on the waste types received at the site, the operating hours and the proposed schedule for the purchase of the Contaminant Attenuation Zone, as well as other comments on the proposed draft Certificate of Approval.

4. Letter dated April 17, 2008 from Patty Wong, Gartner Lee Limited, to Marc-Ettienne LeSiieur, Ministry of Environment, providing the additional clarification on the monitoring for the volatile organic compounds and the schedule and the trigger for the installation of the additional monitoring wells.

Schedule "B"

This Schedule "B" forms part of this Provisional Certificate of Approval for a Waste Disposal Site

CERTIFICATE OF REQUIREMENT

s. 197(2)
Environmental Protection Act

This is to certify that pursuant to a(n) [INSERT ORDER OR DECISION TYPE] [INSERT ORDER OR DECISION NUMBER OR IDENTIFIER] issued by [INSERT NAME OF ISSUING PERSON, POSITION] dated [INSERT DATE] with respect to [INSERT DESCRIPTION, SUCH AS CONTAMINATION, WASTE DISPOSAL SITE, ETC.] on the [INSERT REGISTERABLE DESCRIPTION OF THE PROPERTY]. The following person(s):

[INSERT PERSON(S) NAMED IN INSTRUMENT]

and any other persons having an interest in the [INSERT REGISTERABLE DESCRIPTION OF THE PROPERTY] are required, before dealing with the property in any way, to give a copy of the [INSERT ORDER OR DECISION TYPE] including any amendments that may be made thereto, to every person who will acquire an interest in the property as a result of the dealing.

Under subsection 197(3) of the Environmental Protection Act, this requirement applies to each person who, subsequent to the registration of this certificate, acquires an interest in the real property.

The reasons for the imposition of these terms and conditions are as follows:

1. Conditions 1, 3-7, inclusive 9 and 10 are included to clarify the legal rights and responsibilities of the Owner.

2. Condition 2 is included to ensure that the Site is operated in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.

3. Condition 8 is included to ensure that the appropriate Ministry staff has ready access to the operations of the Site which are approved under this Certificate. The Condition is supplementary to the powers of entry afforded a Provincial Officer pursuant to the *Act* , the *OWRA* , the *PA* , the *NMA* and the *SDWA* .

4. Conditions 11 and 12 are included, pursuant to subsection 197(1) of the *Act* , to ensure that any persons having an interest in the site are aware that the land has been approved and used for the purposes of waste disposal.

5. Condition 13 is included require an establishment of the Contaminant Attenuation Zone to bring the site into compliance with Guideline B-7.

6. Conditions 14 and 15 are included to specify the approved areas from which waste may be accepted at the Site and types and amounts of waste that may be accepted for disposal at the Site, based on the Owner's application and supporting documentation.

7. Conditions 16, 17 and 18 are included to specify restrictions on the extent of landfilling at this Site based on the Owner's application and supporting documentation. These limits define the approved volumetric capacity of the Site. Condition 16 is also included to specify restrictions on the extent of landfilling within the fill area to maintain a vertical separation between the groundwater table and the waste.

8. Condition 19 is included to specify the requirement of daily or interim covers applications to control potential nuisance effects, to facilitate vehicle access on the Site and to ensure an acceptable Site appearance.

9. Condition 20 is included to specify the hours of operation for the landfill Site and a mechanism for amendment of the hours of operation.

10. Condition 21 is included to require inspections that would ensure that only approved waste types are accepted at the Site and that the Ministry is notified of any attempts to dispose off unacceptable wastes.

11. Condition 22 is included to require waste compaction to maximize the capacity of the Site and to provide environmental benefits associated with greater compaction of waste.

12. Condition 23(a) is included to prohibit burning of waste at the Site because of concerns with air emissions, smoke and other nuisance effects and the potential fire hazard. Condition 23(b) is included to control burning of wood products at the Site, to minimize potential environmental adverse effects.

13. Condition 24 is included to ensure protection of public health and safety, and minimization of potential damage to environmental controls, monitoring and other works at the Site due to uncontrolled removal of materials from waste at the Site.

14. Condition 25 is included to ensure that all buildings and structures at the Site are free of any landfill gas accumulation, which due to a methane gas component may be explosive and thus create a danger to any persons at the Site.

15. Condition 26 is included to require reasonable maintenance of the on-site roads to ensure safe

delivery of waste to the working face or to and from the other waste type storage areas.

16. Conditions 27 and 28 are included to ensure that the users of the Site are fully aware of important information and restrictions related to the Site operations as specified by this Certificate.

17. Conditions 29, 30 and 31 are included to ensure that the Site access and integrity are controlled by preventing unauthorized access when the Site is closed and no Site attendant is on duty.

18. Condition 32 is included to ensure that drainage onto or leaving the Site does not adversely affect Site operations or create a nuisance or a hazard to the health and safety of the environment.

19. Conditions 33 - 40, inclusive, and 59 are included to ensure that the Site is designed and operated in a way that does not result in a hazard or nuisance to the natural environment or any persons.

20. Condition 41 is included to provide information that demonstrates that the Site is performing as designed and the impacts on the natural environment are within the Ministry's limits.

21. Conditions 42, 43 and 44 are included to ensure the integrity of the groundwater monitoring network so that accurate monitoring results are achieved and the natural environment is protected.

22. Condition 45 is also included to require the Owner to install additional groundwater monitoring wells to delineate the leachate impacts on the groundwater resources at the Site and the Contaminant Attenuation Zone.

23. Condition 46 is included to ensure that regular inspections are conducted at the Site, to verify that the Site is operated in accordance to this Certificate and in a manner that would not result in a hazard or nuisance to the natural environment or any persons.

24. Condition 47 is included to ensure that the Site is operated and supervised by properly trained staff in a manner which does not result in a hazard or nuisance to the natural environment or any persons.

25. Conditions 48 - 55, inclusive, are included to ensure that information pertaining to Site development, operations and monitoring date is documented and any possible improvements to Site design, operations or monitoring programs are identified. Condition 54 is also included to provide the Ministry with a concise and organized tool to review the Site activities and the effectiveness of the design and to verify compliance with the conditions of this Certificate and other relevant Ministry's requirements.

26. Condition 56 is included to ensure that incidents of spills are reported to the Ministry to ensure public health and safety and environmental protection.

27. Condition 57 is included to ensure that staff and equipment are available to handle emergency situations.

28. Condition 58 is included to ensure that final closure of the Site is completed in an aesthetically pleasing manner and to ensure long-term protection of the natural environment.

29. Condition 60 is included to the ensure that the District Manager is informed of any complaints with respect to the operation of the Site, which would indicate problems with the operation of the Site and non-compliance with the Act. Condition 60 is also included to ensure that any complaints regarding Site operations at the Site are responded to in a timely manner.

This Provisional Certificate of Approval revokes and replaces Certificate(s) of Approval No. A412405 issued on April 2, 1980.

In accordance with Section 139 of the Environmental Protection Act, R.S.O. 1990, Chapter E-19, as amended, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act, provides that the Notice requiring the hearing shall state:

1. The portions of the approval or each term or condition in the approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to eachportion appealed.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The Certificate of Approval number;
6. The date of the Certificate of Approval;
7. The name of the Director;
8. The municipality within which the waste disposal site is

FAX
SHARED BOOTSMA
905 477 1456
KEVIN
STONECLIFFE
11
DATE: JUN 5/08

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Section 39, *Environmental Protection Act*
Ministry of Environment and Energy
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted waste disposal site is approved under Section 39 of the Environmental Protection Act

DATED AT TORONTO this 28th day of April, 2008

THIS CERTIFICATE WAS MAILED
ON April 30, 2008
N.P
(Signed)

Tesfaye Gebrezghi, P.Eng.
Director
Section 39, *Environmental Protection Act*

MW/
c: District Manager, MOE Ottawa
Lauree Armstrong, Jp2g Consultants Inc.

Appendix F

Checklist

Appendix D-Monitoring and Screening Checklist
General Information and Instructions

General Information: The checklist is to be completed, and submitted with the Monitoring Report.
Instructions: A complete checklist consists of:
(a) a completed and signed checklist, including any additional pages of information which can be attached as needed to provide further details where indicated.
(b) completed contact information for the Competent Environmental Practitioner (CEP)
(c) self-declaration that CEP(s) meet(s) the qualifications as set out below and in Section 1.2 of the Technical Guidance Document.

Definition of Groundwater CEP:
For groundwater, the CEP must have expertise in hydrogeology and meet one of the following:
(a) the person holds a licence, limited licence or temporary licence under the *Professional Engineers Act*; or
(b) the person holds a certificate of registration under the *Professional Geoscientists Act, 2000* and is a practicing member, temporary, member or limited member of the Association of Professional Geoscientists of Ontario. O. Reg. 66/08, s. 2..
Definition of Surface water CEP:
A CEP for surface water assessments is a scientist, professional engineer or professional geoscientist as described in (a) and (b) above with demonstrated experience and post-secondary education, either a diploma or degree, in hydrology, aquatic ecology, limnology, aquatic biology, physical geography with specialization in surface water, and/or water resource management.

The type of scientific work that a CEP performs must be consistent with that person's education and experience. If an individual has appropriate training and credentials in both groundwater and surface water and is responsible for both areas of expertise, the CEP may then complete and validate both sections of the checklist.

Monitoring Report and Site Information	
Waste Disposal Site Name	Stonecliffe Waste Disposal Site
Location (e.g. street address, lot, concession)	Lots 21 and 22, Concession 11
GPS Location (taken within the property boundary at front gate/ front entry)	E: 280315 N: 5117778
Municipality	Township of Head, Clara and Maria
Client and/or Site Owner	Township of Head, Clara and Maria
Monitoring Period (Year)	2011 - 2012
This Monitoring Report is being submitted under the following:	
Certificate of Approval No.:	A412405
Director's Order No.:	N/A
Provincial Officer's Order No.:	N/A
Other:	N/A

Report Submission Frequency	○ **Annual** ◉ **Other**	Every 2 years.
The site is:	◉ **Active** ○ **Inactive** ○ **Closed**	
If closed, specify C of A, control or authorizing document closure date:		Select Date
Has the nature of the operations at the site changed during this monitoring period?	○ **Yes** ◉ **No**	
If yes, provide details:	Type Here	
Have any measurements been taken since the last reporting period that indicate landfill gas volumes have exceeded the MOE limits for subsurface or adjacent buildings? (i. e. exceeded the LEL for methane)	○ Yes ◉ No	

Groundwater WDS Verification:

Based on all available information about the site and site knowledge, it is my opinion that:

Sampling and Monitoring Program Status:

1) The monitoring program continues to effectively characterize site conditions and any groundwater discharges from the site. All monitoring wells are confirmed to be in good condition and are secure:	◉ **Yes** ○ **No**	
2) All groundwater, leachate and WDS gas sampling and monitoring for the monitoring period being reported on was successfully completed as required by Certificate(s) of Approval or other relevant authorizing/control document(s):	◉ **Yes** ○ **No** ○ **Not Applicable**	If no, list exceptions below or attach information.

Groundwater Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

3) a) Some or all groundwater, leachate and WDS gas sampling and monitoring requirements have been established or defined outside of a ministry C of A, authorizing, or control document.	○ **Yes** ◉ **No** ○ **Not Applicable**	
b) If yes, the sampling and monitoring identified under 3(a) for the monitoring period being reported on was successfully completed in accordance with established protocols, frequencies, locations, and parameters developed as per the Technical Guidance Document:	○ **Yes** ○ **No** ◉ **Not Applicable**	If no, list exceptions below or attach additional information.

Groundwater Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

4) All field work for groundwater investigations was done in accordance with standard operating procedures as established/outlined per the Technical Guidance Document (including internal/external QA/QC requirements) (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	◉ **Yes** ○ **No**	If no, specify (Type Here):

Sampling and Monitoring Program Results/WDS Conditions and Assessment:			
5) The site has an adequate buffer, Contaminant Attenuation Zone (CAZ) and/or contingency plan in place. Design and operational measures, including the size and configuration of any CAZ, are adequate to prevent potential human health impacts and impairment of the environment.	◉ **Yes** ○ **No**	If no, the potential design and operational concerns/ exceptions are as follows (Type Here):	
6) The site meets compliance and assessment criteria.	◉ **Yes** ○ **No**	If no, list and explain exceptions (Type Here):	
7) The site continues to perform as anticipated. There have been no unusual trends/ changes in measured leachate and groundwater levels or concentrations.	◉ **Yes** ○ **No**	If no, list exceptions and explain reason for increase/change (Type Here):	
1) Is one or more of the following risk reduction practices in place at the site: ***(a)*** **There is minimal reliance on natural attenuation of leachate due to the presence of an effective waste liner and active leachate collection/treatment; or** ***(b)*** **There is a predictive monitoring program in-place (modeled indicator concentrations projected over time for key locations); or** ***(c)*** **The site meets the following two conditions (typically achieved after 15 years or longer of site operation):** ***i.*** **The site has developed stable leachate mound(s) and stable leachate plume geometry/concentrations; and** ***ii.*** **Seasonal and annual water levels and water quality fluctuations are well understood.**	◉ **Yes** ○ **No**	**Note which practice(s):**	☐ **(a)** ☐ **(b)** ☒ **(c)**
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	○ **Yes** ◉ **No** ○ **Not Applicable**	If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here):	

Groundwater CEP Declaration:

I am a licensed professional Engineer or a registered professional geoscientist in Ontario with expertise in hydrogeology, as defined in Appendix D under Instructions. Where additional expertise was needed to evaluate the site monitoring data, I have relied on individuals who I believe to be experts in the relevant discipline, who have co-signed the compliance monitoring report or monitoring program status report, and who have provided evidence to me of their credentials.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended), and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories*, or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature and will be rectified for the next monitoring/reporting period. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

Select Date

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

○ **No changes to the monitoring program are recommended**	Remove VOCs from the groundwater monitoring program.
◉ **The following change(s) to the monitoring program is/are recommended:**	
◉ **No Changes to site design and operation are recommended**	
○ **The following change(s) to the site design and operation is/ are recommended:**	

Name:	Spencer Bootsma		
Seal:	Add Image		
Signature:	Bootsma, Spencer Digitally signed by Bootsma, Spencer DN: cn=Bootsma, Spencer, ou=CATRT3 Date: 2013.05.29 12:53:47 -04'00'	**Date:**	May 24, 2013
CEP Contact Information:			
Company:	AECOM Canada Ltd.		
Address:	300 Town Centre Boulevard, Suite 300, Markham, Ontario, L3R 5Z6		
Telephone No.:	905-477-8400 x 378	Fax No. :	905-477-1456
E-mail Address:	spencer.bootsma@aecom.com		
Co-signers for additional expertise provided:			
Signature:		**Date:**	Select Date
Signature:		**Date:**	Select Date

Surface Water WDS Verification:

Provide the name of surface water body/bodies potentially receiving the WDS effluent and the approximate distance to the waterbody (including the nearest surface water body/bodies to the site):

Name (s)	Conway Creek.
Distance(s)	Approximately 500 m away.

Based on all available information and site knowledge, it is my opinion that:

Sampling and Monitoring Program Status:

1) The current surface water monitoring program continues to effectively characterize the surface water conditions, and includes data that relates upstream/background and downstream receiving water conditions:	(●) Yes ( ) No	If no, identify issues (Type Here):
2) All surface water sampling for the monitoring period being reported was successfully completed in accordance with the Certificate(s) of Approval or relevant authorizing/control document(s) (if applicable):	( ) Yes ( ) No (●) **Not applicable (No C of A, authorizing / control document applies)**	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	Description/Explanation for change (change in name or location, additions, deletions)	Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

3) a) Some or all surface water sampling and monitoring program requirements for the monitoring period have been established outside of a ministry C of A or authorizing/control document.	◉ **Yes** ○ **No** ○ **Not Applicable**	
b) If yes, all surface water sampling and monitoring identified under 3 (a) was successfully completed in accordance with the established program from the site, including sampling protocols, frequencies, locations and parameters) as developed per the Technical Guidance Document:	◉ **Yes** ○ **No** ○ **Not Applicable**	If no, specify below or provide details in an attachment.

Surface Water Sampling Location	**Description/Explanation for change (change in name or location, additions, deletions)**	**Date**
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date
Type Here	Type Here	Select Date

4) All field work for surface water investigations was done in accordance with standard operating procedures, including internal/external QA/QC requirements, as established/ outlined as per the Technical Guidance Document, MOE 2010, or as amended. (Note: A SOP can be from a published source, developed internally by the site owner's consultant, or adopted by the consultant from another organization):	◉ **Yes** ○ **No**	If no, specify (Type Here):

Sampling and Monitoring Program Results/WDS Conditions and Assessment:

5) The receiving water body meets surface water-related compliance criteria and assessment criteria: i.e., there are no exceedances of criteria, based on MOE legislation, regulations, Water Management Policies, Guidelines and Provincial Water Quality Objectives and other assessment criteria (e.g., CWQGs, APVs), as noted in Table A or Table B in the Technical Guidance Document (Section 4.6):	○ **Yes** ○ **No**

If no, list parameters that exceed criteria outlined above and the amount/percentage of the exceedance as per the table below or provide details in an attachment:

Parameter	Compliance or Assessment Criteria or Background	Amount by which Compliance or Assessment Criteria or Background Exceeded
e.g. Nickel	e.g. C of A limit, PWQO, background	e.g. X% above PWQO
See Section 3.2 in text of report.	See Section 3.2 in text of report.	Type Here
Type Here	Type Here	Type Here
Type Here	Type Here	Type Here
Type Here	Type Here	Type Here
6) In my opinion, any exceedances listed in Question 5 are the result of non-WDS related influences (such as background, road salting, sampling site conditions)?	○ **Yes** ○ **No**	See Section 3.2 in text of report.

7) All monitoring program surface water parameter concentrations fall within a stable or decreasing trend. The site is not characterized by historical ranges of concentrations above assessment and compliance criteria.	○ **Yes** ○ **No**	See Section 3.2 in text of report.
8) For the monitoring program parameters, does the water quality in the groundwater zones adjacent to surface water receivers exceed assessment or compliance criteria (e.g., PWQOs, CWQGs, or toxicity values for aquatic biota (APVs)):	○ Yes ○ No ○ Not Known ◉ Not Applicable	See Section 3.2 and 3.3 in text of report.
9) Have trigger values for contingency plans or site remedial actions been exceeded (where they exist):	○ **Yes** ◉ **No** ○ **Not Applicable**	If yes, list value(s) that are/have been exceeded and follow-up action taken (Type Here)

Surface Water CEP Declaration:

I, the undersigned hereby declare that I am a Competent Environmental Practitioner as defined in Appendix D under Instructions, holding the necessary level of experience and education to design surface water monitoring and sampling programs, conduct appropriate surface water investigations and interpret the related data as it pertains to the site for this monitoring period.

I have examined the applicable Certificate of Approval and any other environmental authorizing or control documents that apply to the site. I have read and followed the Monitoring and Reporting for Waste Disposal Sites Groundwater and Surface Water Technical Guidance Document (MOE, 2010, or as amended) and associated monitoring and sampling guidance documents, as amended from time to time. I have reviewed all of the data collected for the above-referenced site for the monitoring period(s) identified in this checklist. Except as otherwise agreed with the ministry for certain parameters, all of the analytical work has been undertaken by a laboratory which is accredited for the parameters analysed to *ISO/IEC 17025:2005 (E)- General requirements for the competence of testing and calibration laboratories,* or as amended from time to time by the ministry.

If any exceptions or potential concerns have been noted in the questions in the checklist attached to this declaration, it is my opinion that these exceptions and concerns are minor in nature or will be rectified for future monitoring events. Where this is not the case, the circumstances concerning the exception or potential concern and my client's proposed action have been documented in writing to the Ministry of the Environment District Manager in a letter from me dated:

Select Date

Recommendations:

Based on my technical review of the monitoring results for the waste disposal site:

◉ **No Changes to the monitoring program are recommended**	
○ **The following change(s) to the monitoring program is/are recommended:**	Type Here
◉ **No changes to the site design and operation are recommended**	
○ **The following change(s) to the site design and operation is/are recommended:**	Type Here

CEP Signature	Bootsma, Spencer	Digitally signed by Bootsma, Spencer DN: cn=Bootsma, Spencer, ou=CATRT3 Date: 2013.05.29 13:06:39 -04'00'
Relevant Discipline	Geoscience	
Date:	May 24, 2013	
CEP Contact Information:	Spencer Bootsma	
Company:	AECOM	
Address:	300 Town Centre Boulevard, Suite 300, Markham, Ontario, L3R 5Z6	
Telephone No.:	905-477-8400 x 378	
Fax No. :	905-477-1456	
E-mail Address:	spencer.bootsma@aecom.com	
Save As		**Print Form**

Ministry of the Environment

P.O. Box 22032
Kingston, Ontario
K7M 8S5
613/549-4000 or 1-800/267-0974
Fax: 613/548-6908

Ministère de l'Environnement

C.P. 22032
Kingston (Ontario)
K7M 8S5
613/549-4000 ou 1-800/267-0974
Fax: 613/548-6908

Ontario

M E M O R A N D U M

February 16, 2012

TO: Lance Larkin
Environmental Officer
Ottawa District Office
Eastern Region

FROM: Mark Phillips
Surface Water Scientist
Technical Support Section
Eastern Region

RE: Annual Monitoring Report (2009/2010)
Stonecliffe WDS CofA # A412405
Lot 21 & 22, Concession 11, Head
Township of Head, Clara and Maria, County of Renfrew
IDS #: 8016-8K4N32

I have reviewed the Annual Monitoring Report (dated May 2011) prepared jointly between Jp2j and AECOM Ltd. as it pertains to surface water impacts and have the following comments.

Background

The site is currently licensed for a .9 hectare landfill site within a 2.43 hectare parcel. The site is licensed to accommodate non-hazardous wastes only. The WDS is designed as a naturally attenuating site.

The landfill is located in a largely non-developed area. Much of the surrounding land is owned by the Crown and is wooded. The only development in the immediate area is a CNR line (220 metres east of the WDS) and a hydro corridor (65 metres south of the site). The consultants have indicated that the nearest watercourse to the WDS is Conway Creek, which is located approximately 550 metres to the southeast. According to the consultants groundwater is in a westerly direction. The Ottawa River is also located approximately 1 km to the north of the WDS. The current monitoring program is comprised of groundwater monitoring only.

Comments

Although there are no identified surface water features in close proximity to the WDS, the consultants have compared the sample collected at the leachate seep to the PWQO. I suggest that measures be taken to prevent the discharge of contaminated water at the seep location.

If you have any questions regarding the above comments please contact me at (613) 540-6854.

Mark Phillips
MP/gl

c: SW RE HC C11 03 06
Groundwater Unit Files

ec: Peter Taylor, Water Resources Unit Supervisor, Eastern Region, MOE
T. MacDonald, District Supervisor (A), Ottawa District, MOE

Appendix G

MOE Correspondence

Jp2g Consultants Inc.
ENGINEERS ▪ PLANNERS ▪ PROJECT MANAGERS

J.M. Jarrota, P.Eng., M.Sc.
J.E. Hunton, MCIP, RPP

March 8, 2012

Ministry of the Environment
2430 Don Reid Drive
Ottawa, ON K1H 1E1

Attention: Lance Larkin
Senior Environmental Officer

Re: Stonecliffe Waste Disposal Site
Certificate No. A412405
Our Project No. 2006025M

Dear Sir:

We acknowledge receipt of your email February 23, 2012 and the attached TSS memo by Mark Phillips Surface Water Scientist dated February 16, 2012. This surface water impact review was completed on the AECOM 2009/2010 Groundwater and Surface Water Monitoring Report dated May 2011.

It is understood that due to elevated concentrations of iron and copper in the water from a seep, the MOE recommends that measures be taken to prevent the discharge of contaminated water. This seep location identified as Seep 1 is located approximately 40m downgradient of the approved 0.9m landfilling area and actually more centrally located between monitors BH3 and BH4. A corrected plan will be provided in the 2011/2012 Biennial Report. The seep has been monitored since 2001 and has exhibited variable flow rates from no flow, to flows ranging from 6 to 30 ml/sec and in August 2010 at 100 ml/sec. We would confirm during our 2011 monitoring event July 7, 2011 there was no flow. Concentrations of iron have ranged from 4.22mg/L to 86.20mg/L, and in August 2010 at 137mg/L. The copper concentration above PWQO occurred once during the high flow event in 2010.

The surface water from the seep which ponds at the base of a slope is iron stained in colour, and has stained the vegetation within a 2m x 2m area.

During the 2012 monitoring event scheduled in August as per Condition 41(a) of the Certificate we will review access requirements to the seep and direct the municipality to apply clean, sandy, granular material on the area as evidenced by stained vegetation.

Trusting this is satisfactory

Yours very truly,

Jp2g Consultants Inc.
Engineers • Planners • Project Managers

Kevin Mooder, MCIP RPP
Sr. Project Planner

c.c. Melinda Reith
Patty Wong
Perry Larochelle