



## LEACHATE MANAGEMENT PLAN

TRILLIUM DRIVE LANDFILL SITE, SOUTHWEST MIDDLESEX,  
ONTARIO

### **MUNICIPALITY OF SOUTHWEST MIDDLESEX**

RWDI #1703470

July 10, 2017

#### **SUBMITTED TO**

**Tara Clayton**  
Public Works Manager  
Municipality of Southwest Middlesex  
153 McKellar Street  
Glencoe, ON, N0L 1M0

#### **SUBMITTED BY**

**Brent Langille, B.Sc., P.Geo.**  
Senior Consultant | Principal  
Brent.Langille@rwdi.com | ext. 2618

**Timothy Boc, B.E.S.**  
Project Manager  
Timothy.Boc@rwdi.com | ext.2312

#### **RWDI**

7978 Confederation Line,  
Watford, Canada, N0M 2S0  
T: 519.823.1311  
F: 519.823.1316



# TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION</b> .....	<b>1</b>
<b>2</b>	<b>LEACHATE QUANTITY</b> .....	<b>1</b>
<b>2.1</b>	<b>Leachate Volume Monitoring</b> .....	<b>1</b>
<b>3</b>	<b>LEACHATE DISPOSAL</b> .....	<b>2</b>
<b>3.1</b>	<b>Trigger Volume</b> .....	<b>2</b>
<b>3.2</b>	<b>Disposal Options</b> .....	<b>3</b>
3.2.1	On-Site Disposal .....	3
3.2.2	Off-Site Disposal .....	3
<b>3.3</b>	<b>Leachate Characterization</b> .....	<b>4</b>
<b>3.4</b>	<b>Site Access</b> .....	<b>4</b>
<b>4</b>	<b>DOCUMENTATION</b> .....	<b>5</b>
<b>5</b>	<b>CLOSURE &amp; SIGNATURES</b> .....	<b>5</b>



## LIST OF TABLES

**Table 1:** Leachate Tracking

## LIST OF APPENDICES

**Appendix A:** MOECC Inspection Report



# 1 INTRODUCTION

RWDI AIR Inc. [RWDI] was retained by the Municipality of Southwest Middlesex [SWM] to prepare this Leachate Management Plan [LMP] for the Trillium Drive Landfill, located at 3945 Trillium Drive, in the Municipality of Southwest Middlesex [Site]. The Site location is presented in **Figure 1**.

RWDI understands the method of leachate control historically employed on-Site involved leachate accumulation in a sump located at the base of the active waste face and active pumping into the waste face (recirculation). The leachate level within the sump was monitored visually and pumping of leachate was initiated when the depth of leachate facilitated pumping. Leachate was pumped from the sump to the active waste face and allowed to infiltrate into the waste mound.

The Ministry of the Environment and Climate Change [MOECC] completed an inspection of the Site on October 18, 2016. Based on the findings of the Site Inspection, the associated MOECC Inspection report included the following required action;

*“By March 3, 2017 provide the undersigned Provincial Officer with a written action plan to address the identified ongoing concerns with leachate management on the site.”*

As such, this LMP was prepared to satisfy the required action referenced above. A copy of the MOECC Inspection Report is provided in **Appendix A**.

# 2 LEACHATE QUANTITY

Leachate is contained at the Site in a sump located at the base of the active waste face. Based on a review of aerial photography of the Site, the leachate sump was estimated to be approximately 9.5 m long by 8 m wide, albeit the general shape of the leachate sump was irregular. Leachate containment within the sump is reportedly intermittent, with no leachate accumulation during drier climatic conditions and leachate accumulation presumably during periods of wetter climatic conditions (i.e. leachate volume dependent on precipitation inputs).

## 2.1 Leachate Volume Monitoring

Leachate volumes contained on-Site will be estimated, such that appropriate leachate management measures will be employed as the estimated leachate volume warrants.

Leachate volume estimation requires measurement of the dimensions of the leachate sump. This should ideally be completed during dry conditions when leachate is not present in the leachate sump, such that safe access/egress is available for field personnel. A staff gauge (graduated plate secured to a fixed post), or similar device, will be installed within the leachate sump. The staff gauge will be positioned such that minimum and maximum leachate levels can be measured, and that field personnel can accurately record levels from a safe



position removed from the bank of the leachate sump. The leachate sump dimensions and leachate level data will then be used to estimate the leachate volume contained within the leachate sump.

If the configuration of the leachate sump is modified as a result of site operations, the dimension measurements and/or staff gauge location will be revised accordingly. A log of measurements and/or staff gauge locations will be recorded and the records will be maintained by SWM.

Leachate volumes contained within the sump will be monitored. The monitoring program consists of leachate level measurement, calculation of estimated leachate volume, and collection of total precipitation data. The estimated leachate volume data will be correlated to precipitation data collected from a local climatological station(s), or online weather service(s).

Leachate level, volume, and precipitation data will be collected once per week during periods of normal operation.

Additionally, total precipitation data will be reviewed on a daily basis during/following precipitation events recorded at a local meteorological station, or online weather service. Leachate level, volume, and precipitation data will be collected following each precipitation event consisting of 25 mm or greater of precipitation over a 24-hour period.

## **3 LEACHATE DISPOSAL**

Leachate generated on-Site will be recirculated into the waste or disposed at an appropriate off-Site treatment/disposal facility. Leachate will be hauled from the Site via tanker truck and delivered to an approved treatment facility or sanitary sewage system.

### **3.1 Trigger Volume**

The volume of the leachate in the sump will be calculated using the level measurement from the staff gauge. When the leachate level in the sump reaches a predetermined level:

- 1) the leachate will be recirculated back into the waste; or
- 2) a MOECC licensed hauler of leachate will be mobilized to the Site to collect the contained leachate for delivery to an appropriate off-Site treatment/disposal facility.

For example, assuming the dimensions of the leachate sump are 9.5 m long by 8 m wide (estimated based on aerial photography) with a uniform bottom, and the leachate level in the sump is 0.5 m in depth, the volume contained in the sump would be approximately 38 m<sup>3</sup>. If off-Site disposal is the selected option (ie too muddy/cold to pump), the tanker truck volume is anticipated to be about 37 m<sup>3</sup> per load. As such, a licensed liquid-waste hauler would be mobilized to the Site when the leachate level in the sump reaches 0.5 m on the staff gauge. Note the volume in the leachate sump triggering off-Site disposal would be slightly greater than the tanker truck volume to account for the minimum head of leachate required for tanker truck transfer equipment.



## 3.2 Disposal Options

### 3.2.1 On-Site Disposal

The current practice of leachate recirculation back into the waste mound is an accepted practice to manage leachate as solid non-hazardous waste disposal sites. There are key considerations that are to be assessed prior and during leachate recirculation in order to protect the natural environment from leachate seeps. These considerations are noted below for SWM.

- Leachate should be pumped into dedicated waste sumps or trenches, and not sprayed onto the waste face.
- Leachate should be recirculated back into waste that is not saturated.
- Leachate should be recirculated at a rate less than the rate the waste can absorb the leachate (this rate may decrease with time during a pumping event).
- Leachate should be recirculated back into waste over an area where perched leachate will not occur (ie not over an old haul road that is buried).
- Leachate should only be recirculated if there are no evidence of, or creation of, leachate seeps through the waste cap (risk of off-Site runoff) or the open waste tipping face (short-circuiting of pumping).
- Leachate should be recirculated during periods only when on-Site personnel are present.
- Leachate should be recirculated during times of non-precipitation events.
- Leachate should be recirculated onto waste that is not frozen.
- Leachate can be recirculated such that it is not causing unacceptable odours at the Site property boundaries.
- Leachate pumping equipment and transfer lines should be free of leaks to prevent leachate from escaping outside the waste footprint as runoff.

### 3.2.2 Off-Site Disposal

As noted, leachate destined to be disposed of at an appropriate off-Site treatment/disposal facility. Two options are presented for off-Site leachate disposal, for consideration by SWM. Option 1 would involve treatment and disposal services provided by a waste transportation and management firm. Option 2 would involve disposal into a municipal sanitary sewer system, pending execution of a sewer use agreement with a local municipality. Each option is outlined below.

#### Option 1 – Waste Management Firm

SWM may wish to retain a licensed liquid-waste management firm to collect and ultimately dispose leachate off-Site. SWM would enter into an agreement directly with the waste management firm. When the leachate level in



the sump meets the predetermined trigger level, the landfill operator would contact the liquid-waste management firm to mobilize to the Site to collect and haul the leachate off-Site. The leachate would be transported to the firm's treatment facility for treatment and ultimate disposal.

It should be noted that leachate would be transported on an as-needed basis, generally during periods of wetter climatic conditions. It is our experience that the liquid-waste management firm would typically require advance notice of approximately one (1) to two (2) days prior to mobilization to the Site.

#### Option 2 – Sanitary Sewer Discharge Agreement

SWM may wish to implement a sanitary sewer discharge agreement with a local municipality. SWM would enter into the discharge agreement directly with the local municipality. An agreement with a licensed liquid-waste hauler would also be necessary. This option would require the landfill operator to contact a licensed liquid-waste hauler when the leachate level in the sump meets the predetermined trigger level. The licensed liquid-waste hauler would collect the leachate from the Site and haul the leachate to a designated disposal location within a municipal sanitary sewer system (typically a sewage pumping station).

As noted, a one (1) to two (2) day advance notice period may be required for mobilization of the licensed liquid-waste hauler to the Site.

### **3.3 Leachate Characterization**

Each of the aforementioned off-Site leachate disposal options will require review of leachate quality data prior to execution of an agreement. Per Option 1, the waste management firm may require verification that the leachate meets the requirements of Schedule 4, Leachate Quality Criteria, of Ontario Regulation 347 (as amended). Per Option 2, implementation of a sanitary sewer discharge agreement would require the leachate quality to meet the criteria outlined in the local municipality's sanitary sewer use by-law.

As such, a leachate sample will be collected for analysis at a Canadian Association for Laboratory Accreditation [CALA] certified laboratory. An appropriate leachate disposal method will then be implemented based on, in part, the leachate quality encountered at the Site.

### **3.4 Site Access**

Access to the leachate sump via tanker truck will be required for each leachate disposal option outlined above. The length of hose required from the pumping apparatus to the tanker truck should be minimized, such that the leachate transfer effort is minimized (minimize hose length, effort by the waste hauler, etc.). As such, an access road from the Site entrance to the leachate sump will be maintained in satisfactory condition for access via tanker truck at all times.

As outlined above, leachate pumping equipment and transfer lines should be free of leaks to prevent leachate from escaping outside the waste footprint as runoff.



## 4 DOCUMENTATION

The leachate level/volume, as well as precipitation monitoring data will be recorded at time of each monitoring event, including date/time. Additionally, including the relevant information noted below, records of leachate level trigger exceedances and volume managed will be maintained on file by SWM.

### On-Site

The records will include the date, and duration of pumping, as well as the manufacture and model of the pump, such that the volume of leachate pumped can be calculated.

### Off-Site

The records will include date of trigger exceedance, date/time of notification of the licensed liquid-waste hauler, date/time of leachate haulage off-Site, waste haulage company and equipment, as well as leachate volume hauled off-Site. Copies of waste manifests will also be collected for each leachate load hauled off-Site. The records will be maintained on file by SWM, for reference.

## 5 CLOSURE & SIGNATURES

We trust that this Leachate Management Plan for the Trillium Landfill, located at 3945 Trillium Drive, in the Municipality of Southwest Middlesex is satisfactory. Please do not hesitate to contact us with any questions you may have.

Yours Very Truly:

**RWDI AIR, Inc.**

DRAFT

Timothy Boc, B.E.S.  
Project Manager

DRAFT

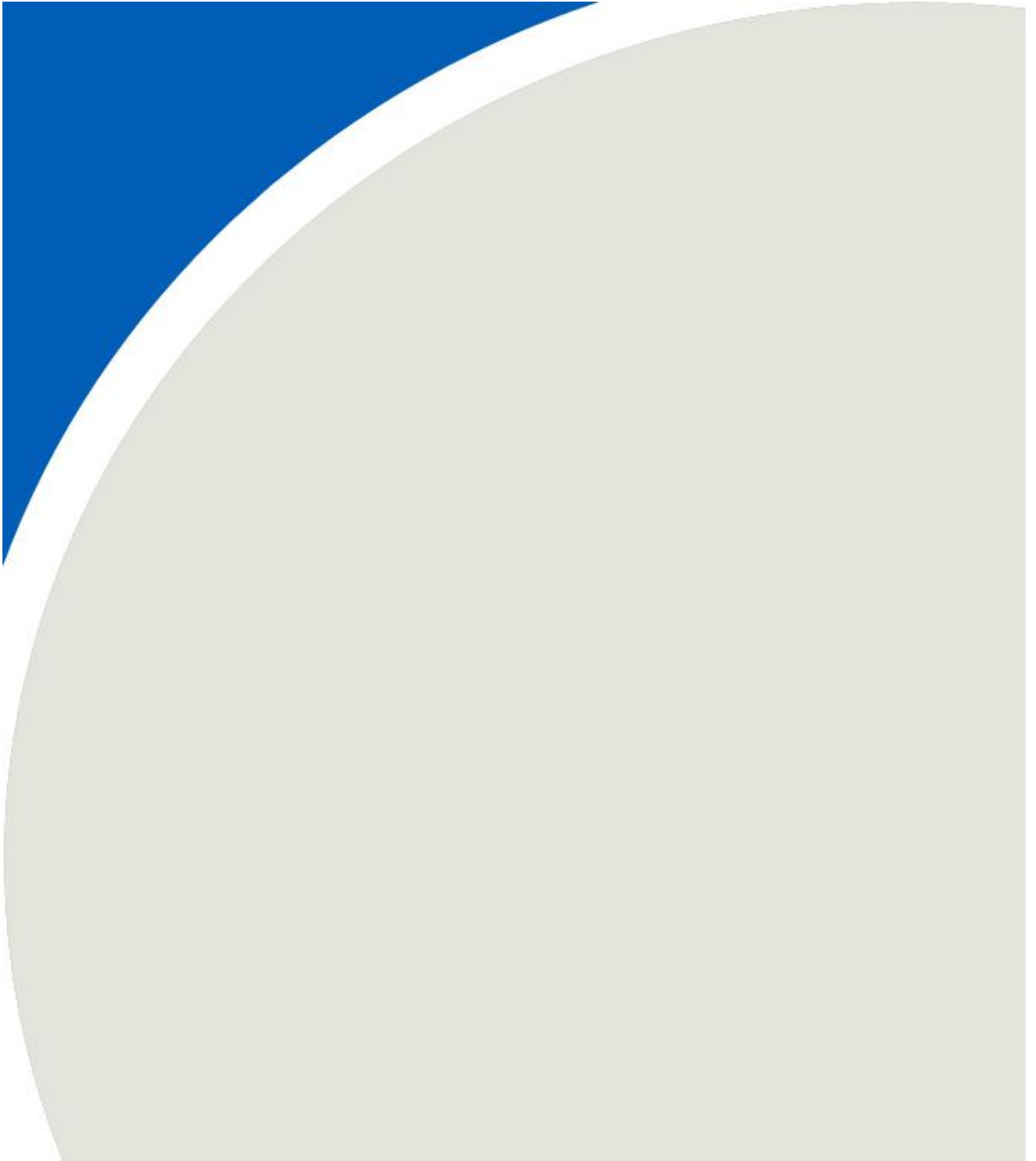
Brent Langille, B.Sc., P.Geo.  
Senior Consultant | Principal





RWDI aims to accommodate. If you require this document in a different format in order to aid accessibility, please contact the sender of this document, email [solutions@rwdi.com](mailto:solutions@rwdi.com) or call +1.519.823.1311

# TABLE



**Table 1 - Leachate Management Record**

Trillium Landfill Leachate Management Plan  
 Municipality of Southwest Middlesex  
 Project No. 1703470.1000

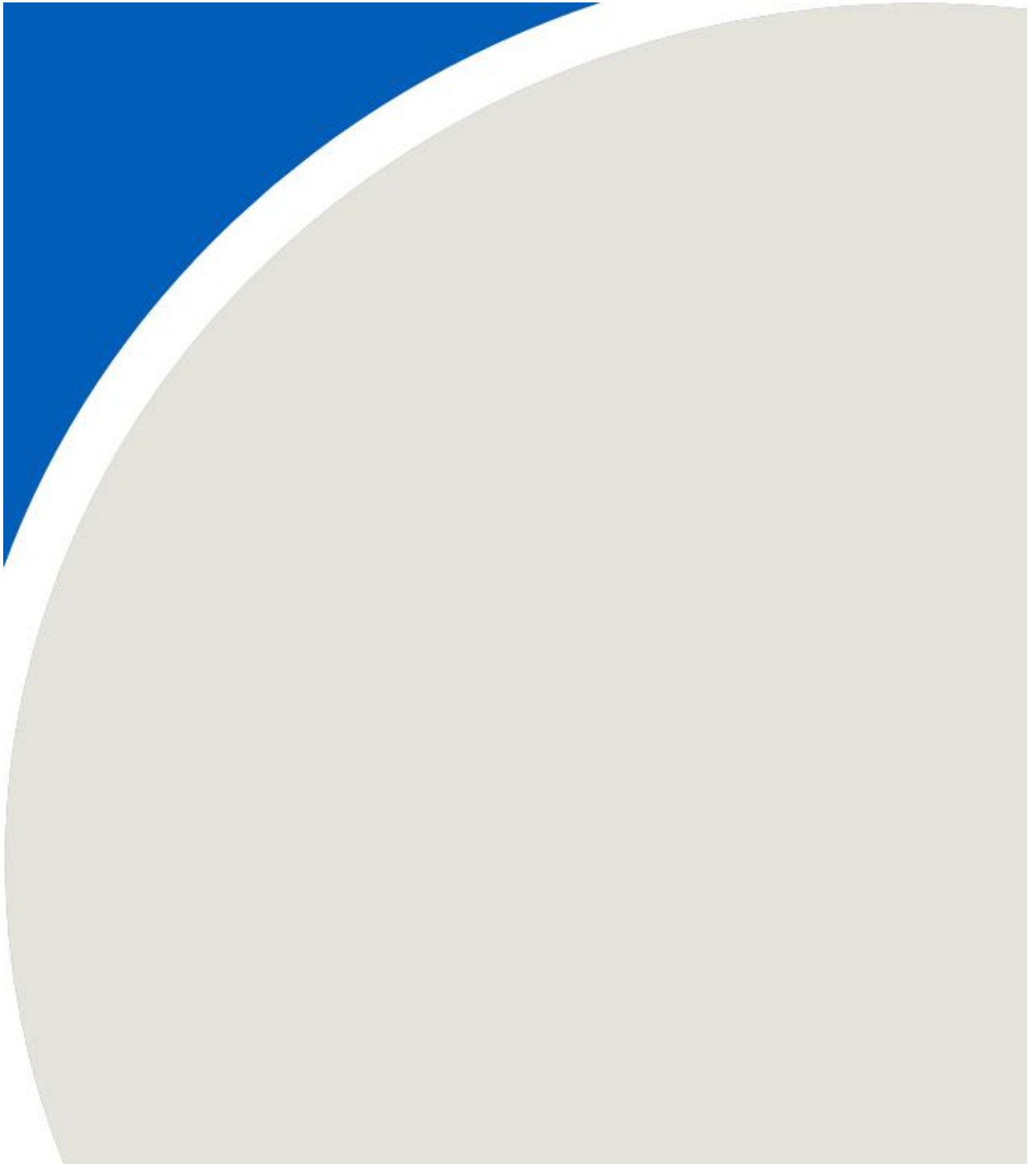
Date/Time	Staff	Staff Gauge Level [m]	Leachate Volume in Sump [m <sup>3</sup> ]	*Cumulative Precipitation [mm]	*24-Hour Precipitation [mm]	Leachate Recirculation			Off-Site Leachate Disposal					
						Pumping Duration [hours]	Manufacture/Model of Pumping Equipment	Estimated Volume Pumped [m <sup>3</sup> ]	Date/Time Liquid Waste Hauler Notified	Date/Time of Leachate Haulage off-Site	Liquid Waste Haulage Company and Equipment Used	Leachate Volume Hauled Off-Site [m]	Leachate Disposal Location	Waste Manifest Number

Notes: \* Denotes total precipitation since last monitoring event.  
 \* Denotes total precipitation during previous 24-hour period during precipitation event greater than 25 mm.

# APPENDICES



# APPENDIX A





## Solid Non-Hazardous Waste Disposal Site Inspection Report

<b>Client:</b>	The Corporation of the Municipality of Southwest Middlesex Mailing Address: 153 McKellar St, Post Office Box, 218, Glencoe, Ontario, Canada, N0L 1M0 Physical Address: 153 McKellar St, Southwest Middlesex, Municipality, County of Middlesex, Ontario, Canada, N0L 1M0 Telephone: (519)287-2015, FAX: (519)287-2359, email: jfrancisco@southwestmiddlesex.ca Client #: 2308-4XUQEP, Client Type: Municipal Government, NAICS: 913910		
<b>Inspection Site Address:</b>	Trillium Drive Landfill Site (Ekfrid Landfill) Address: 3945 Trillium Dr, Southwest Middlesex, Municipality, County of Middlesex, N0L 1M0 District Office: London - District LIO GeoReference: Zone: 17, UTM Easting: 445036.6, UTM Northing: 4731827.0, Latitude: 42.736988, Longitude: -81.67147 Site #: 7217-67MJFL		
<b>Contact Name:</b>	Tara Clayton	<b>Title:</b>	Public Works Manager
<b>Contact Telephone:</b>	(519)287-2015 ext119	<b>Contact Fax:</b>	
<b>Last Inspection Date:</b>			
<b>Inspection Start Date:</b>	2016/10/18	<b>Inspection Finish Date:</b>	2017/01/26
<b>Region:</b>	Southwestern		

### 1.0 INTRODUCTION

On October 18, 2016, as part of the Ministry's 2016/2017 inspection program, Provincial Officer John McGlynn conducted an inspection of the Trillium Drive Landfill site (Ekfrid Landfill), located on Lot 22, Concession R1N, in the Ekfrid Township of the Municipality of Southwest Middlesex. The purpose of the inspection was to assess compliance with the requirements of the Environmental Protection Act, the Ontario Water Resources Act, Regulation 347 (Waste), Environmental Compliance Approval (ECA)# A041403, and all other applicable Ministry of the Environment policies and guidelines.

The site is a municipal solid non-hazardous waste disposal site. The site representative for the inspection was Mike Sholdice, Landfill Attendant.

The landfill is currently operating under the original Certificate of Approval issued in 1971 and renewed each year until 1980, after 1980 no renewals were required. The existing ECA does not require the municipality to prepare and implement a design and operations report, or conduct surface and groundwater sampling.

It is my opinion that the existing ECA needs to be updated to include additional requirements that will ensure the municipality is utilizing current best management practices when operating the landfill. The need for a surface/groundwater monitoring program is necessary to provide analytical data that will assist in determining if current/future operations at the landfill are contributing to adverse impacts offsite. As a result, the London District Office has issued a 'Field Alert' to the MOECC Environmental Approvals Branch (EAB) requesting the current ECA be updated and amended to include, but not limited to, requirements for

a Design & Operations Report and establishment of a monitoring/reporting program.

On January 26, 2017 Provincial Officer McGlynn met with the new Southwest Middlesex Public Works Manager, Tara Clayton, to discuss the ongoing concerns with the operations at the landfill, specifically, the issues surrounding exposed waste and leachate management at the site. It was communicated that the London District Office will be issuing a 'Field Alert' requesting the current ECA be updated and amended, and suggested the municipality consider making preparations for the upcoming changes. It is anticipated that the MOECC London District will work closely with the MOECC EAB during the amendment process and will strive to keep the municipality updated on the proposed changes.

## 2.0 INSPECTION OBSERVATIONS

### **Certificate of Approval Number(s):**

A041403

Certificate of Approval number A041403 was issued on July 3, 1980 and approved a 20.2 hectare (50 acre) waste disposal site in accordance with the application and supporting information forms. The approval was issued originally in 1971 and renewed each year until 1980. After 1980 no renewals were required.

The site is approved to receive domestic, commercial and non-hazardous solid industrial waste and that the approval be a register instrument on title.

### 2.1 FINANCIAL ASSURANCE:

#### **Specifics:**

The site is owned by the municipality, financial assurance requirements do not apply.

### 2.2 APPROVED AREA OF THE SITE:

#### **Specifics:**

Trillium Drive Landfill is a 20.2 hectare (50 acre) site surrounded by agricultural and natural areas. The landfill footprint is not defined in the approval and is difficult to determine where filling has taken place. The active cell which is being filled is identifiable north-east upon entering the landfill. Previous landfill activities which have occurred are generally known by the municipality. The closest residential dwelling was observed to be approximately 250 metres north-east of the landfill. Newbiggen Creek borders the property from the north-east corner to the southeast corner, with drainage from the site being generally directed towards the creek.

### 2.3 APPROVED CAPACITY:

#### **Specifics:**

There is no approved capacity listed in the approval. The remaining capacity at the landfill is currently unknown. There is an active recycling program and refuse is primarily taken to the landfill by residents and Emterra, who performs the municipal collection.

### 2.4 ACCESS CONTROL:

#### **Specifics:**

At the time of the inspection the landfill was observed to have a secure entrance. During the hours of operation the site is supervised by an employee of the County. There are signs posted at the entrance which includes hours of operation, approved wastes, unapproved wastes, and tipping fees.

### 2.5 COVER MATERIAL:

#### **Specifics:**

There are no specific requirements for cover material identified on the approval. At the time of the inspection, the active tipping area was observed to be a large area with exposed waste, considerable in height, with no soil coverage. A large pond of leachate was observed at the base of the exposed waste. Applying regular cover material at the tipping face does not appear to be an operational practice at this site. The application of daily cover assists with reducing odours, controlling litter and controls and reduces amount of leachate accumulation.

**2.6 WASTE BURNING:**

**Specifics:**

At the time of the inspection there was a burn area observed on the south-east side of the landfill. The burn area was observed to only contain brush and clean wood.

**2.7 GROUNDWATER/SURFACEWATER IMPACT:**

**Specifics:**

During the site visit I inspected the vegetative area between the the working face of the landfill and the creek bordering the property. Evidence of previous surface water flowing from the active tipping area to the creek was apparent by the number of water flow paths observed carved in the soil. Leachate impacts to surface water and groundwater is a possibility due to the current waste management practises and excessive amount of leachate observed pooling at the base of the active tipping area. No surface water monitoring or groundwater monitoring has been completed at the site, therefore, it is difficult to determine if the site is contributing to adverse impacts offsite.

**2.8 LEACHATE CONTROL SYSTEM:**

**Specifics:**

The site does not have a leachate collection system. At the time of the inspection a large quantity of exposed leachate was observed pooling at the base of the active tipping area.

**2.9 METHANE GAS CONTROL SYSTEM:**

**Specifics:**

There are no methane gas control requirements or controls for Trillium Drive Landfill.

**2.10 OTHER WASTES:**

**Specifics:**

**3.0 REVIEW OF PREVIOUS NON-COMPLIANCE ISSUES**

As a result of the findings from the inspection completed by the MOECC in October 2014 the following actions were required:

1) The Municipality of Southwest Middlesex shall develop a burning procedure, in writing, that shall be implemented at the municipal landfills by no later than November 28, 2014. A copy of this procedure shall be forwarded to the author of this report no later than the above date.

Complied

2) The Municipality of Southwest Middlesex shall immediately stop taking unapproved wastes at the landfill sites. Waste located at the site shall be assessed, characterized, and if found to be subject waste, removed by an approved carrier and disposed of at an approved receiver. Documentation that the wastes were moved by an approved hauler and disposed of at an approved waste site shall be provided to the undersigned provincial officer by no later than November 28, 2014.

Complied

3) The Municipality of Southwest Middlesex shall provide a response in writing describing how the leachate issues identified will be addressed. This response must be provided to the undersigned provincial officer no later than November 28, 2014.

No record of the actions taken by municipality to address the ongoing leachate concerns received.

**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 ?**

No

**Specifics:**

**Was there any indication of a potential for environmental impairment during the inspection and/or the review of relevant material ?**

Yes

**Specifics:**

At the time of the inspection a large area of exposed leachate was observed to be pooling at the base of the active tipping area in close proximity to adjacent creek.

**Was there any indication of minor administrative non-compliance?**

No

**Specifics:**


**5.0 ACTION(S) REQUIRED**

The municipality shall implement the following practices:

- Apply cover material to minimize the size of the uncovered working face.
- Minimize the size of the tipping area and ensure that wastes are pushed into the trench and covered after each day the site receives waste.
  1. By March 3, 2017 provide the undersigned Provincial Officer with a written action plan to address the identified ongoing concerns with leachate management on the site.

**6.0 OTHER INSPECTION FINDINGS**

**7.0 INCIDENT REPORT**

Applicable  
7230-AJ5REV 



**8.0 ATTACHMENTS**

**PREPARED BY:**

**Environmental Officer:**

**Name:**

**John McGlynn**

**District Office:**

**London District Office**

**Date:**

**2017/01/31**

**Signature**



**REVIEWED BY:**

**District Supervisor:**

**Name:**

**Dan Cromp**

**District Office:**

**London District Office**

**Date:**

**2017/01/31**

**Signature:**



**File Storage Number:** -

**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"