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2022 and 2023 Landfill Gas Monitoring - Park and Elgin/Market Street Closed Landfill Sites Municipality of Kincardine

Dear Scott Gass

1. Introduction

GHD has prepared this letter to summarize the results of the landfill gas (LFG) monitoring programs associated with the closed Park Street and Elgin/Market Street Landfill Sites located within the Municipality of Kincardine (Municipality). This letter describes the results of LFG monitoring throughout 2022 and 2023.

It should be noted that neither site is regulated by an Environmental Compliance Approval (ECA) and that monitoring and reporting is voluntary.

2. Background

LFG is produced during the anaerobic digestion of organic matter in municipal solid waste and largely consists of carbon dioxide and methane gas. Methane is explosive within the range of 5 to 15 percent volume by volume (% v/v) at oxygen concentrations as low as approximately 12% v/v (Coward and Jones, 1950)[1]. If LFG is under positive pressure, it has the ability to migrate in the subsurface from a landfill and accumulate in enclosed structures if sufficient barriers to prevent migration are not in place.

LFG generation and subsequent subsurface migration can be one of the most significant risks associated with closed landfills. LFG monitoring results provide important information on soil gas quality and subsurface gas movement and can be used to characterize potential hazards. LFG monitoring results are used to identify risks associated with LFG migration and can be used to assess the effectiveness of existing control systems or be used to identify and desing control systems to mitigate the risks associated with LFG migration, where warranted.

[1] Coward, H.F. and Jones, G.W., Limits of Flammability of Gases and Vapours, 1950

While combustible gas detected in soil gas in the vicinity of municipal solid waste may be methane produced by anaerobic degradation of organic waste, field monitoring instruments do not differentiate methane from other natural sources of combustible gases that may be present in soil gas at and around the investigated areas. As a conservative approach, detections of combustible gas are considered methane and, when detections are within the accuracy limits of the monitoring equipment, detections of methane are used as the primary indicator of LFG presence.

3. 2022 and 2023 LFG Monitoring Program

3.1 Current Monitoring Program

LFG monitoring at the Park Street Landfill is completed at nine passive LFG vents (candy-cane vents) located along the boundary of the historical landfill and between the historical landfill and residential properties.

At the Elgin/Market Landfill Site LFG monitoring is completed at a series of gas control wells, gas probes, manholes, and catch basins surrounding the waste footprint. Monitoring is also completed at gas control wells which are part of the existing LFG collection system located between the waste footprint and Elgin/Market Street School. Pressure measurements are recorded while the LFG collection system is operating. Pressure measurements are collected during operation to observe the vacuum induced by the collection system. LFG monitoring is completed while the LFG collection system is off. Measurements are collected with the system off to observe natural conditions (i.e., without the influence of the collection system).

Table 1 and Table 2 attached summarize the LFG monitoring programs at the Park and Elgin/Market Street Sites, respectively. Figures 1 and 2 provide illustrations of the LGF monitoring locations at the Park and Elgin/Market Street Landfill Sites, respectively.

GHD field staff completed LFG monitoring four to five times per year at each of the Sites (as outlined in Tables 1 and 2).

In order to monitor for LFG, soil gas measurements of percent methane by % v/v and, where appropriate, pressure (inches of water column ["WC]) are collected. In order to further characterize the constituents of the soil gas, monitoring also included measuring carbon dioxide and oxygen by % v/v.

GHD field staff completed monitoring in accordance with the monitoring program specifications outlined in Table 1 and Table 2, with the exception of monitoring inside of the Elgin/Market school. Historical monitoring included the Elgin/Market Street School foundation and auditorium; however, access to the school has not been granted since 2016, thus monitoring is limited to the outdoor locations. Monitoring at the Elgin/Market Street Site was completed in March 2022 in lieu of the scheduled April 2022 event. Monitoring at the Elgin/Market Street and Park Street Sites was completed in November 2023 in lieu of the scheduled December 2023 event.

Please note that GHD field staff completed an additional monitoring event at the Elgin/Market Street Site on March 24, 2023. The data is presented and discussed herein for completeness but is not required as part of the routine monitoring program.

3.2 Current LFG Monitoring Equipment

During each site visit, GHD staff used a manometer for pressure measurements, and a Landtec GEM5000 for monitoring the gas composition.

Manometer

GHD used a Dwyer Series handheld digital manometer to monitor gauge pressure in gas probes prior to measuring gas composition. The Dwyer Digital Manometer has the following specifications:

– Range: ±10 inches water column
– Accuracy: ±0.1 percent of full scale

The Dwyer Digital Manometer User Guide does not recommend routine maintenance or calibration tests for this instrument's operation.

Soil Gas Composition Detector

The instrument used to monitor gas composition is a Landtec GEM5000 Portable LFG Analyzer (GEM5000). A calibration gas is used to perform a calibration before monitoring rounds, or when obtaining unusual readings, and/or obtaining error notifications from the GEM5000. The GEM5000 purges at an approximate rate of 550 cm^3/min (0.5 L/min) and has the following accuracy limitations which need to be considered when assessing monitoring results.

Table 1 Accuracy of the Landtec GEM5000

Gas	Accuracy (% v/v)				
	0 to 5% v/v	5 to 25% v/v	25 to 60% v/v	60 to 70% v/v	70+% v/v
Methane	±0.3%	±0.5%	±0.5%	±0.5%	±1.5%
Carbon Dioxide	±0.3%	±0.5%	±0.5%	±1.5%	±1.5%
Oxygen	±1%	±1%	N/A	N/A	N/A

Data source: Landtec North America Inc., Landtec GEM5000 Operating Manual

3.3 Current LFG Monitoring Procedure

The following describes the monitoring procedure completed by GHD staff. The monitoring procedure is generally the same for the gas probes despite the different designs and configurations. The procedure consists of the following steps:

1. The Dwyer Digital Manometer was zeroed before use at each monitoring location, or if abnormal results are observed. The manometer was attached to the sample port for measurement and the sample port opened (if a stop cock hose barb assembly was present). The manometer was left on the port until the pressure reading became steady, and then the pressure reading was recorded.
    a. Pressure readings were not collected in the catchbasins or manhole structures at the Elgin/Market Street Landfill Site.
2. The GEM5000 is attached to the sample port via flexible, teflon sample tubing and allowed to purge gas from the monitoring port until stable readings are achieved. This is typically completed in 5 to 10 minutes (per monitor).
    a. GHD staff watch the tubing for water during purging and immediately disconnects the GEM5000 if water is observed within the tubing. After stabilized soil gas readings are achieved final readings are recorded for methane, carbon dioxide, and oxygen (in % v/v). Additional notes or readings are collected if concentrations are observed to rise or fall sharply during purging.

3. During monitoring, the inside of the casing was visually inspected for disconnected tubing and the general condition of the inside of the casing. The quick connect fittings or hose barb monitoring ports are routinely inspected at the time of monitoring.
4. At the Elgin/Market Street Landfill, pressure measurements are recorded while the LFG collection system is operating and soil gas constituent measurements are collected while the LFG collection system is off. Pressure measurements are collected during operation to observe the vacuum induced by the LFG collection system. Soil gas constituent measurements are collected with the system off to observe natural conditions (i.e., without the influence of the collection system).
5. Manholes and stormwater catchment basins at the Park/Elgin Landfill Site are monitored by placing the GEM5000 sample tubing approximately 15 cm (6") into each structure and purging until stable results are achieved. This is typically completed in less than 5 minutes at each structure.
    a. After stabilized readings are achieved final soil gas readings are recorded for methane, carbon dioxide, and oxygen (by % v/v). Additional notes or readings are collected if methane concentrations are observed to rise or fall sharply during purging.

4. Monitoring Program Results

4.1 Park Street Landfill

The results of the 2022 and 2023 Park Street Landfill monitoring are summarized in Table 3. For comparison, the available historical monitoring results from 2012-2022 are included in Attachment A.1.

As shown in Figure 1, gas monitoring locations are completed within and outside the limit of waste (determined by historical test pitting).

In 2022 and 2023, there were no methane detections in any of the LFG monitoring locations with the exception of GV-4, GV-5, and GV-6 in February 2023. As described in Section 3.3, the accuracy of the GEM5000 is ±0.3% v/v when methane is detected at concentrations below 5% v/v. Monitoring results from February 2023 show concentrations of 0.1% v/v for methane in GV-4, GV-5, and GV-6. These detections are below the accuracy limits of the GEM5000 and are not considered reliable readings.

As shown on Figure 1, a number of the LFG probes are within the limit of waste. The absence of methane detections at these locations provides evidence that little LFG is being generated by the Park Street Landfill. Similarly, the absence of methane detections at LFG probes outside of the limit of waste provide evidence that LFG migration is not an issue at the Park Street Landfill. Percentages of CO_2 and O_2 are consistent over time at each location and are typical of natural soil gas concentrations (i.e., do not indicate the presence of LFG).

LFG monitoring results at the Park Street Landfill have consistently shown that neither LFG generation nor migration is an issue at the site. Combustible gas (i.e. methane) has not been detected at the site since 2018. Given the consistent evidence showing negligible LFG present at the monitoring locations, it is recommended that LFG monitoring at the Park Street Landfill be discontinued. It is recommended that the Municipality prepare a formal letter to request discontinuing monitoring. Monitoring should continue until MECP approval is given to cease.

4.2 Elgin/Market Street Landfill

The results of the 2022 and 2023 Elgin/Market Street Landfill monitoring are summarized in Table 4. For comparison, the available historical monitoring results from 2012-2022 are included in Attachment A.2.

With the exception of gas control well GW2, methane was not detected at the Elgin/Market Street Landfill in 2022 or 2023. Recent results show methane in GW2 ranging from 0.0 to 8.3% (v/v) (2018-2023). The lower

explosive limit (LEL) for methane is 5% (v/v) and based on methane readings in GW2, LFG migration continues to be a potential hazard to the nearby school. It's important to note that GW2 is part of the gas collection system and monitoring results from gas probes GP2-89 and GP3-89, located closer to the school, show no detections of methane (i.e., LFG is not likely present).

Methane has not been detected at any other location included in the Elgin/Market Street Landfill monitoring program since at least 2012 (see Attachment A.2).

During 2022 and 2023, negative pressures were noted at GW1 and the blower intake when the LFG control system was active except for the most recent monitoring events in 2023. During the April, July, and November 2023 monitoring events, pressures were 0.0 inches of water column regardless of whether the system was active or not. Pressures at all other collection well and gas probe locations were measured at 0.0 inches of water column whether the LFG collection system was in operation or not. This pattern in pressures suggest that the influence of the LFG control system is limited to the vicinity of the control building and the system was not inducing a vacuum at all during the latter half of 2023.

As shown in Attachment A.2, the blower system has historically induced a relatively large vacuum at GW1 and low levels of vacuum at each of the gas control wells. A pattern of reducing vacuum readings over time is noted at each of the gas control wells. In 2019, a large decrease in the vacuum readings is noted at GW1 (59.0 versus 5.0 inches of water column). Vacuum readings at the remaining gas control wells were negligible beginning in 2019 (0.0 to 0.1 inches of water column).

The lack of negative pressure, particularly in the gas control wells, demonstrates that the LFG control system may no longer be effectively controlling gas migration. Given the presence of LFG at concentrations above the lower explosive limit at GW2, it is recommended that the Municipality assess the existing LFG control system. The Municipality should consider either rehabilitating the existing active LFG control system or replacing the aging system with a passive LFG control system. Either option should be evaluated prior to implementation to ensure the selected alternative will be sufficiently protective of the surrounding properties and buildings.

It is further recommended that the Municipality negotiate access to the school buildings to monitor for the presence of combustible gas within the building. It is unknown if the school is equipped with combustible gas detection equipment. It is recommended that the Municipality begin discussions with the school in regard to installing combustible gas detection equipment within the school (if equipment is not already in place).

5. Scope and limitations

This report: has been prepared by GHD for the Municipality of Kincardine and may only be used and relied on by the Municipality of Kincardine for the purpose agreed between GHD and the Municipality of Kincardine as set out in Section 1 of this report.

GHD otherwise disclaims responsibility to any person other than the Municipality of Kincardine arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

6. Closure

This report has been prepared to summarize the results of the 2022 and 2023 LFG monitoring undertaken at the Park Street and Elgin/Market Street Landfill Sites. The following recommendations are made based on the results of the current LFG monitoring program:

Park Street Landfill

1. It is recommended that the Municipality prepare a formal letter to request that LFG monitoring at the Park Street Landfill be discontinued. LFG monitoring at the Park Street Landfill should continue until MECP approval is given to cease monitoring.

Elgin/Market Street Landfill

1. Monitoring of LFG should continue.
2. The Municipality should assess the current LFG control system. The assessment should determine if rehabilitating the existing active LFG control system or replacing the system is suitable. A passive LFG control system may be a suitable replacement altnerative.
3. The Municipality should negotiate access to the school buildings in order to monitor for the presence of combustible gas within the building.
4. It is recommended that the Municipality begin discussions with the school in regard to installing combustible gas detection equipment within the school (if equipment is not already in place).

If there are any questions or concerns with the contents of this report, please contact the undersigned.

Regards

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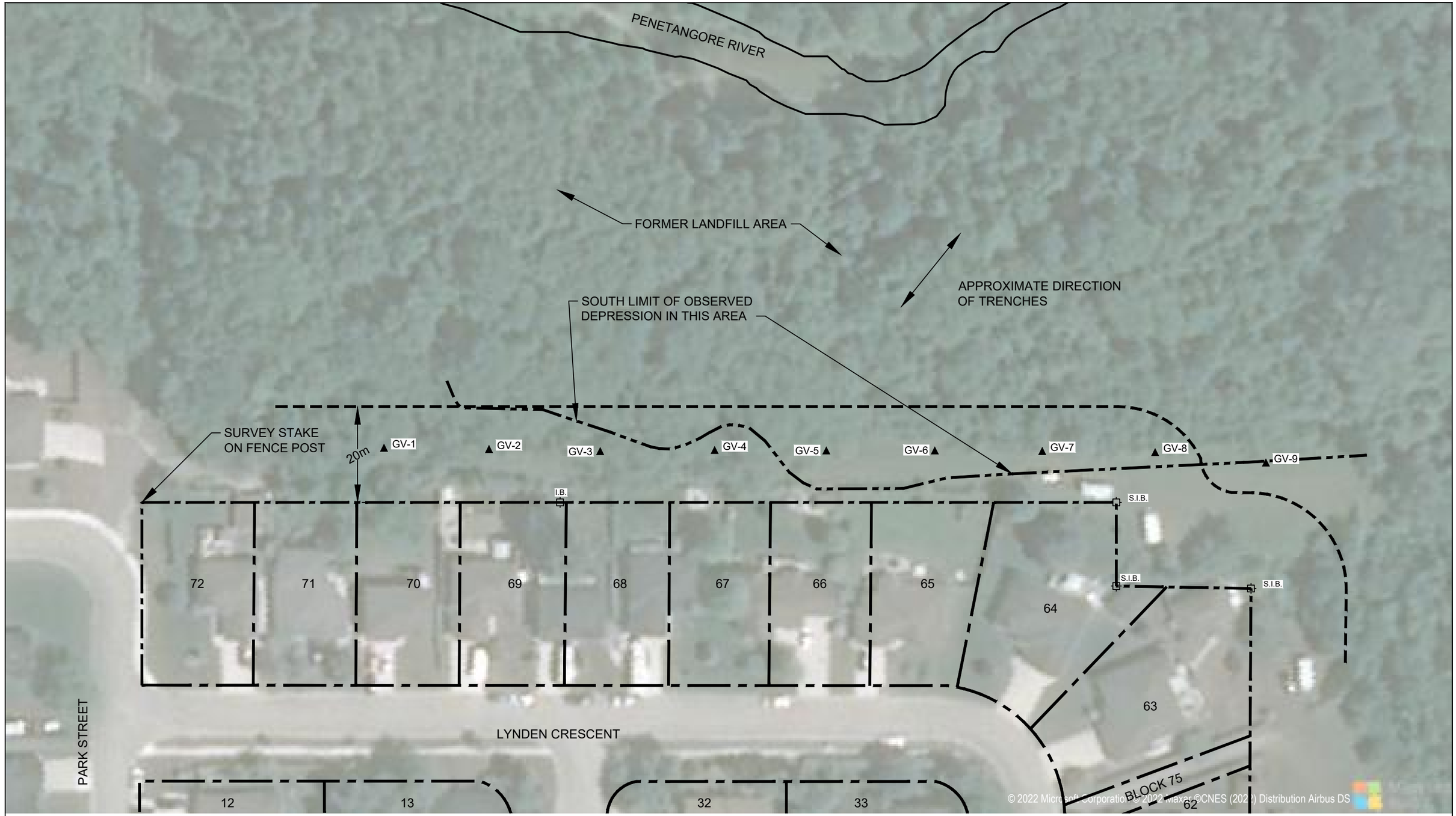
Encl.
Figure 1 – Park Street Landfill Site – Landfill Gas Monitoring Locations
Figure 2 – Elgin/Market Landfill Site – Landfill Gas Monitoring Locations
Table 1 – Landfill Gas Monitoring Locations and Parameters – Park Street Landfill Site
Table 2 – Landfill Gas Monitoring Locations and Parameters – Elgin/Market Street Landfill Site
Table 3 – Summary of Landfill Gas Monitoring Results – Park Street Landfill Site
Table 4 – Summary of Landfill Gas Monitoring Results – Elgin/Market Street Landfill Site
Attachment A.1 – Park Street - Historical Landfill Gas Monitoring Results (2012 -2022)
Attachment A.2 – Elgin/Market Street - Historical Landfill Gas Monitoring Results (2012 -2022)



LEGEND:

▲ GV-1 LANDFILL GAS MONITORING PROBE

20m SEPARATION DISTANCE

APPROXIMATE LIMIT OF WASTE
(AS BASED ON HISTORIC BACKHOE
TESTPIT INFORMATION)

0 7.5 15 22.5m

1:750

Coordinate System:
UTM ZONE 17 NAD83
METRES

N

GHD

PARK STREET LANDFILL SITE
KINCARDINE, ONTARIO

LANDFILL GAS MONITORING LOCATIONS

Project No. **4074**
Date **December 2022**

FIGURE 1

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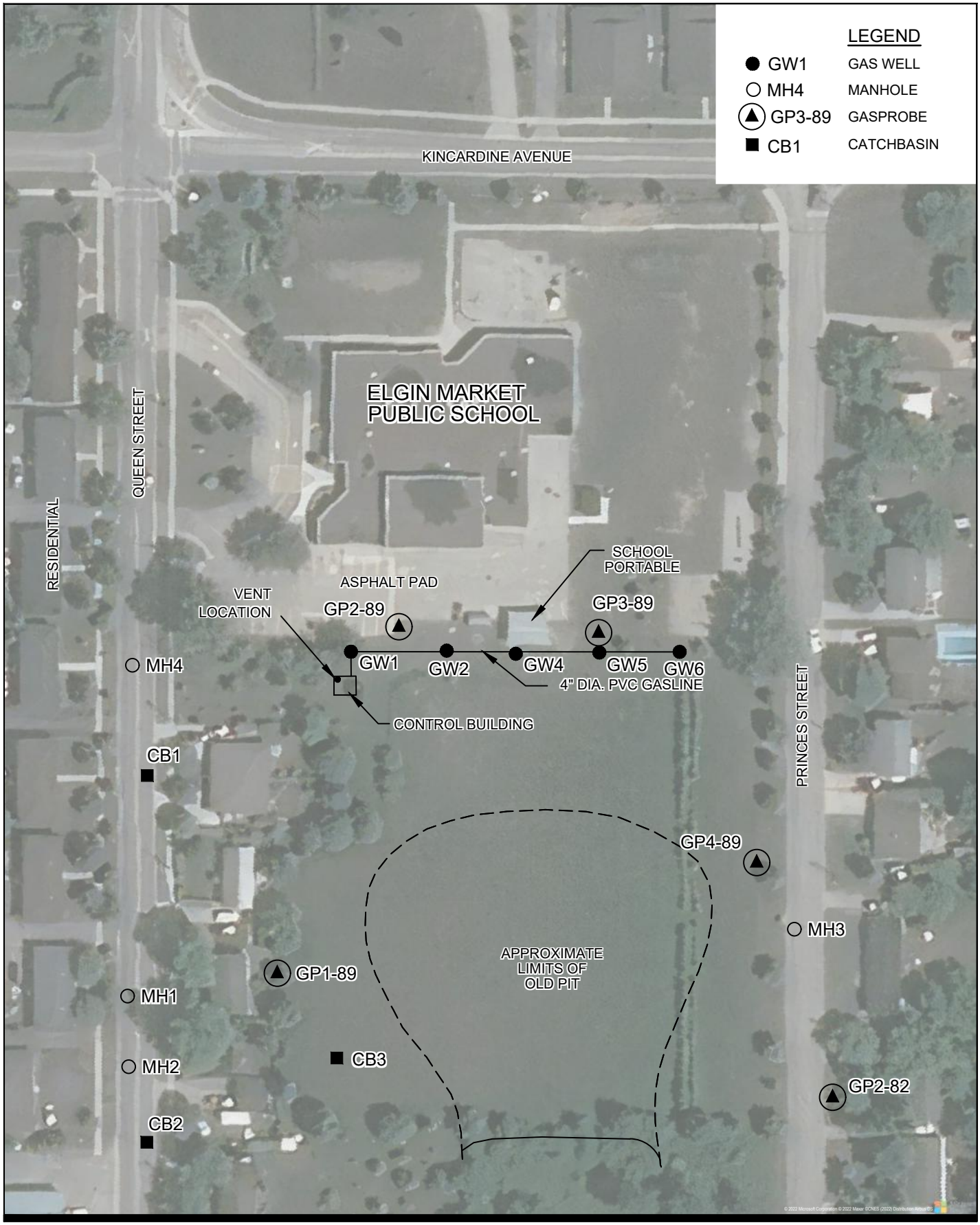
Plot Date: 28 December 2022 1:07 PM



NOT TO SCALE

ELGIN MARKET LANDFILL SITE
KINCARDINE, ONTARIO

Project No. **4074**
Date **December 2022**

LANDFILL GAS MONITORING LOCATIONS

FIGURE 2

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Plot Date: 28 December 2022 1:50 PM

Table 1

Landfill Gas Monitoring Locations and Parameters
Park Street Landfill Site

Location	Static Pressure	% Methane
Landfill Gas Monitoring Probes		
(9 locations)		
GV-1	√	√
GV-2	√	√
GV-3	√	√
GV-4	√	√
GV-5	√	√
GV-6	√	√
GV-7	√	√
GV-8	√	√
GV-9	√	√

Notes:

To be monitored in late February, March, April, July, and December.

Table 2

Landfill Gas Monitoring Locations and Parameters
Elgin Market Street Landfill Site

Location	Pressure (Blower On)	% Methane (Blower Off)
Landfill Gas Monitoring Probes		
(5 locations)		
GP2-82	√	√
GP1-89	√	√
GP2-89	√	√
GP3-89	√	√
GP4-89	√	√
Gas Control System		
(6 locations)		
GW1	√	√
GW2	√	√
GW4	√	√
GW5	√	√
GW6	√	√
Blower Intake	√	√
Additional Monitoring Locations		***% Methane***
(9 locations)		
School Building		
School Foundation		√
School Auditorium		√
Off-Site Manholes & Catchbasins		
MH1		√
MH2		√
MH3		√
MH4		√
CB1		√
CB2		√
CB3		√

Notes:

To be monitored in February, April, July, and December.
Pressure to be measured with the blower on. % methane readings to be collected with the blower off.

Table 3

Summary of Landfill Gas Monitoring Results
2022 Annual Landfill Gas Monitoring Report
Park Street Landfill Site
Kincardine, Ontario

% CH_4	% CO_2	%O_2	e (" WC)	% CH_4	% CO_2	%O_2	e (" WC)	% CH_4	% CO_2	%O_2	e (" WC)	% CH_4	% CO_2	%O_2	e (" WC)	% CH_4	% CO_2	%O_2	e (" WC)
21-Feb-22				**7-Mar-22**				**1-Apr-22**				**23-Jul-22**				**1-Dec-22**			
0.0	0.1	18.3	-	0.0	0.0	18.9	-	0.0	0.2	16.6	-	0.0	0.9	17.3	-	0.0	0.0	18.3	-
0.0	0.1	18.4	-	0.0	0.0	18.8	-	0.0	0.0	19.6	-	0.0	0.2	17.7	-	0.0	0.2	18.3	-
0.0	0.4	18.1	-	0.0	0.0	19.0	-	0.0	0.2	19.6	-	0.0	1.4	16.9	-	0.0	0.2	18.3	-
0.0	0.0	18.6	-	0.0	0.0	18.9	-	0.0	0.2	19.3	-	0.0	2.1	16.1	-	0.0	0.2	18.2	-
0.0	0.0	18.6	-	0.0	0.0	19.4	-	0.0	0.6	19.2	-	0.0	1.5	16.7	-	0.0	0.4	18.4	-
0.0	0.4	18.3	-	0.0	0.0	19.4	-	0.0	0.3	19.4	-	0.0	1.2	17.1	-	0.0	0.2	18.4	-
0.0	0.0	18.7	-	0.0	0.3	19.2	-	0.0	0.3	19.3	-	0.0	0.3	17.8	-	0.0	0.6	18.1	-
0.0	0.3	18.5	-	0.0	0.0	19.3	-	0.0	0.3	19.4	-	0.0	0.0	18.0	-	0.0	0.1	18.2	-
0.0	0.0	18.9	-	0.0	0.0	19.9	-	0.0	0.6	19.4	-	0.0	1.6	16.9	-	0.0	0.1	18.2	-

Notes:

- - No data; not part of the monitoring program
nm - Not measured
2.3 % CH_4 detected (above the accuracy of the GEM5000)

Table 3

Summary of Landfill Gas Monitoring Results
2022 Annual Landfill Gas Monitoring Report
Park Street Landfill Site
Kincardine, Ontario

% CH_4	% CO_2	%O_2	e (" WC)	% CH_4	% CO_2	%O_2	e (" WC)	% CH_4	% CO_2	%O_2	e (" WC)	% CH_4	% CO_2	%O_2	e (" WC)	% CH_4	% CO_2	%O_2	e (" WC)
27-Feb-23				**24-Mar-23**				**28-Apr-23**				**12-Jul-23**				**7-Nov-23**			
0.0	0.3	21.1	0.0	0.0	0.2	21.7	0.0	0.0	0.6	19.9	0.0	0.0	0.8	19.7	0.0	0.0	0.1	20.9	0.0
0.0	0.3	21.0	0.0	0.0	0.2	21.7	0.0	0.0	0.7	19.8	0.0	0.0	0.8	19.6	0.0	0.0	0.2	20.9	0.0
0.0	0.2	20.9	0.0	0.0	0.1	21.7	0.0	0.0	0.8	19.6	0.0	0.0	0.1	20.1	0.0	0.0	0.2	20.9	0.0
0.1	0.4	20.9	0.0	0.0	0.1	21.5	0.0	0.0	0.8	19.7	0.0	0.0	0.1	19.9	0.0	0.0	0.3	20.8	0.0
0.1	0.5	20.5	0.0	0.0	0.5	21.1	0.0	0.1	1.1	19.6	0.0	0.0	2.8	17.1	0.0	0.0	0.8	20.3	0.0
0.1	0.5	20.7	0.0	0.0	0.1	21.4	0.0	0.0	0.2	20.2	0.0	0.0	2.2	17.7	0.0	0.0	0.2	20.6	0.0
0.0	0.2	21.0	0.0	0.0	0.5	21.0	0.0	0.0	0.1	20.4	0.0	0.0	1.6	18.4	0.0	0.0	0.5	20.6	0.0
0.0	0.4	20.9	0.0	0.0	0.4	21.2	0.0	0.0	0.7	19.8	0.0	0.0	2.1	17.8	0.0	0.0	0.1	21.0	0.0
0.0	0.4	20.9	0.0	0.0	0.5	21.1	0.0	0.0	0.8	19.7	0.0	0.0	3.4	16.8	0.0	0.0	0.5	20.6	0.0

Notes:

- - No data; not part of the monitoring program
nm - Not measured
2.3 % CH_4 detected (above the accuracy of the GEM5000)

Table 4

Summary of Landfill Gas Monitoring Results
2023 Annual Landfill Gas Monitoring Report
Elgin/Market Street Landfill Site
Kincardine, Ontario

				Pressure (" of WC)					Pressure (" of WC)				Pressure (" of WC)				Pressure (" of WC)			
				Blower	*Blower*				*Blower*	*Blower*			*Blower*	*Blower*					*Blower*	*Blower*
Location ID	***% CH_4***	***% CO_2***	***%O_2***	***off***	***on***	***% CH_4***	***% CO_2***	***%O_2***	***off***	***on***	***% CH_4***	***% CO_2***	***%O_2***	***off***	***on***	***% CH_4***	***% CO_2***	***%O_2***	***off***	***on***
	21-Feb-22					**7-Mar-22**					**23-Jul-22**					**1-Dec-22**				
Gas Probes																				
GP2-82	0.0	0.1	19.9	0.0	-	0.0	0.1	19.6	0.0	-	0.0	0.3	17.9	0.0	-	0.0	0.0	18.4	0.0	-
GP1-89	0.0	0.1	18.9	0.0	-	0.0	0.1	18.9	0.0	-	0.0	2.6	17.2	0.0	-	0.1	5.9	12.2	0.0	-
GP2-89	0.0	1.2	17.5	0.0	-	0.0	1.1	17.1	0.0	-	0.0	3.2	15.4	0.0	-	0.0	0.1	18.7	0.0	-
GP3-89	0.0	0.0	20.0	0.0	-	0.0	0.0	19.9	0.0	-	0.0	0.6	17.6	0.0	-	0.0	1.7	17.1	0.0	-
GP4-89	0.0	0.0	19.9	0.0	-	0.0	0.0	19.9	0.0	-	0.0	0.1	18.1	0.0	-	-		damaged		
Off-Site Manholes and Catchbasins																				
MH1	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
MH2	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
MH3	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
MH4	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.1	-	-	-	-
CB1	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
CB2	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
CB3	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
Gas Control System																				
GW1	0.0	0.1	19.6	0.0	-3.40	0.0	0.1	19.4	0.0	-3.40	0.0	0.3	18.0	0.0	-3.6	0.0	0.1	18.6	0 / -0.09	-
GW2	**7.9**	18.2	0.0	0.0	0.0	**8.1**	17.9	0.0	0.0	0.0	**2.7**	16.3	0.7	0.0	0.0	0.0	0.1	18.9	0 / -0.07	-
GW3	0.0	0.1	19.0	0.0	0.0	0.0	0.2	19.0	0.0	0.0	0.0	0.4	17.8	0.0	0.0	0.0	2.9	15.7	0.0	-
GW4	0.0	0.5	18.3	0.0	0.0	0.0	0.5	19.1	0.0	0.0	0.0	1.9	16.7	0.0	0.0	0.1	1.7	17.2	0.0	-
GW5	0.0	0.1	18.9	0.0	0.0	0.0	0.1	18.9	0.0	0.0	0.0	4.4	14.1	0.0	0.0	0.0	2.2	16.8	0.0	-
GW6	0.0	0.1	19.0	0.0	0.0	0.0	0.1	19.1	0.0	0.0	0.0	2.0	16.7	0.0	0.0	0.0	2.0	17.0	0.0	-
Blower Intake	0.0	-	-	0.0	-3.90	0.0	-	-	0.0	-3.90	0.0	-	-	0.0	-3.9	0.0	-	-	-	-

Notes:
- - No data; not part of the monitoring program
nm - Not measured
6.7 % CH_4 detected (above the accuracy of the GEM5000)
The %CH4, %CO2, %O2 measurments are collected when the blower is off
The school building locations were inaccessable since 2017.
Pressure readings are not collected from the off-Site Manholes and catchbasins
Blower access panel was not accessible during Dec 2022 monitoring

Table 4

Summary of Landfill Gas Monitoring Results
2023 Annual Landfill Gas Monitoring Report
Elgin/Market Street Landfill Site
Kincardine, Ontario

Location ID	27-Feb-23			Pressure (" of WC)		24-Mar-23			Pressure (" of WC)		28-Apr-23			Pressure (" of WC)		12-Jul-23			Pressure (" of WC)		7-Nov-23			Pressure (" of WC)	
	% CH_4	% CO_2	%O_2	*Blower off*	*Blower on*	% CH_4	% CO_2	%O_2	*Blower off*	*Blower on*	% CH_4	% CO_2	%O_2	*Blower off*	*Blower on*	% CH_4	% CO_2	%O_2	Blower off	Blower on	% CH_4	% CO_2	%O_2	*Blower off*	*Blower on*
Gas Probes																									
GP2-82	-	-	-	-	-	0.0	0.1	22.5	0.0	0.0	0.0	0.1	20.1	0.0	0.0	0.0	0.3	19.7	0.0	0.0	0.0	0.1	21.0	-	0.0
GP1-89	0.0	3.8	17.2	0.0	0.0	0.0	3.8	18.2	0.0	0.0	0.0	3.2	17.3	0.0	0.0	0.0	3.1	17.2	0.0	0.0	0.0	4.7	16.9	-	0.0
GP2-89	0.0	0.3	20.2	0.0	0.0	0.0	0.1	22.5	0.0	0.0	0.0	0.2	20.2	0.0	0.0	0.0	0.1	20.3	0.0	0.0	0.0	0.2	21.6	-	0.0
GP3-89	0.0	1.3	18.6	0.0	0.0	0.0	1.4	20.6	0.0	0.0	0.0	1.3	18.3	0.0	0.0	0.0	1.9	17.6	0.0	0.0	0.0	2.4	18.7	-	0.0
GP4-89	-	-	-	-	-	0.0	7.1	12.5	0.0	0.0	0.0	6.2	13.1	0.0	0.0	0.0	4.1	16.2	0.0	-0.81	0.0	6.6	13.4	-	0.0
Off-Site Manholes and Catchbasins																									
MH1	0.0	0.2	20.6	-	-	0.0	0.1	22.3	-	-	0.0	0.1	20.4	-	-	0.0	0.0	20.3	-	-	0.0	0.1	21.8	-	-
MH2	0.0	0.2	20.6	-	-	0.0	0.1	22.5	-	-	0.0	0.1	20.4	-	-	0.0	0.0	20.3	-	-	0.0	0.1	21.8	-	-
MH3	-	-	-	-	-	0.0	0.2	21.6	-	-	0.0	0.2	20.2	-	-	0.0	0.1	20.2	-	-	0.0	0.1	21.8	-	-
MH4	0.0	0.2	20.5	-	-	0.0	0.1	22.4	-	-	0.0	0.1	20.3	-	-	0.0	0.1	20.3	-	-	0.0	0.1	21.8	-	-
CB1	0.0	0.2	20.6	-	-	0.0	0.1	22.3	-	-	0.0	0.1	20.3	-	-	0.0	0.0	20.3	-	-	0.0	0.1	21.8	-	-
CB2	0.0	0.2	20.6	-	-	0.0	0.1	22.5	-	-	0.0	0.1	20.5	-	-	0.0	0.0	20.3	-	-	0.0	0.1	21.8	-	-
CB3	0.0	0.2	20.7	-	-	0.0	0.2	22.3	-	-	0.0	0.1	20.4	-	-	0.0	0.0	20.2	-	-	0.0	0.1	21.7	-	-
Gas Control System																									
GW1	0.0	0.2	20.9	0.09	-4.54	0.0	0.1	22.5	0.0	-4.49	0.0	0.1	20.3	0.0	0.0	0.0	0.3	19.4	0.0	0.0	0.0	0.1	21.8	-	0.0
GW2	**6.7**	18.3	0.1	0.0	0.00	**0.7**	15.5	2.8	0.0	0.0	**3.9**	13.8	0.3	0.0	0.0	**2.7**	12.9	1.8	0.0	0.0	0.0	0.2	21.6	-	0.0
GW3	0.0	2.8	16.6	0.0	0.00	0.0	2.0	19.5	0.0	0.0	0.0	5.1	11.3	0.0	0.0	0.0	1.5	17.1	0.0	0.0	0.0	0.2	21.5	-	0.0
GW4	0.0	0.4	20.0	0.0	0.00	0.0	0.4	22.0	0.0	0.0	0.0	0.7	19.2	0.0	0.0	0.0	0.9	19.0	0.0	0.0	0.0	0.7	20.8	-	0.0
GW5	0.0	3.8	16.8	0.0	0.00	0.0	2.2	19.5	0.06	0.1	0.0	3.6	16.0	0.0	0.0	0.0	3.9	15.5	0.0	0.0	0.0	3.6	17.2	-	0.0
GW6	0.0	2.6	18.4	0.0	0.00	0.0	2.3	20.3	0.0	0.0	0.0	2.5	18.2	0.05	0.0	0.0	2.2	18.1	0.0	0.0	0.0	2.0	19.2	-	0.0
Blower Intake					-4.65					-4.55					-					-					-

Notes:
- - No data; not part of the monitoring program
nm - Not measured
6.7 % CH_4 detected (above the accuracy of the GEM5000)
The %CH4, %CO2, %O2 measurments are collected when the blower is off
The school building locations were inaccessable since 2017.
Pressure readings are not collected from the off-Site Manholes and catchbasins

Attachments

Attachment A.1

Park Street - Historical Landfill Gas Monitoring Results (2012 - 2022)

Summary of Landfill Gas Monitoring Results
2022 Annual Landfill Gas Monitoring Report
Park Street Landfill Site
Kincardine, Ontario

Location ID	*% LEL*	*% Volume*	*% LEL*	*% Volume*	*% LEL*	*% Volume*	*% LEL*	*% Volume*	*Location ID*	*% LEL*	*% Volume*
	1-Feb-12		**1-Apr-12**		**1-Jul-12**		**1-Dec-12**			**17-Mar-15**	
GV-1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	GV-1	0.0	0.0
GV-2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	GV-2	0.0	0.0
GV-3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	GV-3	0.0	0.0
GV-4		damaged		damaged		damaged		damaged	GV-4		damaged
GV-5									GV-5		
GV-6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	GV-6	0.0	20.9
GV-7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	GV-7	0.0	20.9
GV-8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	GV-8	0.0	20.9
GV-9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	GV-9	0.0	20.9

Notes:

- - No data; not part of the monitoring program
nm - Not measured

6.7

GV-5 and GV-6 were damaged and could not be monitored

Summary of Landfill Gas Monitoring Results
2022 Annual Landfill Gas Monitoring Report
Park Street Landfill Site
Kincardine, Ontario

Location ID	*% LEL*	*% Volume*	*% LEL*	*% Volume*	*% LEL*	*% Volume*	*% LEL*	*% Volume*		*% CO_2*	*%O_2*	*Pressure (" WC)*
	1-Feb-17		**12-Apr-17**		**5-Mar-17**		**31-Jul-17**				**29-Dec-17**	
GV-1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.1	22.1	0
GV-2	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.1	22.8	0
GV-3	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.5	22.4	0
GV-4												
GV-5		damaged		damaged		damaged		damaged			damaged	
GV-6	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.5	22.4	0
GV-7	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.5	22.1	0
GV-8	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.5	22.0	0
GV-9	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0.4	22.1	0

Notes:

- - No data; not part of the monitoring program
nm - Not measured

6.7

GV-5 and GV-6 were damaged in 2017 and could not be monitored

Summary of Landfill Gas Monitoring Results
2022 Annual Landfill Gas Monitoring Report
Park Street Landfill Site
Kincardine, Ontario

Location ID	% CH_4	% CO_2	%O_2	Pressure (" WC)	% CH_4	% CO_2	%O_2	Pressure (" WC)	% CH_4	% CO_2	%O_2	Pressure (" WC)	% CH_4	% CO_2	%O_2	Pressure (" WC)	% CH_4	% CO_2	%O_2	Pressure (" WC)
	6-Feb-18				23-Mar-18				22-Apr-18				27-Jul-18				29-Dec-18			
GV-1	0.0	0.0	21.2	0	0.0	0.0	20.6	0	0.0	0.0	20.2	0	0.0	-	-	0	0.0	0.0	21.5	0
GV-2	0.0	0.0	20.9	0	0.0	0.0	20.6	0	0.0	0.0	21.0	0	0.0	-	-	0	0.0	0.0	20.7	0
GV-3	0.0	0.0	21.1	0	0.0	0.0	20.6	0	0.0	0.2	19.9	0	0.0	-	-	0	0.0	0.0	21.9	0
GV-4																				
GV-5			damaged				damaged				damaged				damaged				damaged	
GV-6	0.0	0.0	20.8	0	0.0	0.3	20.6	0	0.0	0.3	20.3	0	0.0	-	-	0	0.0	0.0	20.1	0
GV-7	0.0	0.0	20.7	0	0.0	0.4	20.6	0	0.0	0.1	20.1	0	0.0	-	-	0	0.0	0.0	21.0	0
GV-8	0.0	0.0	21.2	0	0.0	0.2	20.6	0	0.0	0.2	20.1	0	0.0	-	-	0	0.0	0.0	20.0	0
GV-9	0.0	0.0	21.2	0	0.0	0.0	20.6	0	0.0	0.3	19.8	0	0.0	-	-	0	0.0	0.0	21.1	0

Notes:

- - No data; not part of the monitoring program
nm - Not measured
6.7 % CH_4 detected (above the accuracy of the GEM5000)
The O2 and CO2 sensors were damaged during the July 2018 monitoring event.
GV-5 and GV-6 were damaged in 2017 and could not be monitored

Summary of Landfill Gas Monitoring Results
2022 Annual Landfill Gas Monitoring Report
Park Street Landfill Site
Kincardine, Ontario

Location ID	% CH_4	% CO_2	%O_2	Pressure (" WC)	% CH_4	% CO_2	%O_2	Pressure (" WC)	% CH_4	% CO_2	%O_2	Pressure (" WC)	% CH_4	% CO_2	%O_2	Pressure (" WC)	% CH_4	% CO_2	%O_2	Pressure (" WC)
	23-Jan-19				16-Mar-19				6-Apr-19				26-Jul-19				28-Dec-19			
GV-1	0.0	0.0	19.9	-	0.0	0.1	20.6	-	0.0	0.1	21.0	-	0.0	1.1	19.7	-	0.0	0.1	19.6	-
GV-2	0.0	0.2	19.4	-	0.0	0.1	20.7	-	0.0	0.2	20.9	-	0.0	1.3	19.5	-	0.0	0.1	19.6	-
GV-3	0.0	0.0	20.1	-	0.0	0.1	20.7	-	0.0	0.2	21.0	-	0.0	1.2	19.5	-	0.0	0.1	19.7	-
GV-4													0.0	0.0	20.3	-	0.0	0.3	19.5	-
GV-5			damaged				damaged				damaged		0.0	2.9	17.4	-	0.0	0.0	19.7	-
GV-6	0.0	0.0	20.1	-	0.0	0.1	20.9	-	0.0	0.1	20.1	-	0.0	0.1	19.9	-	0.0	0.1	19.7	-
GV-7	0.0	0.0	20.2	-	0.0	1.1	18.5	-	0.0	0.7	20.4	-	0.0	0.2	19.5	-	0.0	0.0	19.8	-
GV-8	0.0	0.0	20.2	-	0.0	0.2	17.9	-	0.0	0.4	20.6	-	0.0	0.4	18.9	-	0.0	0.2	19.7	-
GV-9	0.0	0.0	20.2	-	0.0	0.7	17.9	-	0.0	0.5	20.6	-	0.0	1.7	17.5	-	0.0	0.3	19.6	-

Notes:

- - No data; not part of the monitoring program
nm - Not measured
2.3 % CH_4 detected (above the accuracy of the GEM5000)
GV-5 and GV-6 were damaged in 2017 and could not be monitored

Summary of Landfill Gas Monitoring Results
2022 Annual Landfill Gas Monitoring Report
Park Street Landfill Site
Kincardine, Ontario

Location ID	% CH_4	% CO_2	%O_2	Pressure (" WC)	% CH_4	% CO_2	%O_2	Pressure (" WC)	% CH_4	% CO_2	%O_2	Pressure (" WC)	% CH_4	% CO_2	%O_2	Pressure (" WC)
			1-Feb-21				1-Mar-21				4-Apr-21				11-Dec-21	
GV-1	0.0	0.1	18.8	-	0.0	0.1	17.8	-	0.0	0.1	18.1	-	0.0	0.1	18.7	-
GV-2	0.0	0.1	19.2	-	0.0	0.1	18.0	-	0.0	0.1	17.8	-	0.0	0.0	18.8	-
GV-3	0.0	0.1	19.6	-	0.0	0.2	18.3	-	0.0	0.1	17.7	-	0.0	0.2	18.7	-
GV-4	0.0	0.5	19.5	-	0.0	0.2	19	-	0.0	0.2	17.1	-	0.0	0.3	18.3	-
GV-5	0.0	1	19.3	-	0.0	0.5	18.8	-	0.0	0.1	16.8	-	0.0	0.3	18.9	-
GV-6	0.0	0.0	20.6	-	0.0	0.2	19	-	0.0	0.2	16.3	-	0.0	0.3	18.7	-
GV-7	0.0	0.3	20.3	-	0.0	0.1	19.2	-	0.0	0.1	16.3	-	0.0	0.3	18.7	-
GV-8	0.0	0.3	20.4	-	0.0	0.1	19.3	-	0.0	0.3	16.1	-	0.0	0.2	18.6	-
GV-9	0.0	0.0	20.7	-	0.0	0.2	19.3	-	0.0	0.1	16.2	-	0.0	0.5	18.6	-

Notes:

- - No data; not part of the monitoring program
nm - Not measured
2.3 % CH_4 detected (above the accuracy of the GEM5000)
GV-5 and GV-6 were damaged in 2017 and could not be monitored

Summary of Landfill Gas Monitoring Results
2022 Annual Landfill Gas Monitoring Report
Park Street Landfill Site
Kincardine, Ontario

Location ID	% CH_4	% CO_2	%O_2	e (" WC)	% CH_4	% CO_2	%O_2	e (" WC)	% CH_4	% CO_2	%O_2	e (" WC)	% CH_4	% CO_2	%O_2	e (" WC)	% CH_4	% CO_2	%O_2	e (" WC)
	21-Feb-22				7-Mar-22				1-Apr-22				23-Jul-22				1-Dec-22			
GV-1	0.0	0.1	18.3	-	0.0	0.0	18.9	-	0.0	0.2	16.6	-	0.0	0.9	17.3	-	0.0	0.0	18.3	-
GV-2	0.0	0.1	18.4	-	0.0	0.0	18.8	-	0.0	0.0	19.6	-	0.0	0.2	17.7	-	0.0	0.2	18.3	-
GV-3	0.0	0.4	18.1	-	0.0	0.0	19.0	-	0.0	0.2	19.6	-	0.0	1.4	16.9	-	0.0	0.2	18.3	-
GV-4	0.0	0.0	18.6	-	0.0	0.0	18.9	-	0.0	0.2	19.3	-	0.0	2.1	16.1	-	0.0	0.2	18.2	-
GV-5	0.0	0.0	18.6	-	0.0	0.0	19.4	-	0.0	0.6	19.2	-	0.0	1.5	16.7	-	0.0	0.4	18.4	-
GV-6	0.0	0.4	18.3	-	0.0	0.0	19.4	-	0.0	0.3	19.4	-	0.0	1.2	17.1	-	0.0	0.2	18.4	-
GV-7	0.0	0.0	18.7	-	0.0	0.3	19.2	-	0.0	0.3	19.3	-	0.0	0.3	17.8	-	0.0	0.6	18.1	-
GV-8	0.0	0.3	18.5	-	0.0	0.0	19.3	-	0.0	0.3	19.4	-	0.0	0.0	18.0	-	0.0	0.1	18.2	-
GV-9	0.0	0.0	18.9	-	0.0	0.0	19.9	-	0.0	0.6	19.4	-	0.0	1.6	16.9	-	0.0	0.1	18.2	-

Notes:

- - No data; not part of the monitoring program
nm - Not measured
2.3 % CH_4 detected (above the accuracy of the GEM5000)
GV-5 and GV-6 were damaged in 2017 and could not be monitored

Summary of Landfill Gas Monitoring Results
2022 Annual Landfill Gas Monitoring Report
Park Street Landfill Site
Kincardine, Ontario

% CH_4	% CO_2	%O_2	e (" WC)	% CH_4	% CO_2	%O_2	e (" WC)	% CH_4	% CO_2	%O_2	e (" WC)	% CH_4	% CO_2	%O_2	e (" WC)	% CH_4	% CO_2	%O_2	e (" WC)
27-Feb-23				**24-Mar-23**				**28-Apr-23**				**12-Jul-23**				**7-Nov-23**			
0.0	0.3	21.1	0.0	0.0	0.2	21.7	0.0	0.0	0.6	19.9	0.0	0.0	0.8	19.7	0.0	0.0	0.1	20.9	0.0
0.0	0.3	21.0	0.0	0.0	0.2	21.7	0.0	0.0	0.7	19.8	0.0	0.0	0.8	19.6	0.0	0.0	0.2	20.9	0.0
0.0	0.2	20.9	0.0	0.0	0.1	21.7	0.0	0.0	0.8	19.6	0.0	0.0	0.1	20.1	0.0	0.0	0.2	20.9	0.0
0.1	0.4	20.9	0.0	0.0	0.1	21.5	0.0	0.0	0.8	19.7	0.0	0.0	0.1	19.9	0.0	0.0	0.3	20.8	0.0
0.1	0.5	20.5	0.0	0.0	0.5	21.1	0.0	0.1	1.1	19.6	0.0	0.0	2.8	17.1	0.0	0.0	0.8	20.3	0.0
0.1	0.5	20.7	0.0	0.0	0.1	21.4	0.0	0.0	0.2	20.2	0.0	0.0	2.2	17.7	0.0	0.0	0.2	20.6	0.0
0.0	0.2	21.0	0.0	0.0	0.5	21.0	0.0	0.0	0.1	20.4	0.0	0.0	1.6	18.4	0.0	0.0	0.5	20.6	0.0
0.0	0.4	20.9	0.0	0.0	0.4	21.2	0.0	0.0	0.7	19.8	0.0	0.0	2.1	17.8	0.0	0.0	0.1	21.0	0.0
0.0	0.4	20.9	0.0	0.0	0.5	21.1	0.0	0.0	0.8	19.7	0.0	0.0	3.4	16.8	0.0	0.0	0.5	20.6	0.0

Notes:

- - No data; not part of the monitoring program
nm - Not measured
2.3 % CH_4 detected (above the accuracy of the GEM5000)

Attachment A.2

Elgin/Market Street - Historical Landfill Gas Monitoring Results (2012 - 2022)

Attachment A.2

Summary of Landfill Gas Monitoring Results
2023 Annual Landfill Gas Monitoring Report
Elgin/Market Street Landfill Site
Kincardine, Ontario

Location ID	% CH_4 (v/v)	Pressure (" of WC) (blower on)	% CH_4 (v/v)	Pressure (" of WC) (blower on)	% CH_4 (v/v)	Pressure (" of WC) (blower on)	% CH_4 (v/v)	% CO_2 (v/v)	% O_2 (v/v)	Pressure (" of WC) Blower off	Pressure (" of WC) Blower on
	1-Feb-17		12-Apr-17		31-Jul-17		29-Dec-17				
Gas Probes											
GP2-82	0.0	-	0.0	-	0.0	-	0.0	0.0	20.7	0.0	0.0
GP1-89	0.0	-	0.0	-	0.0	-	0.0	7.4	17.3	0.0	0.0
GP2-89	0.0	-	0.0	-	0.0	-	0.0	0.0	22.4	0.0	-0.3
GP3-89	0.0	-	0.0	-	0.0	-	0.0	0.9	22.4	0.0	0.0
GP4-89	0.0	-	0.0	-	0.0	-	0.0	0.0	22.4	0.0	0.0
School Buildings											
School Foundation	-	-	-	-	-	-	-	-	-	-	-
School Auditorium	-	-	-	-	-	-	-	-	-	-	-
Off-Site Manholes and Catchbasins											
MH1	0.0	-	0.0	-	0.0	-	0.0	-	-	-	-
MH2	0.0	-	0.0	-	0.0	-	0.0	-	-	-	-
MH3	0.0	-	0.0	-	0.0	-	0.0	-	-	-	-
MH4	0.0	-	0.0	-	0.0	-	0.0	-	-	-	-
CB1	0.0	-	0.0	-	0.0	-	0.0	-	-	-	-
CB2	0.0	-	0.0	-	0.0	-	0.0	-	-	-	-
CB3	0.0	-	0.0	-	0.0	-	0.0	-	-	-	-
Gas Control System											
GW1	0.0	-2.74	0.0	-4.02	0.0	-3.69	0.0	0.1	22.4	+0.4	-66.8
GW2	**1.6**	0.00	**1.7**	0.00	**1.2**	0.00	**7.5**	16.4	0.5	+0.8	-0.4
GW3	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.7	20.8	+0.4	+0.3
GW4	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.8	21.7	+0.8	+0.4
GW5	0.0	0.00	0.0	0.00	0.0	0.00	0.0	2.4	19.5	+0.1	+0.1
GW6	0.0	0.00	0.0	0.00	0.0	0.00	0.0	1.6	20.4	+0.4	+0.4
Blower Intake	-	-	-	-	-	-	-	-	-	+5.0	-4.0

Notes

- - No data; not part of the monitoring program
nm - Not measured
6.7
The %CH4, %CO2, %O2 measurments are collected when the blower is off
The school building locations were inaccessable since 2017.
Pressure readings are not collected from the off-Site Manholes and catchbasins
Blower access panel was not accessible during Dec 2022 monitoring

Summary of Landfill Gas Monitoring Results
2023 Annual Landfill Gas Monitoring Report
Elgin/Market Street Landfill Site
Kincardine, Ontario

				Pressure (" of WC)					Pressure (" of WC)					Pressure (" of WC)					Pressure (" of WC)	
Location ID	*% CH_4 (v/v)*	*% CO_2 (v/v)*	*%O_2 (v/v)*	*Blower off*	*Blower on*	*% CH_4 (v/v)*	*% CO_2 (v/v)*	*%O_2 (v/v)*	*Blower off*	*Blower on*	*% CH_4 (v/v)*	*% CO_2 (v/v)*	*%O_2 (v/v)*	*Blower off*	*Blower on*	*% CH_4 (v/v)*	*% CO_2 (v/v)*	*%O_2 (v/v)*	*Blower off*	*Blower on*
			6-Feb-18					22-Apr-18					27-Jul-18					9-Dec-18		
Gas Probes																				
GP2-82	0.0	0.0	21.6	0.0	-	0.0	0.0	20.8	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	21.6	0.0	0.0
GP1-89	0.0	0.5	18.3	0.0	-	0.0	2.4	18.6	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	22.1	0.0	0.0
GP2-89	0.0	0.9	19.9	0.0	-	0.0	0.0	22.2	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	20.1	0.0	0.0
GP3-89	0.0	0.0	21.7	0.0	-	0.0	0.9	21.8	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	21.7	0.0	0.0
GP4-89	0.0	0.0	21.2	0.0	-	0.0	0.0	20.9	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	20.1	0.0	0.0
												-	-				-	-		
School Buildings												-	-				-	-		
School Foundation																				
School Auditorium																				
Off-Site Manholes and Catchbasins																				
MH1	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
MH2	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
MH3	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
MH4	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
CB1	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
CB2	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
CB3	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
Gas Control System																				
GW1	0.0	0.3	21.2	0.0	-60	0.0	0.1	22.6	+0.3	-60.4	0.0	-	-	0.0	-4.65	0.0	0.0	21.5	+0.1	-59.0
GW2	**5.8**	10.4	4	0.0	-0.1	0.0	13.1	0.5	+0.5	-0.4	**4.2**	-	-	0.0	0.0	**3.5**	12.0	8.5	+0.6	-0.4
GW3	0.0	0.1	21.8	0.0	0	0.0	0.1	22.3	+0.2	+0.4	0.0	-	-	0.0	0.0	0.0	0.0	21.5	+0.4	-0.3
GW4			Frozen			0.0	0.5	21.7	+0.4	+0.3	0.0	-	-	0.0	0.0	0.0	0.7	21.0	+0.2	-0.2
GW5	0.0	0.4	20	0.0	0	0.0	1.7	20.5	+0.2	+0.2	0.0	-	-	0.0	0.0	0.0	0.9	20.7	+0.1	-0.1
GW6	0.0	0.1	21.1	0.0	0	0.0	0.5	22.5	+0.4	+0.4	0.0	-	-	0.0	0.0	0.0	1.1	20.6	+0.1	-0.1
Blower Intake	-	-	-	+15	-4.0	-	-	-	-	-	-	-	-	0.0	-10.7	-	-	-	+1.5	-4.0

Notes

- - No data; not part of the monitoring program
nm - Not measured
6.7
The %CH4, %CO2, %O2 measurments are collected when the blower is off
The school building locations were inaccessable since 2017.
Pressure readings are not collected from the off-Site Manholes and catchbasins
Blower access panel was not accessible during Dec 2022 monitoring

Summary of Landfill Gas Monitoring Results
2023 Annual Landfill Gas Monitoring Report
Elgin/Market Street Landfill Site
Kincardine, Ontario

				Pressure (" of WC)					Pressure (" of WC)					Pressure (" of WC)				Pressure (" of WC)	
	$\%CH_4$	$\%CO_2$	$\%O_2$			$\%CH_4$	$\%CO_2$	$\%O_2$			$\%CH_4$	$\%CO_2$	$\%O_2$			$\%CH_4$	$\%CO_2$	$\%O_2$		
Location ID	*(v/v)*	*(v/v)*	*(v/v)*	***Blower off***	***Blower on***	*(v/v)*	*(v/v)*	*(v/v)*	***Blower off***	***Blower on***	*(v/v)*	*(v/v)*	*(v/v)*	***Blower off***	***Blower on***	*(v/v)*	*(v/v)*	*(v/v)*	***Blower off***	***Blower on***
			23-Jan-19					6-Apr-19					27-Jul-19					28-Dec-19		
Gas Probes																				
GP2-82	0.0	0.4	18.7	0.0	-	0.0	0.1	20.6	0.0	-	0.0	0.3	20.3	0.0	-	0.0	0.10	19.8	0.0	-
GP1-89	0.0	2.4	14.5	0.0	-	0.0	3.4	17.4	0.0	-	0.0	4.1	17.1	0.0	-	0.0	3.40	17.1	0.0	-
GP2-89	0.0	1.4	17.6	0.0	-	0.0	0.2	20.5	0.0	-	0.0	0.2	19.8	0.0	-	0.0	1.10	18.3	0.0	-
GP3-89	0.0	1.1	18.1	0.0	-	0.0	1.8	18.7	0.0	-	0.0	2.3	18.1	0.0	-	0.0	0.50	19.2	0.0	-
GP4-89	0.0	1.0	18.6	0.0	-	nm	nm	nm	nm	nm	0.0	1.5	19.2	0.0	-	0.0	6.40	19.7	0.0	-
School Buildings																				
School Foundation																				
School Auditorium																				
Off-Site Manholes and Catchbasins																				
MH1	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
MH2	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
MH3	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
MH4	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
CB1	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
CB2	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
CB3	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
Gas Control System																				
GW1	0.0	0.7	19.2	0.0	-5.0	0.0	0.0	20.1	0.0	-4.9	0.0	0.2	20.3	0.0	-4.7	0.0	0.1	19.7	0.0	-3.4
GW2	8.3	18.7	4.6	0.0	0.0	3.4	16.7	0.6	0.0	0.0	2.2	14.8	1.1	0.0	-0.1	4.7	0.5	19.1	0.0	0.0
GW3	0.0	0.1	18.1	0.0	0.0	0.0	0.0	20.3	0.0	0.0	0.0	1.3	19.1	0.0	0	0.0	0.3	19.8	0.0	0.0
GW4	0.0	0.1	18.5	0.0	0.0	0.0	0.5	19.4	0.0	0.0	0.0	1.5	18.7	0.0	0.0	0.0	0.5	19.2	0.0	0.0
GW5	0.0	3.8	14.5	0.0	0.0	0.0	3.5	16.7	0.0	0.0	0.0	5.5	14.5	0.0	0.0	0.0	2.9	16.9	0.0	0.0
GW6	0.0	2.9	15.5	0.0	0.0	0.0	2.5	18.3	0.0	0.0	0.0	0.4	18.3	0.0	0	0.0	1.8	18.4	0.0	0.0
Blower Intake	-	-	-	0.0	-3.8	-	-	-	0.0	-3.5	-	-	-	0.0	-3.0	-	-	-	0.0	-3.0

Notes

- - No data; not part of the monitoring program
nm - Not measured

6.7

The %CH4, %CO2, %O2 measurments are collected when the blower is off
The school building locations were inaccessable since 2017.
Pressure readings are not collected from the off-Site Manholes and catchbasins
Blower access panel was not accessible during Dec 2022 monitoring

Attachment A.2

Summary of Landfill Gas Monitoring Results
2023 Annual Landfill Gas Monitoring Report
Elgin/Market Street Landfill Site
Kincardine, Ontario

				Pressure (" of WC)					Pressure (" of WC)					Pressure (" of WC)	
Location ID	*% CH_4 (v/v)*	*% CO_2 (v/v)*	*%O_2 (v/v)*	*Blower off*	*Blower on*	*% CH_4 (v/v)*	*% CO_2 (v/v)*	*%O_2 (v/v)*	*Blower off*	*Blower on*	*% CH_4 (v/v)*	*% CO_2 (v/v)*	*%O_2 (v/v)*	*Blower off*	*Blower on*
			1-Feb-21					2-Apr-21					11-Dec-21		
Gas Probes															
GP2-82	0.0	0.1	19.9	20.3	-	0.0	0.1	17.1	0.0	-	-	-	-	-	-
GP1-89	0.0	3.6	18.9	17.6	-	0.0	3.5	14.4	0.0	-	0.0	0.0	18.9	-	-
GP2-89	0.0	1.2	17.5	18.9	-	0.0	8.1	9.6	0.0	-	0.0	0.1	17.8	-	-
GP3-89	0.0	9.9	20.0	7.9	-	0.0	1.5	16.6	0.0	-	0.0	1.9	15.8	-	-
GP4-89			Damaged					Damaged			0.0	0.0	19.2	-	-
School Buildings															
School Foundation															
School Auditorium															
Off-Site Manholes and Catchbasins															
MH1	0.0	0.0	-	-	-	0.0	0.1	18.0	-	-	0.0	-	-	-	-
MH2	0.0	0.0	-	-	-	0.0	0.1	18.4	-	-	0.0	-	-	-	-
MH3	0.0	0.0	-	-	-	0.0	0.1	18.5	-	-	0.0	-	-	-	-
MH4	0.0	0.0	-	-	-	0.0	0.0	18.6	-	-	-	-	-	-	-
CB1	0.0	0.0	-	-	-	0.0	0.0	17.3	-	-	0.0	-	-	-	-
CB2	0.0	0.0	-	-	-	0.0	0.0	18.6	-	-	0.0	-	-	-	-
CB3	0.0	0.0	-	-	-	0.0	0.0	18.9	-	-	0.0	-	-	-	-
Gas Control System															
GW1	0.0	0.1	20.0	0.0	-4.65	0.0	0.2	17.5	0.0	-4.30	0.0	0.0	17.9	0.0	-4.2
GW2	**4.6**	19.1	0.3	0.0	0.00	**3.5**	15.0	0.1	0.0	0.0	**8.0**	9.2	3.6	0.0	0.0
GW3	0.0	0.3	19.8	0.0	0.00	0.0	0.2	17.2	0.0	0.0	0.0	0.0	18.1	0.0	0.0
GW4	0.0	0.5	19.3	0.0	0.00	0.0	0.6	17.1	0.0	0.0	0.0	1.3	17.1	0.0	0.0
GW5	0.0	2.8	17.8	0.0	0.00	0.0	1.8	16.9	0.0	0.0	0.0	4.0	13.0	0.0	0.0
GW6	0.0	2.1	18.2	0.0	0.00	0.0	1.7	17.0	0.0	0.0	0.0	2.1	16.6	0.0	0.0
Blower Intake	0.0	0.2	8.0	0.0	-4.52	0.0	0.0	20.1	0.0	-4.42	-	-	-	-	-4.2

Notes

- - No data; not part of the monitoring program
nm - Not measured
6.7 % CH_4 detecte % CH_4 detected (above the accuracy of the GEM5000)
The %CH4, %CO2, %O2 measurments are collected when the blower is off
The school building locations were inaccessable since 2017.
Pressure readings are not collected from the off-Site Manholes and catchbasins
Blower access panel was not accessible during Dec 2022 monitoring

Summary of Landfill Gas Monitoring Results
2023 Annual Landfill Gas Monitoring Report
Elgin/Market Street Landfill Site
Kincardine, Ontario

Location ID	% CH_4 (v/v)	% CO_2 (v/v)	%O_2 (v/v)	Pressure (" of WC)		% CH_4 (v/v)	% CO_2 (v/v)	%O_2 (v/v)	Pressure (" of WC)		% CH_4 (v/v)	% CO_2 (v/v)	%O_2 (v/v)	Pressure (" of WC)		% CH_4 (v/v)	% CO_2 (v/v)	%O_2 (v/v)	Pressure (" of WC)	
			21-Feb-22	Blower off	Blower on			7-Mar-22	Blower off	Blower on			23-Jul-22	Blower off	Blower on			1-Dec-22	Blower off	Blower on
Gas Probes																				
GP2-82	0.0	0.1	19.9	0.0	-	0.0	0.1	19.6	0.0	-	0.0	0.3	17.9	0.0	-	0.0	0.0	18.4	0.0	-
GP1-89	0.0	0.1	18.9	0.0	-	0.0	0.1	18.9	0.0	-	0.0	2.6	17.2	0.0	-	0.1	5.9	12.2	0.0	-
GP2-89	0.0	1.2	17.5	0.0	-	0.0	1.1	17.1	0.0	-	0.0	3.2	15.4	0.0	-	0.0	0.1	18.7	0.0	-
GP3-89	0.0	0.0	20.0	0.0	-	0.0	0.0	19.9	0.0	-	0.0	0.6	17.6	0.0	-	0.0	1.7	17.1	0.0	-
GP4-89	0.0	0.0	19.9	0.0	-	0.0	0.0	19.9	0.0	-	0.0	0.1	18.1	0.0	-	-		damaged		
School Buildings																				
School Foundation																				
School Auditorium																				
Off-Site Manholes and Catchbasins																				
MH1	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
MH2	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
MH3	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
MH4	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.1	-	-	-	-
CB1	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
CB2	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
CB3	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
Gas Control System																				
GW1	0.0	0.1	19.6	0.0	3.40	0.0	0.1	19.4	0.0	3.40	0.0	0.3	18.0	0.0	3.6	0.0	0.1	18.6	0 / -0.09	-
GW2	**7.9**	18.2	0.0	0.0	0.00	**8.1**	17.9	0.0	0.0	0.0	**2.7**	16.3	0.7	0.0	0.0	0.0	0.1	18.9	0 / -0.07	-
GW3	0.0	0.1	19.0	0.0	0.00	0.0	0.2	19.0	0.0	0.0	0.0	0.4	17.8	0.0	0.0	0.0	2.9	15.7	0.0	-
GW4	0.0	0.5	18.3	0.0	0.00	0.0	0.5	19.1	0.0	0.0	0.0	1.9	16.7	0.0	0.0	0.1	1.7	17.2	0.0	-
GW5	0.0	0.1	18.9	0.0	0.00	0.0	0.1	18.9	0.0	0.0	0.0	4.4	14.1	0.0	0.0	0.0	2.2	16.8	0.0	-
GW6	0.0	0.1	19.0	0.0	0.00	0.0	0.1	19.1	0.0	0.0	0.0	2.0	16.7	0.0	0.0	0.0	2.0	17.0	0.0	-
Blower Intake	0.0	-	-	0.0	3.90	0.0	-	-	0.0	3.90	0.0	-	-	0.0	3.9	0.0	-	-	-	-

Notes

- - No data; not part of the monitoring program
nm - Not measured
6.7
The %CH4, %CO2, %O2 measurments are collected when the blower is off
The school building locations were inaccessable since 2017.
Pressure readings are not collected from the off-Site Manholes and catchbasins
Blower access panel was not accessible during Dec 2022 monitoring

Attachment A.2

Summary of Landfill Gas Monitoring Results
2023 Annual Landfill Gas Monitoring Report
Elgin/Market Street Landfill Site
Kincardine, Ontario

				Pressure (" of WC)					Pressure (" of WC)					Pressure (" of WC)	
Location ID	*% CH_4 (v/v)*	*% CO_2 (v/v)*	*%O_2 (v/v)*	*Blower off*	*Blower on*	*% CH_4 (v/v)*	*% CO_2 (v/v)*	*%O_2 (v/v)*	*Blower off*	*Blower on*	*% CH_4 (v/v)*	*% CO_2 (v/v)*	*%O_2 (v/v)*	*Blower off*	*Blower on*
	27-Feb-23					24-Mar-23					28-Apr-23				
Gas Probes															
GP2-82	-	-	-	-	-	0.0	0.1	22.5	0.0	0.0	0.0	0.1	20.1	0.0	0.0
GP1-89	0.0	3.8	17.2	0.0	0.0	0.0	3.8	18.2	0.0	0.0	0.0	3.2	17.3	0.0	0.0
GP2-89	0.0	0.3	20.2	0.0	0.0	0.0	0.1	22.5	0.0	0.0	0.0	0.2	20.2	0.0	0.0
GP3-89	0.0	1.3	18.6	0.0	0.0	0.0	1.4	20.6	0.0	0.0	0.0	1.3	18.3	0.0	0.0
GP4-89	-	-	-	-	-	0.0	7.1	12.5	0.0	0.0	0.0	6.2	13.1	0.0	0.0
School Buildings															
School Foundation															
School Auditorium															
Off-Site Manholes and Catchbasins															
MH1	0.0	0.2	20.6	-	-	0.0	0.1	22.3	-	-	0.0	0.1	20.4	-	-
MH2	0.0	0.2	20.6	-	-	0.0	0.1	22.5	-	-	0.0	0.1	20.4	-	-
MH3	-	-	-	-	-	0.0	0.2	21.6	-	-	0.0	0.2	20.2	-	-
MH4	0.0	0.2	20.5	-	-	0.0	0.1	22.4	-	-	0.0	0.1	20.3	-	-
CB1	0.0	0.2	20.6	-	-	0.0	0.1	22.3	-	-	0.0	0.1	20.3	-	-
CB2	0.0	0.2	20.6	-	-	0.0	0.1	22.5	-	-	0.0	0.1	20.5	-	-
CB3	0.0	0.2	20.7	-	-	0.0	0.2	22.3	-	-	0.0	0.1	20.4	-	-
Gas Control System															
GW1	0.0	0.2	20.9	0.09	4.54	0.0	0.1	22.5	0.0	4.49	0.0	0.1	20.3	0.0	0.0
GW2	**6.7**	18.3	0.1	0.0	0.00	**0.7**	15.5	2.8	0.0	0.0	**3.9**	13.8	0.3	0.0	0.0
GW3	0.0	2.8	16.6	0.0	0.00	0.0	2.0	19.5	0.0	0.0	0.0	5.1	11.3	0.0	0.0
GW4	0.0	0.4	20.0	0.0	0.00	0.0	0.4	22.0	0.0	0.0	0.0	0.7	19.2	0.0	0.0
GW5	0.0	3.8	16.8	0.0	0.00	0.0	2.2	19.5	0.06	0.1	0.0	3.6	16.0	0.0	0.0
GW6	0.0	2.6	18.4	0.0	0.00	0.0	2.3	20.3	0.0	0.0	0.0	2.5	18.2	0.05	0.0
Blower Intake					4.65					4.55					

Notes

- - No data; not part of the monitoring program
nm - Not measured
6.7 % CH_4 detected (above the accuracy of the GEM5000)
The %CH4, %CO2, %O2 measurments are collected when the blower is off
The school building locations were inaccessable since 2017.
Pressure readings are not collected from the off-Site Manholes and catchbasins
Blower access panel was not accessible during Dec 2022 monitoring

Attachment A.2

Summary of Landfill Gas Monitoring Results
2023 Annual Landfill Gas Monitoring Report
Elgin/Market Street Landfill Site
Kincardine, Ontario

			Pressure (" of WC)					Pressure (" of WC)	
% CH_4 (v/v)	*% CO_2 (v/v)*	*% O_2 (v/v)*	*Blower off*	*Blower on*	*% CH_4 (v/v)*	*% CO_2 (v/v)*	*% O_2 (v/v)*	*Blower off*	*Blower on*
12-Jul-23					**7-Nov-23**				
0.0	0.3	19.7	0.0	0.0	0.0	0.1	21.0	-	0.0
0.0	3.1	17.2	0.0	0.0	0.0	4.7	16.9	-	0.0
0.0	0.1	20.3	0.0	0.0	0.0	0.2	21.6	-	0.0
0.0	1.9	17.6	0.0	0.0	0.0	2.4	18.7	-	0.0
0.0	4.1	16.2	0.0	0.81	0.0	6.6	13.4	-	0.0
0.0	0.0	20.3	-	-	0.0	0.1	21.8	-	-
0.0	0.0	20.3	-	-	0.0	0.1	21.8	-	-
0.0	0.1	20.2	-	-	0.0	0.1	21.8	-	-
0.0	0.1	20.3	-	-	0.0	0.1	21.8	-	-
0.0	0.0	20.3	-	-	0.0	0.1	21.8	-	-
0.0	0.0	20.3	-	-	0.0	0.1	21.8	-	-
0.0	0.0	20.2	-	-	0.0	0.1	21.7	-	-
0.0	0.3	19.4	0.0	0.0	0.0	0.1	21.8	-	0.0
2.7	12.9	1.8	0.0	0.0	0.0	0.2	21.6	-	0.0
0.0	1.5	17.1	0.0	0.0	0.0	0.2	21.5	-	0.0
0.0	0.9	19.0	0.0	0.0	0.0	0.7	20.8	-	0.0
0.0	3.9	15.5	0.0	0.0	0.0	3.6	17.2	-	0.0
0.0	2.2	18.1	0.0	0.0	0.0	2.0	19.2	-	0.0
								-	0.0