



PWLLFAWATKIN LANDFILL SITE

VARIATION NOTICE NUMBER: YP3333MK
PERMIT NUMBER: BU8819IV

PWLLFAWATKIN ANNUAL MONITORING REPORT

1ST JANUARY 2021 – 31ST DECEMBER 2021

January 2022



Author	Approval	Subject	Date	Status
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Contents

1. Introduction	3
2. Landfill Gas	3
2.1. Perimeter Gas	3
2.2. Ambient Air Monitoring	4
2.3. In-Waste Gas Wells	4
2.4. Flare and Engine Emissions	4
2.5. Trace gas composition	4
3. Leachate	5
3.1. Leachate Quality	5
3.2. Leachate Levels	5
4. Groundwater	8
4.1. Groundwater quality	8
4.2. Groundwater Levels	8
5. Surface Waters	9
6. Conclusions	9

Author	Approval	Subject	Date	Status
Paul Sebastian Rabięga	Martin Greaves	Pwllfawatkin Annual Monitoring Report 2021	January 2022	

Pwllfawatkin Landfill Site Annual Report of Monitoring 2021

1. Introduction

This annual report is submitted in accordance with Condition 4.2.1 of Permit BU8819IV and covers the period January 2021 to December 2021 inclusive. All monitoring data has been separately reported to the Agency on a quarterly basis and so only selected data is repeated in this report. This report concentrates on those aspects of the monitoring that have been given exceedance levels by the Agency and/or are indicators of landfill impact. It does not attempt to review all the quantitative monitoring that has been carried out but instead attempts to assess whether or not the landfill is having an impact and whether the monitoring results are as anticipated and comply with trigger levels set in the PPC permit.

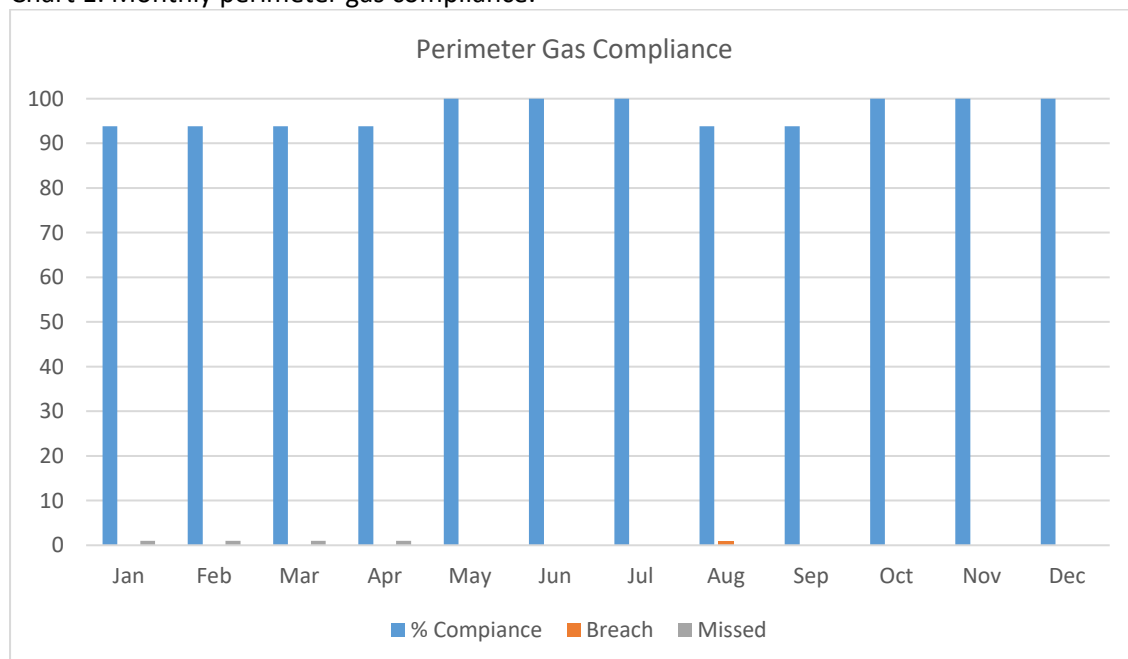
2. Landfill Gas

2.1. Perimeter Gas

There was one methane limit exceedances during 2021. This breach occurred in August at GP16 where a methane concentration of 1.1% was recorded (permitted limit 1.0%). This breach seems to have been a localised and temporary issue and is now resolved. Several boreholes have recorded Carbon Dioxide concentrations above the limit of 1.5%. There are ICoP works underway as part of a planned permit variation to adjust the CO₂ limits set out in the permit.

Monitoring points that were missed during monthly monitoring are summarised below (table 1.) with details as to why these points were missed.

Chart 1: Monthly perimeter gas compliance.



Author	Approval	Subject	Date	Status
Paul Sebastian Rabiega	Martin Greaves	Pwllfawatkin Annual Monitoring Report 2021	January 2022	

Table 1. Perimeter gas compliance summary.

	% Compliance	Breach	Missed	Comment/Reason for being missed
Jan	93.8		1	GBHA - flooded
Feb	93.8		1	GBHA - flooded
Mar	93.8		1	GBHA - flooded
Apr	93.8		1	GBHA - flooded
May	100.0			
Jun	100.0			
Jul	100.0			
Aug	93.8	1		GP16 - methane breach.
Sep	93.8			
Oct	100.0			
Nov	100.0			
Dec	100.0			

2.2. FID Walkover Survey

An annual FID walkover was carried out in January 2022. In total, 3 points of gas emission were detected, but none of the readings exceeded the elevated hydrocarbon threshold of >100 ppm for a feature, and >1000 ppm for an infrastructure/installation. Therefore, the reported results from the survey were favourable.

2.3. In-Waste Gas Wells

Landfill gas is controlled by an active gas extraction system, which creates an inward pressure gradient across the landfill to minimise potential off-site migration. This is achieved by the installation of appropriately spaced gas wells across the landfill. These are connected to the extraction plant located in the Waste to Energy Compound.

Gas wells are monitored on a monthly basis, in line with Table S4.7 of the Permit. There are no exceedance levels associated with these wells.

2.4. Flare and Engine Emissions

Monitoring of emissions to air from the flare and engines are scheduled on an annual basis in accordance with Table S4.7 of the Permit. Engine and flare emissions monitoring were carried out in March 2021. The engine emissions were compliant with the permit limits for NOx, CO and TVOC

2.5. Trace gas composition

Trace gas analysis needs to be compared to the assumptions made in the Landfill Gas Risk Assessment (LFGRA) to fulfil table S4.7 of the permit. All parameters recorded during the sampling of the raw landfill gas that were found to be above the detection limit are within the assumptions of the LFGRA.

Author	Approval	Subject	Date	Status
Paul Sebastian Rabiega	Martin Greaves	Pwllfawatkin Annual Monitoring Report 2021	January 2022	

3. Leachate

3.1. Leachate Quality

There are currently no exceedance levels set for leachate quality.

Leachate is sampled on a 6 monthly basis (June/December) and the last leachate quality data was submitted to the Environment Agency, sampled during quarter 4.

3.2. Leachate Levels

Leachate level data is recorded as per Condition 3.6.1 (Tables S4.1 and S4.8) of the Permit and the results are summarised in Table 2 and Chart 2b.

The leachate levels have remained relatively stable during the year. On average, per cell, the leachate levels remained below the permitted breach limits, and it is envisaged that this compliance will remain in place going forward.

Numerous works have been done on the leachate system as a whole, including the replacing of pumps, valves, slam shuts, as associated infrastructure.

Chart 2a depicts the average leachate levels for the entire site relative to compliance limits in metres. whereby, Chart 2c depicts the average leachate levels by cell relative to compliance limits in metres.

Table 2: Average leachate compliance levels relative to cell (m).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Phase 1 Cell 1C	-5.02	-5.00	-4.98	-5.03	-6.2	-5.05	-4.99	-4.99	-5.00	-5.75	-5.00	-5.08
Phase 1 Cell 2A	-2.83	-2.63	-1.32	-2.91	-3.62	-5.03	-2.50	-2.82	-2.40	-0.66	-2.40	-4.97
Phase 1 Cell 3A	-7.97	-8.33	-8.57	-8.44	-8.44	-2.63	-8.60	-8.33	-8.01	-3.1	-8.01	-8.57
Phase 2 Cell 1	-1.13	-3.73	-1.54	-1.22	-2.16	-4.10	-1.08	-1.08	-1.09	-2.02	-1.09	-1.21
Phase 2 Cell 2	-3.87	-3.22	-3.91	-4.72	-3.36	-6.17	-3.74	-3.69	-3.72	-3.77	-3.72	-3.90
Phase 2 Cell 3	-0.98	-1.13	0.47	-2.91	-3.56	-0.18	-2.62	-1.55	-1.65	-2.03	-1.65	-1.91
Phase 2 Cell 4	1.48	1.53	-0.57	-1.11	-0.22	-0.55	-0.67	-3.16	-0.96	-0.72	-0.96	-0.73
Average	-2.9	-3.21	-2.91	-3.76	-3.93	-3.38	-3.45	-3.66	-3.26	-2.57	-3.26	-3.76

Author	Approval	Subject	Date	Status
Paul Sebastian Rabiega	Martin Greaves	Pwllfawatkin Annual Monitoring Report 2021	January 2022	

Chart 2a: Average leachate levels relative to compliance limits (m).

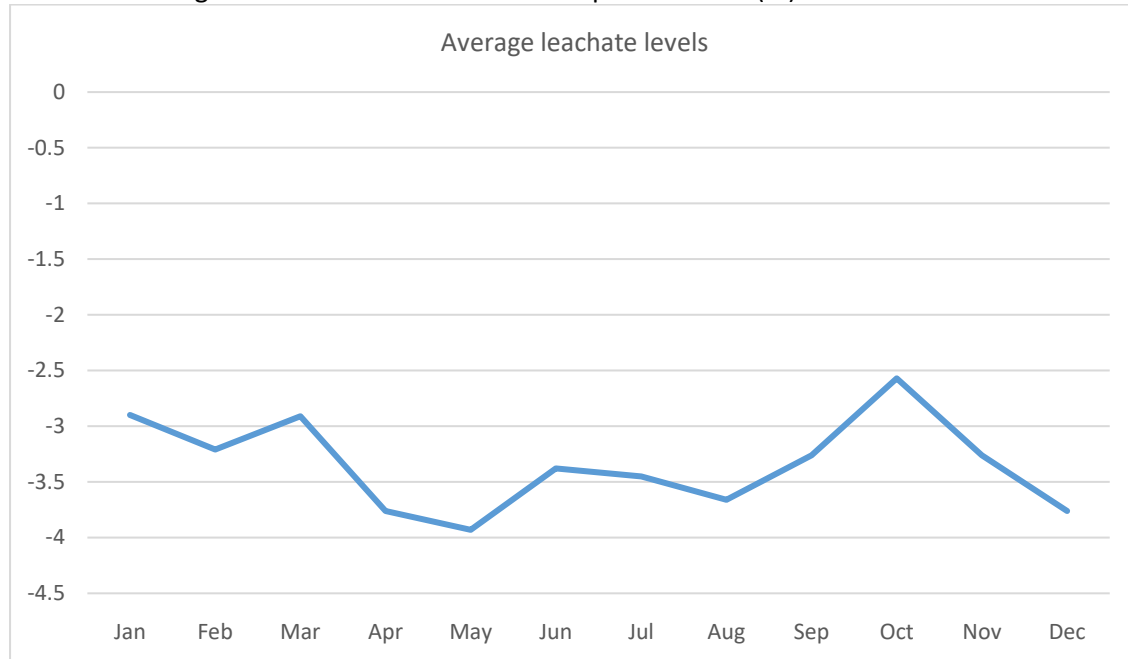
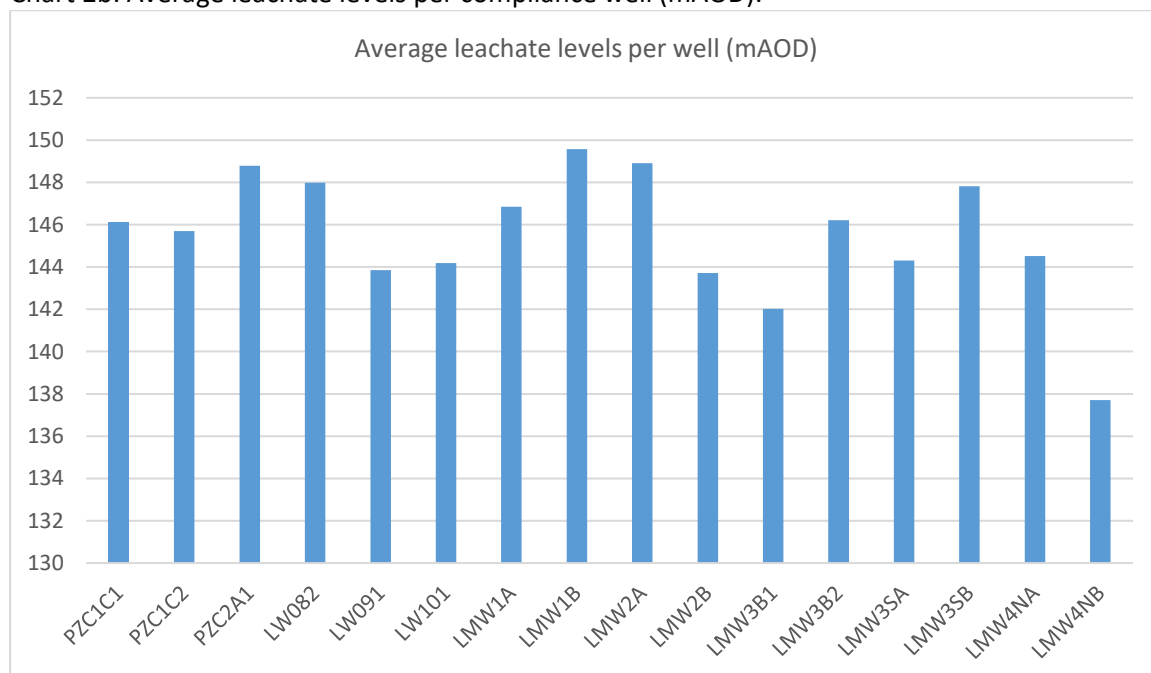
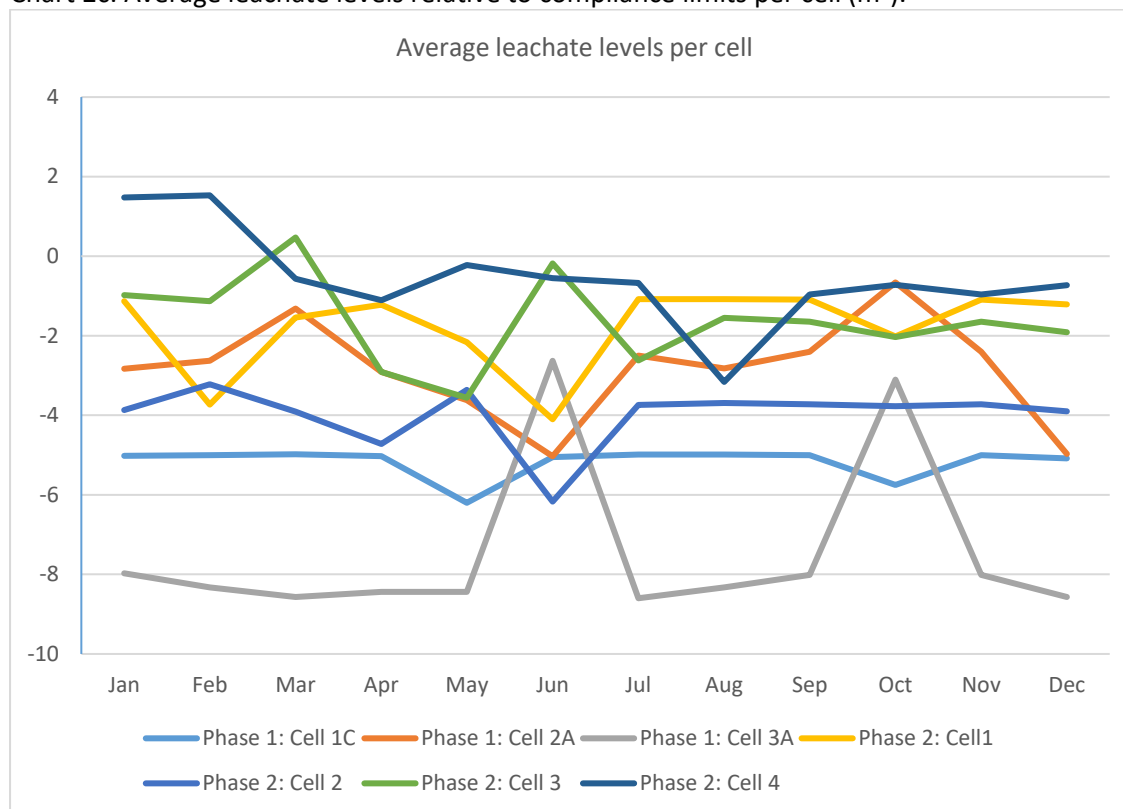


Chart 2b: Average leachate levels per compliance well (mAOD).



Author	Approval	Subject	Date	Status
Paul Sebastian Rabiaga	Martin Greaves	Pwllfawatkin Annual Monitoring Report 2021	January 2022	

Chart 2c: Average leachate levels relative to compliance limits per cell (m³).

In order to maintain and improve leachate levels against compliance, FCC tankers leachate to be treated offsite. Around 24,050 m³ of leachate was treated during 2021. Total volumes treated each month are represented in Table 3.

Table 3: Volumes of leachate treated in 2021.

Month	Treated volume (m3)
Jan-21	1,821
Feb-21	2,653
Mar-21	2,178
Apr-21	2,479
May-21	1,945
Jun-21	2,118
Jul-21	1,864
Aug-21	1,973
Sep-21	1,463
Oct-21	1,316
Nov-21	2,054
Dec-21	2,187
Total	24,050

Author	Approval	Subject	Date	Status
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4. Groundwater

4.1. Groundwater quality

Groundwater is sampled on a quarterly basis and results are reported as per table S4.4 and S4.10.

Groundwater compliance limits are summarised in Table 4, which are relevant to groundwater boreholes monitored on a monthly basis.

Table 5. provides a summary of the groundwater breaches that were present per quarterly monitoring, with comments provided on the limit exceedances. Other parameter limits are to be agreed on in accordance with improvement condition 6.

Table 4: Groundwater compliance limits.

Determinant	Exceedance Level
Ammoniacal Nitrogen	1.0 mg/l (WB10A, WB10B, WB11A, WB11B, WB12A, WB12B, WB18, WB19, WB5A, WB5B, WB16A, WB16B, WB20) and 1.5 mg/l (WB17A, WB17B)
Chloride	250 mg/l

Table 5: Ground water monitoring breaches per quarter.

Period	Breaches	Comments
Quarter 1	WB11B (Jan) WB11B (Feb) WB11B (Mar)	A permit variation is currently being addressed to vary the limit for ammoniacal nitrogen.
Quarter 2	WB11B (Apr)	A permit variation is currently being addressed to vary the limit for ammoniacal nitrogen.
Quarter 3	WB11B (Jul) WB11B (Aug)	A permit variation is currently being addressed to vary the limit for ammoniacal nitrogen.
Quarter 4	WB11B (Oct) WB11B, WB10A (Nov) WB11B (Dec)	A permit variation is currently being addressed to vary the limit for ammoniacal nitrogen.

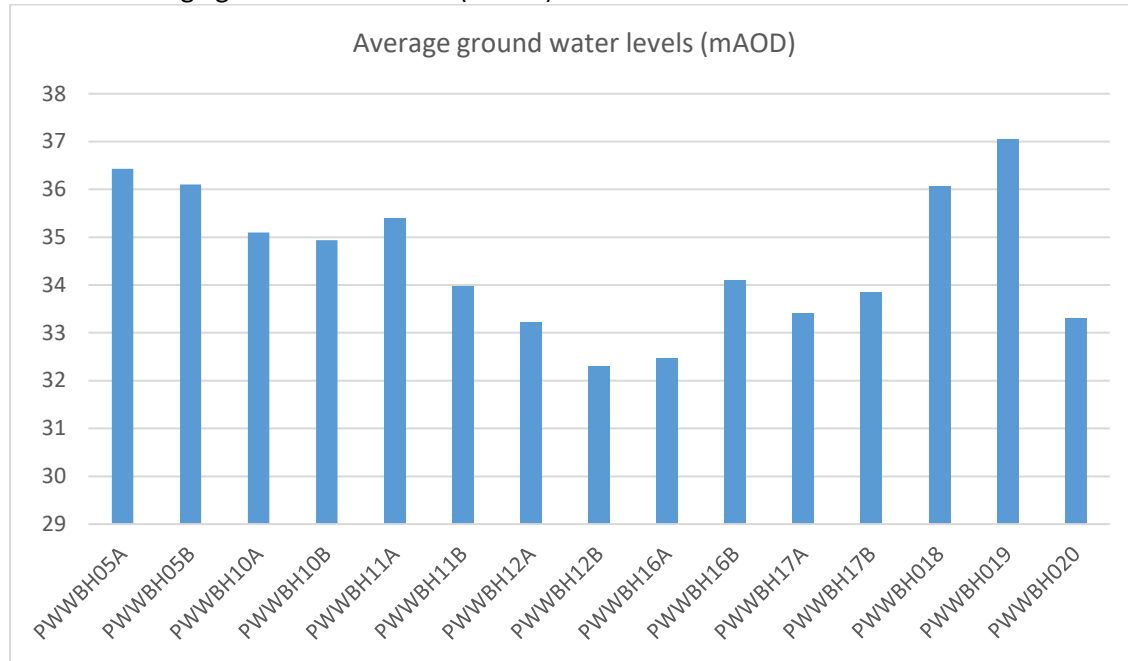
4.2. Groundwater Levels

Groundwater levels are measured on a quarterly basis at the same time that samples are taken to ensure an adequate purge volume is calculated. Chart 3 depicts the average groundwater levels per monitored borehole.

The groundwater levels have remained constant over the year with no significant fluctuations recorded between monitoring intervals.

Author	Approval	Subject	Date	Status
Paul Sebastian Rabiaga	Martin Greaves	Pwllfawatkin Annual Monitoring Report 2021	January 2022	

Chart 3: Average ground water levels (mAOD).



5. Surface Waters

The site has four surface water monitoring points, two of which are permitted location for surface water discharge. The monitoring parameters and frequency are undertaken as per Table S4.9 of the permit.

There were no recorded surface water breaches in 2021.

6. Conclusions

After reviewing the monitoring data collected throughout 2021 it is possible to conclude that Pwllfawatkin landfill has had an insignificant impact on the nearby environment. There are ICoP works underway as part of a planned permit variation to adjust trigger levels for some of the monitoring requirements, which will undoubtedly increase site performance. The site is therefore deemed as operating within expected limits.

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January 2022



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