Cyngor Sir Ynys Môn

Penhesgyn Gors Landfill

Annual Environmental Monitoring Report

2023 Review Period

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Prepared for

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1.0 INTRODUCTION

1.0.1 Egniol Consulting Limited (Egniol) of Llys Onnen, Parc Menai, Bangor, Gwynedd have been appointed by Cyngor Sir Ynys Môn as Consultants for undertaking environmental monitoring and reporting works at Penhesgyn Gors Landfill (closed).

1.0.2 The appointment includes environmental reports which should be prepared in compliance with the requirements of the site Environmental Permit (EP) EPR/DP3734DC, as varied in May 2021. Section 4.2 of the Permit lists the following requirements:

4.2.2 A report or reports on the performance of the activities over the previous year shall be submitted to Natural Resources Wales by 31 January (or other date agreed in writing by Natural Resources Wales) each year. The report(s) shall include as a minimum:

(a) a review of the results of the monitoring and assessment carried out in accordance with this permit against the relevant assumptions, parameters and results in the risk assessments submitted in relation to this facility and any agreed amendments thereto;

(b) the annual production/treatment set out in schedule 4 table S4.2;

(c) the topographical surveys required by condition 3.5.3 other than those submitted as part of a CQA validation report;

(d) an assessment of the settlement behaviour of the landfill body based on the difference between the most recent topographical survey and previous annual topographical survey for the areas of the landfill which did not receive waste between the surveys;

1.0.3 The monitoring schedule and emissions limits are listed in EP Schedule 3, with the reporting schedule in Schedule 4.

1.0.4 This report includes all of the data as required for the annual 2023 monitoring period.

2.0 SITE LOCATION AND SURROUNDING LAND USE

2.0.1 Penhesgyn Gors Landfill Site (NGR SH 532 74) is located 2km northwest of Menai Bridge on Ynys Môn.

Site Address:

Penhesgyn Waste Transfer and Recycling Centre
Llansadwrn
Menai Bridge
Ynys Môn
LL59 5RY

2.0.2 The overall site covers an area of approximately 21ha, of which, approximately 12ha comprises the closed landfill site with the remaining area utilized as a Waste Transfer Station, an In-Vessel Composting facility, and a Household Waste Recovery Centre (HWRC).

2.0.3 Access to the landfill site is via the weighbridge and through a set of double agricultural type galvanized steel gates. Engineered tracks provide access across the site through the Valley Cell and along the perimeter of Landfill Area 3.

2.0.4 The site is bound by farmland to the east, west and north. The nearest residential properties are Cae Uchaf (320m East), Penhesgyn Isaf (340m East) and Penhesgyn Hall (220m South).

2.0.5 The local topography is gently undulating land which is dissected by the shallow valleys of the Afon Braint to the northeast and an unnamed stream to the southwest. A series of low hills lie in a general northeast to southwest orientation. Immediately to the southwest of the site is an area of lower lying wetland. This is fed by drainage from the surrounding area and in turn drains to the west into the Afon Braint.

3.0 SITE DEVELOPMENT

3.0.1 Prior to the deposition of waste, the site is likely to have been used in a similar way to the surrounding area i.e. rough grazing and wetland.

3.0.2 The landfill part of the site is divided into three main areas. Area 1 has been developed into the HWRC, site offices and has an undeveloped section to the east which continues to be used as agricultural land. Area 2 and Area 3 are closed landfill areas.

3.0.3 Deposition of waste at the site predates 1968, however, there is no documentary information available before this date. Previous site investigations have indicated that both household and commercial waste was deposited.

3.0.3 Documented landfilling at Penhesgyn Gors began in 1968 in Area 2 which is unlined and was operated as a 'Dilute and Disperse' landfill. Area 2 was infilled by 1998 and capped in 2000.

3.0.4 Area 3 has been operated on the principle of engineered containment. Waste was disposed in 4 engineered cells (known as Cell 1, Cell 2, Cell 3 and Valley Cell) between 2000 and 2008. Both areas of the site have been capped and fully restored.

4.0 ENVIRONMENTAL CONTEXT

4.1 Geology

4.1.1 The site is underlain by superficial deposits of Alluvium overlying Glacial Till, which is embedded with layers of sand and gravel. The superficial deposits are underlain by the bedrock of the Mica Schist of the Penmynydd Zone of metamorphism, which forms part of the Mona Complex.

4.1.2 Prior to the land filling of Cell 3 most of the basal area was reported to have contained pockets of peat (Alluvium) overlying the Glacial Till, which was subsequently removed prior to construction works taking place. Schist bedrock was not encountered during the works.

4.2 Hydrogeology

4.2.1 The superficial deposits underlying the site are classified by the Environment Agency as a Secondary (undifferentiated) Aquifer. Beneath the western part of the site the groundwater within sand and gravel layers is confined by the overlying clay. In the east of the site where the clay is absent the groundwater within the sand and gravel layers is unconfined.

4.2.2 The metamorphic bedrock is classified as a Secondary B Aquifer.

4.3 Hydrology

4.3.1 The site and the surrounding agricultural land are served by a network of drainage ditches. The drainage ditch that flows along the eastern boundary of the site flows into a sump leading to a culvert beneath Area which discharges into a lower lying wetland immediately to the southwest of the site. This wetland is fed by drainage ditches from the surrounding area and groundwater. The Afon Braint is drained by two surface water ditches which then flow into the Afon Braint 800m downstream on the site.

5.0 MONITORING ISSUES

5.0.1 During the review period, the following issues were encountered:

- Leachate Well L7 was recorded as dry, therefore no sample or laboratory testing was completed.
- SW03 and SW04 were inaccessible due to flooding, the monitoring of these locations will be completed in July going forward.
- BH51, BH2/88 and BH96B were inaccessible due to flooding, therefore the dip levels and laboratory testing has not been completed.
- BH22 and BH25 were not located, additional attempts during 2024 will be made to try to locate the well and confirm its condition and complete the monitoring if possible.
- BH13, the gas cap is stuck so the dip levels of the groundwater and base of the well have not been completed. This well head will require repairs in 2024 to ensure it is serviceable.
- Groundwater monitoring borehole BH8/88 was lost during 2022 and will not be reinstated, as agreed with NRW. This borehole is situated in a field outwith the area owned by the Site Operator. The location is difficult to access by machinery.
- BH05 was not monitored in the Q2 period due to a broken gas tap, the gas tap was replaced the borehole monitoring recommenced during the Q3 period.

6.0 LANDFILL GAS

6.0.1 Routine landfill gas monitoring was carried out in accordance with the relevant provisions of the EP Schedule 3, as follows:

- Table S3.2 Point source emissions to air;
- Table S3.6 Landfill gas in external monitoring boreholes;
- Table S3.7 Landfill gas – other monitoring requirements.

6.0.2 During the review period, landfill gas continued to be actively extracted from both operational areas of the landfill and utilised in the gas combustion engines or treated in the gas flare. The single combustion engine SGI13 with an electrical output of 189kWe was available for operation during the review period.

6.0.3 The gas flare provided a backup gas utilisation when the gas engine was not available during engine maintenance or other engine outages. The gas flare was utilised during 568 hours in 2023, which equates to 6.48% utilised. Based on the usage being less than 10% the point source emissions testing for the gas flares is note required for 2023.

6.0.4 The location of the Gas Utilisation Compound (GUC) is shown on Drawing 6170.GA.D04.

6.1 Point Source Emissions to Air

6.1.1 The permit requirements are as follows:

Table 1: Point source emissions to air: landfill gas engines (Table S3.2)

Parameter	Limit[1]	Scania SGI 13	MU[2]	Monitoring Frequency
Carbon Monoxide, mg/m³	**None specified**	742	33.1	Annually
Oxides of Nitrogen, mg/m³	**None specified**	652	31.7	
Total VOCs, mg/m³	**None specified**	1301	61.0	

1. No specific emission limits are imposed on spark ignition engines (<250kWe) other than the mass release of pollutants from these engines should not exceed the comparable mass release from the engine meeting the emission standards in Table 2.4 of LFTGN08.
2. The Measurement Uncertainty (MU) is calculated from values in LFTGN 08 (2010), at 20% of the result of CO, 30% of the result for NOx and 40% of the result for total VOCs.

Table 2: Point Source Emissions to Air: Landfill gas flares (Table S3.2)

Parameter	Limit (hourly mean)	Fixed Gas Flare	Monitoring Frequency*
Oxides of Nitrogen, mg/m³	**150**	Not tested in 2023[3]	Annually
Carbon Monoxide, mg/m³	**50**		
Total VOCs, mg/m³	**10**		

3. Annual monitoring of flares is only required when flare operates in excess of 10% of the time, taken on an annual assessment period.

6.1.2 No emission limits are imposed on spark ignition engines (<250KWe), turbines and micro turbines in reference to Guidance for Monitoring Landfill Gas Engine Emissions LFTGN08 v2 (2010). Section 2.6 states that for such gas engines NRW *"do not intend to impose specific emission limits on these engines other than the mass release of pollutants from these engines should not exceed the comparative mass release from an engine meeting the emission standards in Table 2.4".*

6.1.3 Annual stack gas emissions testing of the Scania SGI13 engine was carried out on

10th November 2023. An isokinetic testing protocol was used in line with the Monitoring Certification Scheme (MCERT).

6.1.4 The recorded concentration of nitrogen oxides of 652mg/m^3 slightly exceeded the relevant emission standard of 500mg/m^3 as listed in Table 2.4 of LFTGN08.

6.1.5 The concentration of carbon monoxide recorded of 742 mg/m^3 which is below the relevant emissions standards of 1400mg/m^3 as listed in Table 2.4 of LFTGN08.

6.1.6 The concentration of Total VOCs recorded was above the relevant emission standards of 1000mg/m^3, with the level recorded of 1301mg/m^3.

6.1.7 The stack gas emissions survey is enclosed in Appendix 1.

6.2 Landfill Gas in External Monitoring Points

6.2.1 Perimeter gas is monitored in twenty one gas monitoring boreholes BH01 to BH07, BH9 to BH20, BH15A and BH16A. Landfill gas monitoring points are shown on drawing 5739.SURV.D03.

6.2.2 The monitoring requirements and compliance limits for the external monitoring boreholes are listed in Table 3 below.

Table 3: Landfill gas in external monitoring boreholes (Table S3.6)

Monitoring Point ID	Limit, CH4 (%v/v)	Action Level, CO_2 (%v/v)	Monitoring Frequency
PENBH01	1	5.3	Quarterly
PENBH02	1	5.7	
PENBH03	1	4.4	
PENBH04	1	3.9	
PENBH05	1	14.2	
PENBH06	1	2.8	
PENBH07	1	7.6	
PENBH09	1	7.2	
PENBH10	1	5.4	
PENBH11	1	5.7	
PENBH12	1	4.2	
PENBH13	1	3.1	
PENBH14	1	8.3	
PENBH15	1	7.2	
PENBH15a	1	4.8	
PENBH16	1	5.4	
PENBH16a	1	5.9	
PENBH17	1	4.8	
PENBH18	1	7.0	
PENBH19	1	4.3	
PENBH20	1	10.4	
All monitoring boreholes	Oxygen, Atm. Pressure, Diff. Pressure, Meteorol. data	No limit	

6.2.3 Concentrations of methane in perimeter boreholes were below the compliance limit (1%v/v) in all monitoring points. Carbon dioxide was detected in low concentrations in all boreholes. The compliance levels were exceeded during the 2023 monitoring period, a summary of the exceedances is included within Table 4 below;

Table 4: Summary of Landfill Gas Perimeter Monitoring Non-Compliances

Monitoring Point ID	Date	Compliance Limit, CH4 (%v/v)	CH4 Recorded (%v/v)	Compliance Limit, CO_2 (%v/v)	CO^2 Recorded (%V/V)
PENBH05	19/04/2023	Not monitored, gas tap broke off. Repaired ahead of next visit.			
PENBH06	15/02/2023	1.0	<1.0	2.8	3.0
PENBH06	19/04/2023	1.0	<1.0	2.8	4.0
PENBH12	06/11/2023	1.0	3.4*		
PENBH13	06/11/2023	1.0	1.2*	3.1	<3.1
PENBH14	19/04/2023	1.0	3.9	8.3	<8.3
PENBH14	25/07/2023	1.0	17.9	8.3	10.3
PENBH14	06/11/2023	1.0	23.4	8.3	9.4
PENBH17	15/02/2023	1.0	8.2	4.8	5.4
PENBH17	25/07/2023	1.0	8.4	4.8	6.7
PENBH17	06/11/2023	1.0	<1.0	4.8	8.4
PENBH18	06/11/2023	1.0	3.4	7.0	7.7

* Steady readings were below the compliance limit, peak readings included within the table above.

6.2.4 The raw landfill gas monitoring data is included within Appendix 2.

6.3 Landfill gas – other monitoring requirements Table S3.7

6.3.1 Other compliance monitoring requirements set out in the site permit comprise the following:

- Gas collection system – 4-weekly monitoring of methane (CH_4), carbon dioxide (CO_2), oxygen (O_2), balance gas, atmospheric pressure, gas flow/suction, carbon monoxide (CO), and hydrogen sulphide (H_2S).
- Input to Gas Utilisation Compound (GUP) – 4-weekly monitoring of methane (CH_4), carbon dioxide (CO_2), oxygen (O_2), balance gas, atmospheric pressure, gas flow/suction, carbon monoxide (CO), and hydrogen sulphide (H_2S).

6.3.2 Landfill gas monitoring in the gas collection system and the GUP is carried out as part of the routine balancing of the gas management system in order to maximise gas flows for extraction.

6.3.3 The gas quality data collected during 2023 was consistent with the data from 2022. Landfill gas quality data in the collection system and the GUC are enclosed in Appendix 3.

7.0 LANDFILL LEACHATE

7.0.1 Routine leachate monitoring was carried out in accordance with the relevant provisions of the EP Schedule 3, as follows:

- Table S3.1 Leachate levels.
- Table S3.8 Leachate - other monitoring requirements.

7.0.2 A leachate collection and extraction system operates in landfill Area 3 only. Each cell in Area 3 was constructed with a drainage layer above the basal liner coupled with leachate wells/collection pipework. There are no leachate management provisions in Area 2. This area is unlined and is in hydrogeological continuity with the surrounding perched groundwater and surface water.

7.0.3 During the review period leachate levels in the cells of Area 3 were regulated by pumping out leachate for direct recirculation into 'dry' cells. Leachate was periodically pumped out from Cells 2, 3A and 3B and recirculated into Cell 1 and the Valley Cell as part of a pumping trial. There is an ongoing agreement with NRW to facilitate this management option. Leachate levels in all cells were measured before and after the leachate transfer and the volume of leachate removed recorded.

7.0.4 No leachate was tankered off site for treatment and disposal during the review period.

7.0.5 The locations of leachate wells / monitoring points are shown on Drawing 2 fc37224.

7.1 Leachate Levels

7.1.1 Leachate level monitoring schedule is as follows:

Table 5: Leachate Level Monitoring Schedule (Table S3.1)

Monitoring Point ID	Limit	Monitoring Frequency
Area 2 Leachate Wells: L1, L4, L5, L6, L7	none	Annually
Area 3 Leachate Wells: - Cell 1 (BHL14, BHL15) - Cell 2 (BHL13, L nr 38, L nr 122) - Cell 3 (BHL10, BHMH3A, BHMH3B) - Valley Cell (L16, L17)	2 m above cell base	Quarterly

7.1.2 The leachate levels in landfill Area 3, Cell 1 during the 2023 monitoring and reporting period remained low and were between 0.02m and 1.18m above the cell base.

7.1.3 In Area 3, Cell 2 the recorded levels were variable at between 1.49m and 4.36m above the cell base, exceeding the compliance limit of 2m on all by one of the readings taken.

7.1.4 Within Area 3, Cell 3, leachate levels were elevated above the 2m compliance limit on a number of occasions, with the highest level recorded of 13.621m in BHMH3B in July 2023. It is considered likely that this reading has been impacted by the pumping equipment at the location causing a false high reading on the infrastructure within the well. Excluding this level, the next highest reading of 6.57m was recorded within BHL10 in April 2023. Pumping trails are currently in progress to evaluate varying leachate levels.

7.1.5 Within the Valley Cell, also part of Area 3, the leachate levels remained generally low ranging from 0.00m to 3.21m. A single reading exceeded the compliance limit, this was within BHL16 in March 2023 with a reading of 2.10m above the base, slightly exceeding the compliance limit.

7.1.6 Leachate levels in Area 2 were measured at 0.00m to 0.44m (above base). There is no compliance limit for this area of the site.

7.1.7 Leachate levels monitoring data is presented in Appendix 4.

7.2 Leachate Quality

7.2.1 Leachate quality is assessed in both landfill Area 2 and Area 3. The monitoring requirements are summarised in Table 6 below.

Table 6: Leachate Monitoring Schedule (Table S3.8)

Monitoring Point ID	Total	Frequency	Parameters	Unit
Area 2 L1, L4, L5, L6, L7	5	Annually	pH Electrical Conductivity Ammoniacal Nitrogen Chloride BOD COD Dissolved Oxygen Depth to base, m	pH units µS/cm mg/l
Area 3 - Cell 1 (BHL13) - Cell 2 (BHL14) - Cell 3 (BHMH3A) - Valley Cell (BHL60)	4	Annually	pH Electrical Conductivity Ammoniacal Nitrogen Chloride BOD COD Dissolved Oxygen List 1 substances Depth to base, m	pH units µS/cm mg/l
Area 3 - Cell 1 (BHL13) - Cell 2 (BHL14) - Cell 3 (BHMH3A) - Valley Cell (BH60)	4	6-monthly	Sulphates Alkalinity TON TOC Sodium Potassium Calcium Magnesium Iron Manganese Cadmium Chromium Copper Nickel Lead Zinc	mg/l

7.2.1 Ammoniacal nitrogen in leachate samples taken from Area 2 during the 2023 monitoring period, ranged from 0.24mg/l to 120mg/l (L1). Chloride was detected in concentrations between 14mg/l and 48mg/l (L1). These concentrations are relatively low and are indictive of weak/diluted leachate. The detected levels were similar to those observed in 2022.

7.2.2 Other tested parameters were as follows:

- pH levels were near neutral or slightly alkaline at between 6.7 and 7.6.
- Electrical Conductivity levels varied between 540µs/cm to 990µs/cm.
- BOD ranged from 2.3mg O_2/l to 150mg O_2/l.
- COD levels varied between 13mg O_2/l and 1300mg O_2/l.

7.2.3 A more extensive leachate testing regime was carried out in landfill Area 3. Leachate samples were taken every 6 months and analysed for a wider range of parameters.

7.2.4 Ammoniacal nitrogen was detected in variable concentrations across this landfill area. Leachate in Cells 1 and 2 continued to show higher concentrations of NH_3-N (350mg/l in L13 (Cell1) and 740mg/l in L14 (Cell 2), compared to concentrations of 47mg/l in MH3A (Cell 3) and 160mg/l in BH60 (Valley cell).

7.2.5 Chloride was detected in higher concentrations in Cell 2 (1,900mg/l) compared with Cell 1 (210mg/l), Cell 3 (180mg/l) and Valley cell (470mg/l).

7.2.4 Other inorganic parameters (calcium, potassium, sodium, sulphate) were present in leachate in variable but relatively low concentrations which were similar or lower than those observed in 2022. Heavy metals and non-hazardous substances (cadmium, chromium, copper, iron, magnesium, manganese, nickel, lead, zinc) showed a similar variability. Xylene continued to be detected in negligible concentrations (<3.0 to 28.1µg/l). Other hazardous substances (mecoprop, tributyltin) were not tested during this review period; these were either not detected or were present in negligible concentrations in 2021.

7.2.5 Levels of Biological Oxygen Demand (BOD) varied significantly (5.1 to 220mg/l). Chemical Oxygen Demand (COD) levels also varied significantly (75 to 4000 mg/l). Both parameters were highest in Cell 2 (L14). pH levels of leachate were slightly alkaline; and Electrical Conductivity was recorded between 1,700µs/cm and 10,000µs/cm.

7.2.6 The latest monitoring results are comparative with those reported in 2022. The laboratory results for the leachate testing are presented in Appendix 5.

8.0 GROUNDWATER

8.0.1 Groundwater monitoring requirements are stated in EP Schedule 3:

- Table S3.5 Groundwater – Trigger levels for emissions into groundwater and monitoring requirements
- Table S3.10 Groundwater – other monitoring requirements.

8.0.2 Groundwater monitoring points are shown on Drawing 2 fc37224.

8.1 Groundwater Quality

8.1.1 Groundwater monitoring requirements are listed in Tables 7 and 8 below.

Table 7: Groundwater – other monitoring requirements Water Level (Table S3.10)

Monitoring Point ID	Frequency	Parameter
BH1-BH31, BH50-BH54 BH1/88, BH2/88, BH96B	Annually	Water Level

Table 8: Groundwater – other monitoring requirements (Table S3.10)

Monitoring Point ID	Frequency	Parameters	Limit, mg/l
BH1/88 BH2/88 BH19 BH96B	Annually	pH Electrical conductivity Chloride Ammoniacal nitrogen COD BOD Dissolved Oxygen	none
BH2/88 BH8/88* BH22 BH96B	6-monthly	Sulphates Alkalinity TON TOC Nitrates Sodium Potassium Calcium Magnesium Iron Manganese Chromium Copper Nickel Lead Zinc	none
BH2/88 BH8/88* BH22 BH96B	Annually	List 1 substances found in Leachate	None

*BH8/88 is lost and will not be reinstated as agreed with NRW

8.1.2 Compliance limits are set up to regulate groundwater quality downgradient from the site. For this purpose, two representative monitoring points (BH2/88 and BH96B) are used. The relevant compliance limits are listed in Table 9.

Table 9: Compliance limits for emissions into groundwater (Table S3.5)

Monitoring Point ID	Parameters	Limit, mg/l	Frequency
BH2/88	Chloride	75	Annually
	Ammoniacal Nitrogen	0.56	
BH96B	Chloride	34	
	Ammoniacal Nitrogen	3.0	

8.1.3 Both BH2/88 and BH96B were inaccessible due to flooding. It is recommended that these locations are sampled as early as possible during 2024 and again later in the year to capture the data required.

8.1.4 There are no compliance limits for the other groundwater sampling points. The sampling and testing have been completed with the results included within Appendix 5.

9.0 SURFACE WATER

9.0.1 The monitoring requirements of surface water quality are outlined in the Schedule 3 of the permit, as follows:

- Table S3.3 Point source emissions to water.
- Table S3.9 Surface water – other monitoring requirements.

9.0.2 Surface water monitoring was carried out at 8 out of the 10 monitoring points:

- SW1 Drain and tributary of Afon Braint, upstream of the site;
- SW2 Water entering Afon Braint from the drain (SW1);
- SW5 A wetland area downstream from the site (Area 2);
- SW6 A drain entering the site from east; an upstream monitoring point;
- SW7 A stream entering the site from drain SW6; an upstream monitoring point (sampled in the sump before entering the culvert beneath Area 2);
- SW8 At the culvert exit, downstream of the site (Area 2);
- SW9 A drainage ditch draining from wetland towards Afon Braint;
- SW10 Afon Braint at the point of entry from drainage ditch (SW9).

9.0.3 The following surface water monitoring points were inaccessible due to flooding;

- SW3 Afon Braint to the west and upstream of the site;
- SW4 Drain from wetland to Afon Braint, downgradient of the site;

9.0.4 It is recommended that SW3 and SW4 are sampled as early as possible during 2024 and again later in the year. It is likely that the flooding in this area could potentially be an ongoing problem. Surface Water Management is currently under review for the Site in collaboration with NRW.

9.0.5 Surface water monitoring locations are shown on drawing fc37224.

9.1 Point source emissions to water

9.1.1 Surface water monitoring requirements are listed in Table 10 below.

Table 10: Surface water – other monitoring requirements (Table S3.9)

Monitoring Point ID	Frequency	Parameters	Limit, mg/l
SW1 SW2 SW3 SW4 SW5 SW6 SW7 SW8 SW9 SW10	Annually	pH Electrical conductivity Chloride Ammoniacal nitrogen COD BOD Dissolved oxygen	none

9.1.2 Compliance limits are set up to regulate concentrations of NH_3-N and Cl in surface water downstream from the site. For this purpose, two representative monitoring points (SW9 and SW10) are used. The compliance limits are listed in Table 11.

Table 11: Point source emissions to water (Table S3.3)

Monitoring Point ID	Frequency	Parameters	Limit, mg/l
SW9	6-monthly	Chloride	64
		Ammoniacal Nitrogen	1.3
SW10		Chloride	61
		Ammoniacal Nitrogen	0.53

9.1.3 The SW9 ammoniacal nitrogen was detected in concentrations 1.9mg/l (19th April 2023) and 0.05mg/l (8th November 2023). Chloride was detected in concentrations 50mg/l (19th April 2023) and 18 mg/l (18th November 2023). The water sample collected on 19th April 2023 showed elevated concentrations of both regulated parameters.

9.1.4 The SW10 ammoniacal nitrogen was detected in concentrations 0.37mg/l (19th April 2023) and 0.2mg/l (19th November 2023). Chloride was detected in concentration of 21mg/l (19th April 2023) and 18mg/l (18th November 2023). Both sets of results from this monitoring point were compliant with the limits set in Table S3.3.

9.1.5 Surface water quality in other downstream and upstream monitoring points has been completed in accordance with the permit. Surface water monitoring laboratory data is presented in Appendix 5.

10.0 ANNUAL PRODUCTION/TREATMENT

10.0.1 Details of the annual production/treatment at Penhesgyn Gors Landfill during the review period are stated in the EP Schedule 4, Table S4.2, and summarised below.

Table 12: Annual Production, 2023

Leachate	**Volume, m^3/year**
Tankered off site for disposal	0
Treated at the on-site effluent treatment plant	0
Recirculated into the waste mass	TBC
Landfill Gas	**Nm^3/year**
Combustion in flare	TBC
Combustion in gas engines	TBC
Other methods of gas utilisation	N/A

11.0 TOPOGRAPHIC SURVEY

11.0.1 Condition 3.5.3 of the site permit requires that *"A topographical survey of the site referenced to ordnance datum shall be carried out:*

(a) annually, and

(b) following closure of the landfill or part of the landfill.

The topographical survey shall be used to produce a plan of a scale adequate to show the Survey."

11.0.2 A topographic survey of the site was carried out in December 2023. The resultant survey drawing is enclosed in Appendix 6.

11.0.3 The topographic survey completed has been compared to the January 2023 survey data. Cross sections have been produced to compare the levels to allow an assessment of any changes. The survey comparison indicates some slight change in levels, however, the changes are not considered to be significant.

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Appendix 1

Table S3.2 Point Source Emissions to Air

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Appendix 2

Table S3.6 Landfill Gas in Perimeter Monitoring Points

Cyngor Sir Ynys Môn

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Appendix 3

Table S3.7 Landfill Gas in Collection System

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Appendix 4

Table S3.1 Leachate Levels

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Appendix 5

RAW Laboratory Test Data

Cyngor Sir Ynys Môn

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Appendix 6

Table S4.3Topographic Survey of Penhesgyn Gors Landfill Site