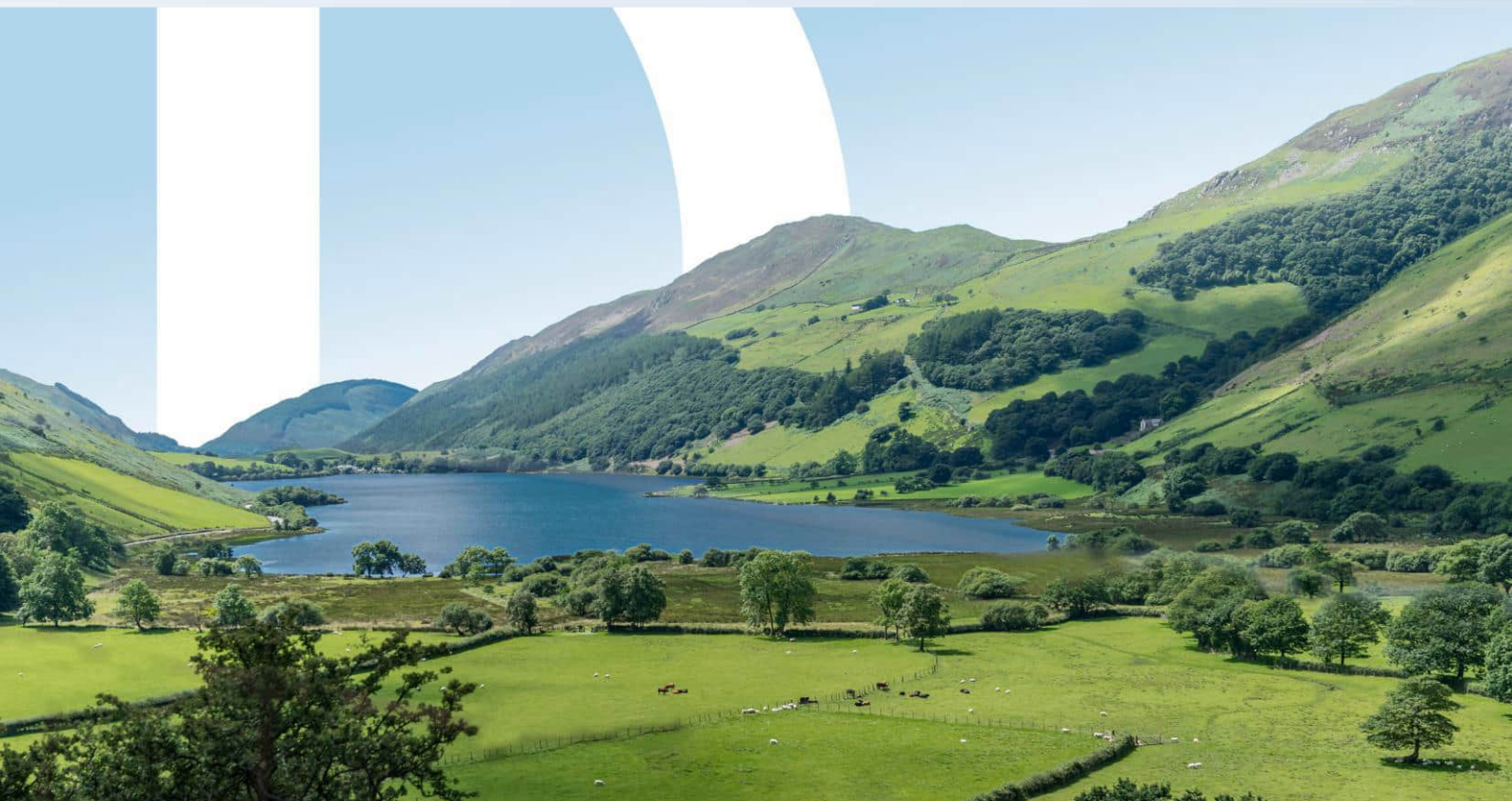




Gwynedd Council

FFRIDD RASUS LANDFILL

Annual Environmental Report 2023





Gwynedd Council

FFRIDD RASUS LANDFILL

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EXECUTIVE SUMMARY

This report provides the January to December 2023 annual monitoring report for Ffridd Rasus Landfill ('the site'), in accordance with the requirements of Condition 4.2 of the site's Environmental Permit (EP).

The site comprises Areas 1, 2 and 3 and is located approximately 3 km to the north of Harlech, at National Grid Reference (NGR) SH 577 338. Area 1 comprises the main elements of the site infrastructure including the Civic Amenity (CA) site and the Waste Transfer Station (WTS). Area 2 is an unlined landfill in its aftercare phase and Area 3 is a capped and restored engineered landfill which has been in 'definitive closure' since April 2016. Previously, Area 2 was regulated under the conditions of Environmental Permit (EP) ref: PP3294FJ and Area 3 was regulated under the conditions of EP ref: GP3330BY. In November 2023 a consolidation permit was issued (v007) by NRW, combining the regulation of Area 2 and Area 3 under permit GP3330BY.

Leachate sumps in Area 2 continue to be recorded as dry during 2023. Leachate monitoring in Area 3 showed levels below the EP compliance limit of 1.5 m above base except for two marginal exceedances in Cell 2. Leachate quality data was only available for Cell 2 due to an issue with within the pipes in the April and a technical failure of the pump in the November monitoring round. The data for Cell 2 were within range of previous data. Overall, leachate quality (as chloride and ammoniacal-nitrogen) is either stable or showing a downward trend since 2016. In previous reporting, Cells 3 and 4 have shown the highest leachate concentrations across the site which is consistent with having the most recently deposited and capped waste.

Groundwater levels within the sand aquifer underlying the site remain largely within historical data and continue to indicate a westwards flow direction towards the coast during 2023. Local groundwater quality is impacted (as elevated chloride and ammoniacal-nitrogen concentrations) by historical leachate leakage from the unlined Area 2. Data for 2023 shows that:

- Groundwater quality at the downgradient edge of Area 2 continues to improve and is consistent with capping of Area 2 in 2005-2008, which has led to reduced leakage and therefore increased dilution in groundwater;
- Chloride and ammoniacal-nitrogen concentrations are stable or declining at most boreholes at the downgradient edge of Area 3 which is consistent with the reduced leakage following the capping of Area 2 in 2005-2008. The observed breakthrough at the downgradient edge of Area 3 is consistent with theoretical travel times; and
- Chloride concentrations at paired boreholes are consistent with sinking of the leachate plume with distance from the source.

Surface water quality data for 2023 was only available for the April monitoring round. This data showed that SW1 (Area 1 permitted discharge) and SW2 (ditch flowing south along downstream boundary of Area 3) indicate no impact of leachate from the site. Data for SW3 (ditch exiting downstream boundary of Area 3) continues to show low chloride concentrations and occasional



spikes in ammoniacal-nitrogen concentrations which may reflect compost stockpiles/spreading and livestock (cows) in the adjacent farmland and outside the site's EP boundary and/or natural low flow/stagnant water conditions in the ditch.

Methane and carbon dioxide concentrations in the perimeter monitoring boreholes indicate no evidence of off-site landfill gas migration during 2023. There were no gas compliance limits exceeded during the reporting period.

The hydrogeological, landfill gas and stability risk assessments for Area 3 were reviewed using 2023 monitoring data and indicate that:

- **2015 Hydrogeological Risk Assessment (HRA) Review:** The updated hydrogeological conceptual model has not changed from the 2015 HRA Review and therefore the results of the 2015 model remain valid, i.e., there is no predicted impact on groundwater or surface water at the Morfa Harlech SSSI/NNR from leachate in Area 3. The 2015 HRA Review will be reviewed in 2024 in accordance with condition 4.2.2 of the EP.
- **Landfill Gas Risk Assessment:** The GasSim model was last updated in March 2023, for the annual pollution inventory reporting. There were no waste inputs in 2023 as the landfill closed on 6 January 2014. The GasSim model predicts a mean landfill gas generation rate of approximately 77 m³/hr in 2023.
- **Stability Risk Assessment:** the operator has advised that there is no evidence of capping instability at the site from inspections undertaken by the operator during 2023.
- The total energy consumption for 2023 was 143,841 kWh.

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1 INTRODUCTION

1.1 PURPOSE OF THIS REPORT

This report constitutes the January to December 2023 annual monitoring report for Ffridd Rasmus Landfill ('the site') in accordance with the requirements of Condition 4.2 of the site's Environmental Permit (EP).

1.2 BACKGROUND

The site is located approximately 3 km north of Harlech and received predominantly municipal waste. The site is operated by Gwynedd Council and comprises Areas 1, 2 and 3 (Figure 1.1). Area 1 comprises the main elements of the site infrastructure including the Civic Amenity (CA) site and the Waste Transfer Station (WTS). Area 2 is an unlined landfill, which is in its aftercare phase and Area 3 is a capped and restored engineered landfill which has been in 'definitive closure' since April 2016. Previously, Area 2 was regulated under the conditions of Environmental Permit (EP) ref: PP3294FJ and Area 3 was regulated under the conditions of EP ref: GP3330BY. In November 2023 a consolidated permit was issued (v007), combining the regulation of Area 2 and Area 3 under permit GP3330BY.

The periods of filling and capping in Area 3 were as follows:

- Cells 1 and 2: filled between 2007 and 2011, with capping works completed in June 2011;
- Cell 3: filled between January 2011 and June 2012, with capping works completed in February 2013; and
- Cells 4A and 4B: filled up to closure on 6 January 2014, with capping works completed on 2 April 2014.

1.3 LAYOUT OF THIS REPORT

Following this introduction, a summary of the environmental monitoring requirements is provided in Section 2. The site monitoring data for January to December 2023 is reviewed in Section 3 followed by a review of the HRA and landfill gas and stability risk assessments using the 2023 monitoring data in Section 4, a summary of energy consumption in Section 5, and production/ treatment volumes of landfill leachate, landfill gas and surface water in Section 6 and a review of waste settlement/remaining capacity in Section 7.

Data is summarised in the text and more detailed information and charts are provided in the Appendices to this report.

2 ENVIRONMENTAL MONITORING

The environmental monitoring requirements under the site's EP are summarised in Sections 2.1 to 2.4 below.

2.1 LEACHATE MONITORING

Leachate quality and levels are monitored in Areas 2 and 3. Monitoring locations are shown on Figure 1.1. The leachate sampling regime set out in EP GP3330BY/V007 is identified in Table 2.1. The latest EP Variation includes a reduction of monitoring leachate quality from quarterly to six-monthly.

Table 2.1 Leachate Monitoring Regime (EP GP3330BY/V007)

Monitoring Location	Frequency	Parameter
Area 2 LW4a, LW5a, LW6a, LW13.	Six-monthly	Level, Temperature, Cl, pH, EC, NH ₄ , Ca, Mg, K, Na, Alkalinity, TOC, SO ₄ , TON, phenol, COD, BOD.
	Annually	As six-monthly plus Cd, Cr, Cu, Fe, Pb, Mn, Ni, Zn and hazardous substances.
Area 3 LCP1, LCP2, LCP3, LCP4/2 and LCP4/B	Quarterly	Leachate level
	Six Monthly	As quarterly plus pH, EC, NH ₄ -N, TON, TOC, COD, BOD, Ca, Mg, K, Na, Cd, alkalinity, SO ₄ , phenol, naphthalene, mecoprop, toluene.
	Annually	As six-monthly plus Fe, Pb, Mn, Ni, Zn and hazardous substance screen

2.2 GROUNDWATER MONITORING

The monitoring requirements for groundwater in the Blown Sand deposits underlying the site set out in EP GP3330BY/V007 is identified in Table 2.2. Monitoring locations are shown on Figure 1.1. The latest EP Variation includes a reduction of groundwater monitoring frequency from quarterly to six-monthly.

Table 2.2 Groundwater Monitoring Regime (EP GP3330BY/V007)

Monitoring Location	Frequency	Parameter
BH1, BH15, BH18A, BH18B, BH19A, BH19B, BH19C, BH20A, BH20B, BH21A, BH21B, BH23, BH24, BH27-BH36 and NRA3	Six-monthly	Water level, DO, pH, EC, NH ₄ , Cl, Ca, Mg, K, Na, Alkalinity, TOC, SO ₄ , TON, phenol, Cd and naphthalene.
	Annually	As six-monthly plus Cr, Cu, Fe, Pb, Mn, Ni and Zn.

2.3 SURFACE WATER MONITORING

Surface water quality is monitored at several locations shown on Figure 1.1 and described below:

- SW1 and adjacent pipe: Area 1 permitted surface runoff discharge;
- SW2: ditch flowing south along the downstream boundary of Area 3; and
- SW3: ditch exiting downstream boundary of Area 3.

The surface water sampling regime set out in EP GP3330BY/V007 is identified in Table 2.3. Monitoring locations are shown on Figure 1.1.

Table 2.3 Surface Water Monitoring Regime (EP GP3330BY/V007)

Monitoring Location	Frequency	Parameter
SW1 and SW3	Six-monthly	Oil and grease (visual observation)
SW1, SW2 and SW3	Six-monthly	pH, temperature, EC, DO (field and laboratory), COD, BH4 and Cl

2.4 LANDFILL GAS MONITORING

Landfill gas is monitored in perimeter and in-waste boreholes at the site. The monitoring locations are shown on Figure 1.1. The gas sampling regime set out in EP GP3330BY/V007 is identified in Table 2.4.

Table 2.4 Landfill Gas Monitoring Regime (EP GP3330BY/V007)

Monitoring Location	Frequency	Parameter
Peripheral gas monitoring boreholes: BHG01, BHG02, BHG03 and BHG04	Six-monthly	Methane and carbon dioxide.
Spiker bar survey (eastern boundary at 50m spacing; northern boundary at 25m spacing)	Six-monthly	Methane, carbon dioxide, oxygen, balance gases, barometric pressure, relative pressure
In-waste gas monitoring boreholes in phase 3	Six-monthly	Methane, carbon dioxide, oxygen, carbon monoxide, hydrogen sulphide, atmospheric pressure, differential pressure and meteorological data.
Internal landfill gas boreholes: BH1, BH2, BH3, BH4, H5, BH6, BJ7, BH8, BH8A, BH9, BH10, BH11, BH12, BH13, BH14, BH15, BH16, BH17, BH18, BH19, BH20, BH21, BH22 and BH23. GW1, GW2, GW3, GW4, GW5, GW6, GW7, GW8, GW9, GW10, GW11, GW12, GW13 and GW14.	Six-monthly	Methane, carbon dioxide, oxygen, carbon monoxide, hydrogen sulphide, atmospheric pressure, differential pressure and meteorological data.



Monitoring Location	Frequency	Parameter
Permanently capped zone	Annually	Average methane flux and total methane emission

3 REVIEW OF MONITORING DATA

3.1 INTRODUCTION

This section presents a summary of the results of environmental monitoring for January to December 2023 as specified in the site’s EP’s (Sections 2.1 to 2.4).

Surface water, groundwater, leachate and landfill gas monitoring at the site was undertaken by Gwynedd Council during 2023. Surface water, groundwater and leachate samples were sent to ALS Environmental for analysis. Laboratory analytical report references are included as Appendix A.

3.2 LEACHATE LEVELS AND QUALITY

AREA 2 - LEACHATE LEVELS

Leachate sumps LW4A, LW5A, LW6A and LW13 were recorded as dry during 2023.

AREA 3 - LEACHATE LEVELS

Time-series plots for leachate levels since January 2012 are shown in Appendix B. The data for 2023 is summarised in Table 3.1 and show that leachate levels were below the EP compliance level of 1.5 m above base in all cells apart from Cell 2, where they rose marginally above the EP compliance limit on 2 occasions (November and December at 1.52 and 1.53 m above base respectively). This is as a result of reduced leachate pumping in Cell 2 following electrical issues with the leachate pump. These were resolved in January 2024.

Table 3.1 Leachate Level Data for 2023

Monitoring Point	Leachate Level (m above base)		
	Min	Mean	Max
Cell 1 (LCP1)	1.28	1.35	1.42
Cell 2 (LCP2)	1.32	1.42	1.53
Cell 3 (LCP3)	1.16	1.26	1.35
Cell 4A (LCP4/2)	0.91	0.97	1.01
Cell 4B (LCP4/B)	0.92	0.92	0.92
EP Compliance level	-	-	1.50

Note: Monthly monitoring data. Data for January to December 2023.

AREA 2 LEACHATE QUALITY

Due to leachate sumps LW4A, LW5A, LW6A or LW13 being dry in 2023 no samples of leachate were collected. Leachate sumps have been dry since 2008. Data collected during the period 2006 to 2008 indicated an improving trend in leachate quality in this area of the site, as shown on the data plots in Appendix B.

AREA 3 LEACHATE QUALITY

Time-series plots for ammoniacal nitrogen and chloride concentrations (leachate indicators for the site) and temperature since February 2009 are shown in Appendix B. Due to an issue with the pipes used to take the samples, only data for Cell 2 April is available in April. There was a technical issue with the pump during the November monitoring round which resulted in a failure to take the samples for all cells. These issues were resolved in late January 2024. The data available for 2023 are summarised in Table 3.2. Overall, chloride and ammoniacal-nitrogen concentrations show some variability but have remained in the range of 900 to 1400 mg/l since 2016 and 850 to ~1100 mg/l since 2017 respectively.

Table 3.2 Selected Leachate Quality Data for 2023

Cell	pH		Electrical Conductivity (µS/cm)		Ammoniacal Nitrogen (mg/l)		Chloride (mg/l)	
	April	October	April	October	April	October	April	October
Cell1								
Cell2	7.4		12600		1050		1350	
Cell3								
Cell4A								

Note: EP requires six-monthly monitoring data, but only data for April 2023 at Cell 2 is available.

The annual extended analytical suite comprising additional metals and organic substances as required by the EP for Area 3 was not carried out in 2022 as a result of electrical/ pump issues. These samples were collected in January 2023 and the data was provided to NRW in March 2023. No further hazardous suites have been carried out since this time.

The data collected in January 2023 shows that most of the organic substances were below the laboratory detection limits (laboratory detection limits ranged from 1 µg/l for organic compounds such as MCPB to 100 µg/l for Di-n-butylphthalate). The organic substances above detection limit are summarised in Table 3.3 and continue to include the pesticide mecoprop and extractable hydrocarbon bands (mainly as C6-C40 and C10-C16) with smaller concentrations of BTEX compounds (ethyl benzene and m&p Xylene) from samples taken from Cells 2 and 3. The metals detected include the hazardous metal lead (<0.006 – 0.009 mg/l) and the non-hazardous metals chromium (0.08 – 0.408 mg/l), iron (1.18 – 8.7 mg/l), nickel (0.141 – 0.307 mg/l), manganese (0.534 – 1.19 mg/l) and zinc (0.03 - 0.05 mg/l). Overall, the leachate data for January 2023 is consistent with historical data.

Table 3.3 - Leachate Quality Results of Extended Analytical Suite (Organic Substances Above Detection Limit) – January 2023

Substance	Cell 1	Cell 2	Cell 3
Pesticides (µg/l)			
Mecoprop	14.9	12.9	27.1
MCPB	<1.00	<2.00	4.43
Hydrocarbon Bands (µg/l)			
EH >C16 - C24	53	84	<100
EH >C10 - C16	199	364	496
EH >C8 - C10	<40	52	<100
EH >C6 - C40	252	500	496
BTEX Compounds (µg/l)			
Ethyl Benzene	<5.00	5.8	5.51
m&p Xylene	<5.00	7.23	6.25
Other organics (ug/l)			
3&4-Methylphenol	<2.00	<2.00	2.27
Cyanide	0.015	0.033	0.018
Substance	Cell 1	Cell 2	Cell 3
Pesticides (µg/l)			
Mecoprop	14.9	12.9	27.1
MCPB	<1.00	<2.00	4.43

3.3 GROUNDWATER LEVELS AND QUALITY

MONITORING BOREHOLES

Groundwater levels and quality are monitored at several boreholes around the site perimeter (Figure 1.1). The groundwater monitoring boreholes have been split into three groups for ease of presenting the data as follows:

- Boreholes drilled prior to 2004 - BH1, BH15 and NRA3;
- Boreholes drilled during 2004 - BH18A, BH18B, BH19A, BH19B and BH19C, BH20A, BH20B, BH21A, BH21B, BH23 and BH24; and

- Boreholes drilled during 2006 (BH27 to BH33) and 2012 (BH34 to BH36).

GROUNDWATER LEVELS

Groundwater level time-series plots since February 2000 for the sand aquifer underlying the site are shown in Appendix C. Data for 2023 are summarised in Table 3.3. There was no access to BH19B in October and BH21A and BH21B in July and October. These boreholes are located on adjoining agricultural land and the landowner refused access due to the proximity of grassing cattle. The data shows:

- Groundwater levels remain within the range of historical values. Seasonal variation is not as clear as observed in historical data due to the reduction in monitoring frequency in 2016 from monthly to quarterly; and
- A general drop in groundwater levels from east (BH1, BH15 and BH24 with levels ranging between 4.73 and 7.06 m AOD) to the west (BH19A/B/C, BH20A/B, BH21A/B, BH30 and BH31 with levels ranging between 4.19 to 4.96 m AOD) which continues to indicate groundwater flow towards the coast.

Table 3.4 Groundwater Levels for 2023

Borehole	Datum	Borehole Depth (screened section)	Groundwater Levels (m AOD)		
	m AOD		m bgl	Min	Mean
BH1	7.88	5	5.61	6.14	6.72
BH15	8.15	5	4.78	6.43	7.06
NRA3	6.78	4.9	4.73	5.40	6.22
BH18A	6.72	10 (6-9)	4.60	4.93	5.21
BH18B	6.75	10 (3-6)	5.24	5.57	5.83
BH19A	5.82	18 (14-17)	4.23	4.60	4.85
BH19B	5.95	12 (8-11)	4.30	4.59	4.83
BH19C	5.92	8 (4-7)	4.23	4.55	4.79
BH20A	5.07	16 (12-15)	4.19	4.42	4.56
BH20B	5.07	11 (7-10)	4.24	4.38	4.53
BH21A	5.19	15 (11-14)	4.52	4.74	4.96
BH21B	5.2	10 (6-9)	4.47	4.71	4.95
BH23	4.47	11.5 (6.5-10.5)	3.54	3.54	3.54
BH24	7.36	13 (9-12)	5.12	5.52	5.98
BH27	9.81	13	5.14	5.34	5.70
BH28	7.35	8	4.77	5.36	5.93
BH29	6.01	8	4.42	4.96	5.42
BH30	5.6	8	4.03	4.41	4.72
BH31	5.49	8	4.48	4.54	4.67



BH32	6.36	8	4.21	4.57	4.81
BH33	7.22	8	5.08	5.44	5.72
BH34	6.42	8.7	5.44	5.94	6.41
BH35	6.55	8.7	5.34	5.84	6.40
BH36	7.22	8.5	5.77	5.99	6.38

Notes: Quarterly monitoring data (January, April, July, and October 2023).

GROUNDWATER QUALITY

Time-series plots for ammoniacal-nitrogen, chloride and cadmium concentrations and temperature in groundwater since February 1998 are shown in Appendix D. Ammoniacal-nitrogen concentrations for boreholes BH20A, BH20B, BH21A and BH21B have been graphed separately as concentrations are higher than measured in other boreholes within the group of boreholes drilled during 2004.

A summary of the data for 2023 is provided in Table 3.4. BH23 was inaccessible in January, BH21A and B and BH27 were inaccessible in July and BH21A and B and BH19B were inaccessible in October.



Table 3.5 Selected Groundwater Quality Data for 2023

Borehole	Ammoniacal Nitrogen (mg/l)			Chloride (mg/l)			Cadmium (µg/l)			Temperature (°C)		
	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max
Upgradient of Areas 2 and 3												
BH1	<0.41	0.55	0.7	16.4	18.4	20.3	<0.07		<0.6	9.8	12.3	15.0
BH15	<0.41	<0.41	<0.41	9.80	14.1	17.1	<0.07		<0.6	9.9	12.0	14.0
BH24	<0.41	<0.41	<0.41	15.1	30.9	36.8	<0.07		<0.6	10.3	11.6	13.5
Downgradient of Area 2 and Upgradient of Area 3												
BH27	69	71.97	75.7	84.2	96.63	106	<0.07	0.05	1.20	13.7	14.0	14.4
BH34	<0.41	<0.41	<0.41	10.2	22.75	29.8	<0.07		<0.6	11.0	12.4	15.1
BH35	10.5	12.63	15.4	36.4	39.83	44	<0.07	0.23	0.7	11.5	12.8	14.2
BH36	38.6	53.97	73.6	56.7	68.00	77.3	<0.07		<0.6	12.6	13.3	14.5
NRA3	<0.41	<0.41	<0.41	16.4	21.23	23.8	<0.07	0.23*	0.17	10.5	11.7	13.2
Lateral to Groundwater Flow												
BH18A	<0.41	<0.41	<0.41	16.3	16.93	17.6	<0.07		<0.6	10.7	11.5	11.9
BH18B	<0.41	<0.41	<0.41	13.6	17.17	23.8	<0.07		<0.6	11.0	12.0	13.1
BH28	<0.41	<0.41	<0.41	19.3	20.87	22.9	<0.07		<0.6	9.2	10.7	12.9
BH32	<0.41	<0.41	<0.41	12.1	12.93	14.5	<0.07		<0.6	10.7	11.8	13.2
BH33	<0.41	<0.41	<0.41	10.1	12.9	14.4	<0.07		<0.6	9.9	11.5	13.0
Downgradient of Areas 2 and 3												
BH19A	<0.41	<0.41	<0.41	174	186	212	<0.07	0.26*	0.11	11.4	12.2	13.4
BH19B	<0.41	<0.41	<0.41	105	115	125	<0.07		<0.6	11.6	12.1	12.8
BH19C	0.45	1.02	2.01	17.4	19.3	20.4	<0.07	0.32	0.80	11.4	12.5	13.6
BH20A	11.9	12.10	12.3	249	251	253	<0.07		<0.6	13.9	14.5	15.0
BH20B	118	128	142	78.3	167	253	<0.07		<0.6	13.7	14.1	14.7
BH21A	1.54	2.00	2.06	78.3	124.2	170	<0.07		<0.6	6.8	9.1	11.3
BH21B	<0.41	1.00	1.93	17.7	18.9	20	<0.6*	0.37*	0.14	9.0	11.0	12.9
BH29	<0.41	0.45	0.50	15.8	20.48	22.7	<0.07		<0.6	10.2	11.2	12.3
BH30	99.4	108	116	114	149.25	192	<0.07	0.25	0.80	11.6	13.1	14.8
BH31	<0.41	6.69	10.4	42.5	46.13	50.3	<0.07	0.25	0.60	10.5	12.9	15

Notes: Quarterly monitoring (January, April, July and October 2023).

*Mean result is higher than maximum detected value due to reduction in detection limit after January 2023.

Upgradient Boreholes

Boreholes BH1, BH15 and BH24 are situated upgradient of Areas 2 and 3 and provide an indication of local background groundwater quality. Boreholes BH27, BH34 to BH36 and NRA3 are situated downgradient of Area 2 and upgradient of Area 3 and provide an indication of any potential impact from Area 2 (Figure 1.1).

Data for the reporting period show that:

- Local background groundwater quality (BH1, BH15 and BH24):
 - Ammoniacal-nitrogen concentrations continue very low, with all but one sample below the laboratory detection limit (<0.41 mg/l) in 2023 (0.7 mg/l in October at BH1). This is consistent with historical data;
 - Chloride concentrations at all boreholes are low (9.8-36.8 mg/l) and show little variability. Borehole BH15 continues to show lower concentrations than boreholes BH1 and BH24;
 - Cadmium concentrations have remained below the detection limit of 0.07 µg/l, which reduced from 0.6 µg/l after January 2023.
- Groundwater quality downgradient of Area 2 and upgradient of Area 3 (BH27, BH34 to BH36 and NRA3):
 - Ammoniacal-nitrogen and chloride concentrations at boreholes BH27, BH35 and BH36 continue to be above local background quality because of impact on groundwater from leachate from Area 2. However, following capping of Area 2 in 2005-2008 groundwater quality is improving at the downgradient edge of Area 2. Concentrations of ammoniacal-nitrogen and chloride at boreholes BH27, BH35 and BH36 show a downward trend since 2010/2012 but appear to have reached a plateau for chloride at BH35 (around 30-50 mg/l) and BH36 (around 50-100 mg/l). Cadmium continues to be measured at detectable concentrations in BH27 and BH36 and above background quality, with concentrations at BH35 below detection limit (<0.07 µg/l) on all but one occasion (0.08 µg/l in October); and
 - Ammoniacal-nitrogen and chloride concentrations at boreholes BH34 and NRA3 were within local background quality. Cadmium was above detection limits in January 2023 (0.0012 µg/l), but since then has remained below detection limits. NRA3 has previously remained consistently below detection limits, but since lowering of detection limit after January, July and October samples were both above detection (0.17 and 0.08 µg/l respectively). Similarly, cadmium concentrations at BH35 have on occasion marginally exceeded detection limits, as in January 2023 (0.7 µg/l, slightly above the limit of 0.6 µg/l). Since the lowering of detection limits for cadmium there has been one detection at BH35 in October 2023, but this remained low (0.08 µg/l). These boreholes are in the northwest and southwest corners of Area 2 and on the edge of the plume originating from Area 2.

Boreholes Situated lateral to the Groundwater Flow Direction

Boreholes BH18 (A and B), BH28, BH32 and BH33 are situated in a lateral direction to groundwater flow beneath the site. The data for the reporting period show:

- Ammoniacal-nitrogen concentrations and chloride concentrations show little variability and were within local background quality; and
- Cadmium concentrations were below detection limit (<0.07 µg/l) in all boreholes.

Downgradient Boreholes

Boreholes BH19 (A, B and C), 20 (A and B), 21 (A and B), 29, 30 and 31 are located downgradient of Areas 2 and 3. Groundwater compliance limits for these boreholes are specified in the EP (ref PP3294FJ) for Area 2 and Civic Amenity and EP (ref GP3330BY) for Area 3. Revised limits for chloride and ammoniacal-nitrogen in Areas 2 and 3 were proposed by Wood (2017). The limits for Area 3 were accepted by NRW on 6 December 2017.

Following a meeting with Gwynedd Council in January 2020, NRW suspended temporarily the CAR scoring and Schedule 6 reporting for ammoniacal nitrogen, chloride and cadmium in boreholes BH19B, BH19C, BH20A, BH21A and BH21B subject to further review of the monitoring data by NRW (see Appendix E). This suspension of compliance limits continued throughout 2021 and was lifted on 1st April 2022. An EP Variation for one set of common compliance limits across all the compliance boreholes was submitted to NRW in August 2022 and was accepted by NRW in November 2023.

Comparison of the 2023 monitoring data against the compliance limits set in the EP (ref GP3330BY/V007) are summarised in Table 3.6. This shows that there were no exceedances of the compliance limits for any substances.

Table 3.6 Ammoniacal-Nitrogen, Chloride, Cadmium and Naphthalene concentrations in 2023

Boreholes	EP Compliance Limit (mg/l)	Groundwater concentration (mg/l)			
		January	April	July	October
Ammoniacal nitrogen					
BH19A	150	<0.41	<0.41	N/S	<0.41
BH19B	-	<0.41	<0.41	N/S	N/S
BH19C	150	0.45	0.59	N/S	2.01
BH20A	150	12.3	11.9	N/S	12.1
BH20B	150	118	142	N/S	N/S
BH21A	150	2.06	1.54	N/S	N/S
BH21B	150	1.93	<0.41	N/S	N/S
BH29	150	<0.41	<0.41	<0.41	0.5
BH30	150	116	106	99.4	109
BH31	150	<0.41	N/S	9.27	10.4
Chloride					
BH19A	500	174	173	N/S	212
BH19B	-	125	105	N/S	N/S
BH19C	500	17.4	20.1	N/S	20.4
BH20A	500	253	249	N/S	251
BH20B	500	78.3	253	N/S	78.3
BH21A	500	78.3	170	N/S	N/S
BH21B	500	20	17.7	N/S	N/S

Boreholes	EP Compliance Limit (mg/l)	Groundwater concentration (mg/l)			
		January	April	July	October
BH29	500	15.8	22.7	21.2	22.2
BH30	500	192	114	152	139
BH31	500	50.3	N/S	42.5	45.6
Cadmium					
BH19A	0.0055	<0.0006	<0.00007	N/S	0.00011
BH19B	-	<0.0006	<0.00007	N/S	N/S
BH19C	0.0055	0.0008	<0.00007	N/S	0.00009
BH20A	0.0055	<0.0006	<0.00007	N/S	<0.00007
BH20B	0.0055	<0.0006	<0.00007	N/S	N/S
BH21A	0.0055	<0.0006	<0.00007	N/S	N/S
BH21B	0.0055	<0.0006	0.00014	N/S	N/S
BH29	0.0055	<0.0006	<0.00007	<0.00007	<0.00007
BH30	0.0055	0.0008	<0.00007	<0.00007	<0.00007
BH31	0.0055	0.0006	N/S	<0.00007	<0.00007
Naphthalene					
BH19A	0.002	N.m	0.000012	N/S	N.m
BH19B	-	N.m	0.000022	N/S	N/S
BH19C	0.002	N.m	<0.00001	N/S	N.m
BH20A	0.002	N.m	0.000137	N/S	N.m
BH20B	0.002	N.m	0.00014	N/S	N/S
BH21A	0.002	N.m	<0.0001	N/S	N/S
BH21B	0.002	N.m	<0.0001	N/S	N/S
BH29	0.002	N.m	<0.0001	N.m	N.m
BH30	0.002	N.m	<0.0001	N.m	N.m
BH31	0.002	N.m	N/S	N.m	N.m

N/S= No sample collected due to access issues. N.m = not measured.

Groundwater Quality Data Review

The overall trends in groundwater quality show that:

- The leachate plume associated with historical leakage from the unlined Area 2 continues to have an impact on groundwater quality (as elevated chloride and ammoniacal-nitrogen concentrations) downgradient of Areas 2 and 3 as it migrates towards the coast;
- The historical release and movement of the leachate plume from Area 2 within the underlying sand aquifer to the boreholes at the downgradient (western) edge of Area 3 is complex and is affected by:

- Variations in hydraulic conductivity and gradient of the underlying sand aquifer;
 - Retardation of leachate contaminants within the sand aquifer;
 - Capping of Area 2 in 2005-2008, which reduced leachate generation and leakage in this area;
 - Engineering of Area 3 during 2007 to 2014, which reduced recharge to the aquifer; and
 - Sinking of the plume within the sand aquifer with distance from the source, which may result in different concentrations in paired deep/shallow borehole installations.
- Groundwater quality at the downgradient edge of Area 2 has improved since 2012. This is consistent with capping of Area 2 in 2005-2008, which has reduced leachate leakage and therefore increased dilution in groundwater. This is apparent in the downward trend in chloride and ammoniacal-nitrogen concentrations observed at boreholes BH27, BH35 and BH36 since 2010/2012 which is levelling off at some locations. However, there will be a time lag before this improvement is shown in boreholes that are further downgradient on the western edge of Area 3;
 - The breakthrough of chloride and ammoniacal-nitrogen at the downgradient edge of Area 3 is consistent with calculated travel times from the edge of Area 2 (where infilling started 38 years ago) to the edge of Area 3 of approximately 6 to 10 years for chloride (unretarded) and 21 to 37 years for ammoniacal-nitrogen (retarded; sorption coefficient of 0.4 ml/g from EA, 2003¹);
 - Chloride and ammoniacal-nitrogen concentrations at most boreholes at the downgradient edge of Area 3 are stable or declining. This is consistent with the reduced leakage following the capping of Area 2 in 2005-2008;
 - Chloride concentrations at the downgradient edge of Area 3 in the paired boreholes BH20A/B and BH21A/B is consistent with sinking of the leachate plume with distance from the source: chloride breakthrough first at the shallower installations (BH20B and BH21B), followed by breakthrough at the deeper installations (BH20A and BH21A) as concentrations start to stabilise/drop at the shallower installations. Chloride concentrations have generally been higher at the deeper installations (BH20A since 2013 and BH21A since 2006);
 - The previously elevated but unsustainable peak above the compliance limit in chloride concentrations at BH21A (deeper installation) and BH21B (shallower installation) at the downgradient edge of Area 3 during 2017/2018 could be due to:
 - Leakage from Area 3. However, this is unlikely as Area 3 comprises a Landfill Regulations-compliant composite liner on the base and sides. In addition, leachate levels have been managed below the EP compliance limit of 1.5 m above base and show minimal fluctuation from one dipping round to the next. This is supported by previous LandSim modelling² which did not predict discernible breakthrough of chloride from Area 3 (maximum predicted concentration at the edge of Area 3 of 0.8 mg/l in 2112 as 95th percentile) for leachate heads of up to 2 m; or
 - Impact of leachate plume migration from Area 2 at depth. This appears to be the most likely cause as it is consistent with higher chloride concentrations observed at the deeper

¹ Environment Agency, 2003. Review of ammonium attenuation in soil and groundwater.

² Amec Foster Wheeler, 2016. Ffridd Rasus Landfill. Hydrogeological Risk Assessment Review. Report ref 28587rr954i2.

installations downgradient edge of Area 3 in 2017 (Appendix D). This may be due to sinking of the leachate plume with distance from the source.

3.4 SURFACE WATER QUALITY

Surface water quality data for 2023 for ammoniacal nitrogen, chloride, electrical conductivity (EC) and temperature are summarised in Table 3.7 and presented (excluding EC but including chemical oxygen demand (COD)) graphically combined with long term water quality data in Appendix F. The six-monthly EP monitoring requirement was undertaken in April and October 2023. SW1 (pipe) was dry in April. The data from the October monitoring round has not been recovered. The data available for 2023 shows that:

- Ammoniacal-nitrogen and chloride:
 - SW1 (Area 1 permitted surface run-off discharge) and adjacent pipe discharge (SW1 pipe): both ammoniacal-nitrogen and chloride concentrations were within the range of previous data. SW1 (pipe) was dry in April. The data indicate no impact of leachate at these locations;
 - SW2 (ditch flowing south along the downstream boundary of Area 3): ammoniacal-nitrogen concentrations were below detection limit (<0.41 mg/l) in the April monitoring round. Chloride concentrations continued to be lower than the elevated peaks observed in 2012 to 2015. The data indicate no impact of leachate at this location; and
 - SW3 (ditch exiting downstream boundary of Area 3 and represents the main surface water discharge from the site): both chloride and ammoniacal nitrogen concentrations in April remained within the range of historical data.
- **COD:** measurements remained low (11-76 mg/l) and were within historical values across all monitoring locations. Several elevated and non-sustained peaks (up to 8200 mg/l) have been measured historically and are likely to be associated with natural low flow/stagnant water conditions in the ditch;
- Six-monthly observations of the state of the water at locations SW1 and SW3 show no evidence of surface film or oil (Appendix F). This meets the EP requirement for no visible oil and grease at the site's discharge point SW3.

Table 3.7 Selected surface water Quality Data for 2023

Determinand	SW1		SW1 (pipe)		SW2		SW3	
	Apr	Oct	Apr	Oct	Apr	Oct	Apr	Oct
Ammoniacal N (mg/l)	<0.41		Dry		<0.41		<0.41	
Chloride (mg/l)	25.0		Dry		29.8		28.7	
Electrical Conductivity (µS/cm)	350		Dry		371		389	
Temperature (°C)	12.0	11.3	12.0	11.3	11.5	11.4	11.4	11.4
COD (mg/l)	11		Dry		46		76	

Notes: EP requires six-monthly monitoring, but data only available for April. SW1 (pipe) was dry during the April 2023 monitoring round.

3.5 LANDFILL GAS

3.5.1 PERIMETER GAS MONITORING (AREA 3)

Landfill gas monitoring in the perimeter boreholes on a six-monthly basis is a requirement of the EP for Area 3 to identify any off-site migration.

Five landfill gas monitoring boreholes were installed around the perimeter of Cell 1, Area 3 in September 2006, as shown on Figure 1.1. Borehole BG05 was lost during previous engineering works. The perimeter boreholes are required to be monitored on a 6-monthly basis but continue to be monitored monthly. A summary of the monitoring results for boreholes BHG01 to BHG04 for 2023 is presented in Table 3.8 together with the EP compliance limits for methane and carbon dioxide.

Table 3.8 Monitoring Results from Perimeter Landfill Gas Boreholes for 2023

	BHG01			BHG02			BHG03		
	CH4 %v/v	CO2 %v/v	O2 %v/v	CH4 %v/v	CO2 %v/v	O2 %v/v	CH4 %v/v	CO2 %v/v	O2 %v/v
Minimum	0	0.1	18.8	0	0.3	17.8	0	0.5	18.0
Maximum	0.2	0.54	21.9	0.2	1.4	21.4	0.2	3.1	21.6
Average	0.07	0.23	20.9	0.04	0.56	20.2	0.05	1.79	19.7
EP Compliance Limits	1.0	1.5	-	1.0	1.6	-	1.0	5.1	-

Note: 2023 statistics are for monthly monitoring results between January and December 2023.

The results presented in Table 3.8 indicate no evidence of off-site landfill gas migration. No compliance limits were exceeded during the reporting period.

Measurements of rainfall, temperature and cloud cover are recorded daily at the site. Monitoring data for 2023 are presented as Appendix G.

3.5.2 IN-WASTE GAS MONITORING (AREA 3)

In-waste gas monitoring is carried out in Area 3 in accordance with the site EP. Monitoring during the reporting period was from the combined leachate and gas monitoring wells, leachate manholes and gas wells (locations shown in Figure 1.1) as follows:

- LM1/1 and LM1/2 in Cell 1;
 - LM2/1 and LM2/2 in Cell 2;
 - LM3/1 and LM3/2 in Cell 3;
 - LM4/2 in Cell 4A;
 - Leachate manholes (LCP1, LCP2, LCP3, LCP4A and LCP4B in Cells 1, 2, 3 and 4, respectively);
- and

- Gas wells C11 to C14 in Cell 1, C21 to C25 in Cell 2, C31 to C36 in Cell 3, C41 to C46 in Cell 4A and C51 to C57 in Cell 4B.

The results of the landfill gas monitoring undertaken within Area 3 is provided as Appendix H.

Active gas extraction was undertaken from all Cells during 2023. Data indicates that the landfill is in a methanogenic stage of decomposition, with most wells indicating gas in the range typically expected for municipal waste landfill.

Landfill gas composition, calculated from the average concentrations recorded in the in-waste wells during the reporting period comprises 19.4% methane and 14.1% carbon dioxide (both by volume, or v/v) as the major constituents during the most active phase of waste decomposition. The rate of gas production is controlled by several factors such as moisture content, pH, temperature, oxygen ingress and composition of the waste and this will account for some of the variability seen in some of the readings.

A walkover survey of surface emissions of Areas 2 and 3 was not carried out by Gwynedd Council in 2023. The latest walkover survey was undertaken on 26th September 2022. The weather conditions were dry with intermittent heavy showers. The maximum methane concentration recorded was 4 ppm, which is not indicative of significant fugitive emissions from the landfill cap. There has been no record of any problems noted on the cap condition or stability in 2023.

3.5.3 GAS MONITORING (AREA 2)

Landfill gas monitoring in Area 2 is carried out in accordance with Table 2.4 of this report.

The results of the spiker bar surveys carried out in May 2023 showed no measurable detection or low concentrations of methane and carbon dioxide (up to 0.1% v/v), and average oxygen concentration of 21% v/v, which is indicative of atmospheric air. Additional spiker bar information is taken along the northern boundary (in the area behind the IVC building) on a monthly basis at SKBN08, SKBN09, SKBN10 and SKBN11. Monthly results taken between January and December 2023 show low concentrations of methane and carbon dioxide (up to 0.3% v/v), with an average oxygen concentration of 21% v/v.

4 REVIEW OF HYDROGEOLOGICAL, LANDFILL GAS AND STABILITY RISK ASSESSMENTS

4.1 REVIEW OF HYDROGEOLOGICAL RISK ASSESSMENT

The conceptual model for Area 3 developed in the latest HRA review dated 4 June 2015 is summarised in Table 4.1. The 2015 HRA Review predicted no impact from Area 3 landfill on groundwater or surface water quality and the Morfa Harlech SSSI/NNR.

Table 4.1 Hydrogeological Conceptual Model for Area 3 of Ffridd Rasus Landfill (2015 HRA Review)

Source	Potential Pathways	Potential Receptors
Landfill leachate	Leachate leakage through the engineered composite liner into the underlying unsaturated Blown Sand deposits.	Groundwater within the Blown Sand deposits aquifer below the site.
	Vertical migration through the unsaturated Blown Sand deposits to the underlying water table.	Surface water in the drainage ditches around the site boundary.
	Lateral migration within groundwater flow westwards towards the coast.	Morfa Harlech SSSI/NNR.
	Lateral migration westwards within surface water in the drainage ditches around the site boundary.	

REVIEW OF SOURCE

The leachate source concentrations and levels modelled in the 2015 HRA Review remain valid when compared to the available 2023 monitoring data (Table 4.2).

Table 4.2 Comparison of Leachate Composition Modelled in 2015 HRA Review with Leachate Monitoring Data for 2023

Parameter	Unit	2015 HRA Review Modelled Values			2023 Measured Values		
		Min	Mean	Max	Min	Mean	Max
Ammoniacal-N	mg/l	15	1200	2300		1050*	
Chloride	mg/l	200	1600	2600		1350*	
Mecoprop	mg/l	0.0015	0.040	0.08		0.0137*	
Naphthalene	mg/l	0.005	-	0.05		<0.001*	

Parameter	Unit	2015 HRA Review Modelled Values			2023 Measured Values		
		Min	Mean	Max	Min	Mean	Max
Zinc	mg/l	0.02	0.2	0.6		0.062*	
Cadmium	mg/l	0.0006	0.0032	0.06		<0.00070*	
Leachate Head Above Liner	m	0.5	1.0	1.5	1.16	1.34	1.53

Note: The annual extended analytical suite comprising mecoprop and naphthalene as required by the EP for Area 3 was not carried out in 2022 as a result of electrical/ pump issues. These samples were collected in January 2023 and provided to NRW in March. No extended suites have been carried out since January 2023.

* Available leachate quality data for 2023 (April 2023 at LCP2). This was due to an issue with the pipes used to take the sample during the April monitoring round and a pump failure in the November monitoring round. A contractor was called to replace the piping.

REVIEW OF PATHWAYS

The site ceased accepting wastes in early 2014 and capping works were completed in April 2014. The potential pathways for any contaminants from the landfill continue to be as identified in the 2015 HRA Review.

REVIEW OF RECEPTORS

No additional receptors to those identified in the 2015 HRA Review (Table 4.1) have been identified during 2023.

SUMMARY

Overall, the hydrogeological conceptual model for Area 3 has not changed from the 2015 HRA Review and therefore the results of the 2015 HRA Review remains valid, i.e., there is no predicted impact on groundwater or surface water and the Morfa Harlech SSSI/NNR from leachate in Area 3.

The 2015 HRA Review will be reviewed in 2024 in accordance with condition 4.2.2 of the EP.

4.2 REVIEW OF LANDFILL GAS RISK ASSESSMENT

GAS COLLECTION SUMMARY

Cell 1 and Cell 2

Waste previously deposited in engineered containment Cells 1 and 2 has been capped and a landfill gas collection system (including extraction wells, collector pipework and condensate knockout pots) is in operation. Four landfill gas collection wells (C11 to C14) are available for monitoring in Cell 1 and five wells (C21 to C25) are available in Cell 2.

Cell 3

Six gas wells numbers (C31 to C36) were completed in Cell 3 in October 2012. Gas extraction from the wells commenced in March 2013 following capping operations and installation of collection pipework.

Cell 4A

Six gas wells (C41 to C46) were completed in Cell 4A in July 2013. Gas extraction from the wells commenced in August 2013 following capping operations and installation of collection pipework.

Cell 4B

Waste operations commenced in Cell 4B on 14 June 2013. Cell 4B was filled with waste to closure on 6 January 2014 and capping of cells 4A and 4B was complete in late March 2014. A total of 7 gas wells (C51-C57) were drilled in Cell 4B in early March 2014. Gas extraction from the wells commenced in April 2014 following capping operations and installation of collection pipework.

LANDFILL GAS FLARING AND UTILISATION

Up until April 2017, landfill gas from Areas 2 and 3 was collected and combusted in a 500 m³/hour high temperature enclosed flare, with annual flare monitoring undertaken as per Schedule 4 (Table S4.2) in the permit.

From April 2017 to August 2021, landfill gas extracted from Area 2 and Area 3 was utilised via a microturbine. In September 2021, the microturbine was replaced by a 75 m³/hour capacity low calorific enclosed high temperature flare.

As per their letter dated 21 November 2018 (Ref. GP3330BY/V006), NRW have agreed that emissions monitoring of the flare will only be completed when usage (operational hours) is more than 10% of the available hours over the calendar year. Bulk and trace gas analysis of samples from the flare inlet (e.g. raw landfill gas) were undertaken by SOCOTEC in December 2023 in accordance with Table S3.7 (Landfill gas – other monitoring requirements) of the EP. The monitoring results are provided in Appendix I and all results are within the emission limits specified in the EP.

MONITORING

Landfill gas is monitored at a number of locations within and around the perimeter of the landfill. Monitoring of landfill gas is discussed in Section 3.5.

GASSIM MODEL

The GasSim model for Area 3 was last updated in March 2023 for the annual pollution inventory reporting. There were no waste inputs in 2023 as the landfill closed on 6 January 2014.

The GasSim model bulk landfill gas generation graph is included as Appendix I. The GasSim model predicts an average landfill gas generation rate of 77 m³/hr in 2023.

It is not possible to directly compare this prediction with the actual flow rates measured at the flare because the flare combusts gas from both the Area 3 landfill and the older Area 2 landfill.

In 2023, the flare was operational 99.35% of the time which equates to a total of 363 days. The remaining 0.65% of downtime was caused by the flare being turned off for servicing occasional

power cuts and for a fire in a shed in the transfer station in October. Since July 2022 the flare is able to be monitored and restarted remotely, following installation of telemetry which has led to a significant reduction in downtime.

4.3 REVIEW OF STABILITY RISK ASSESSMENT

The Stability Risk Assessment was undertaken in November 2004 as a part of the EP application for Area 3. The assessment concluded that the general design as submitted in the permit application was stable and could be constructed and operated safely and without risk to the stability and integrity of the lining system.

BASAL LINING SYSTEM

Cells 1 to 4 basal lining systems were installed in accordance with the assessment undertaken in November 2004 and as detailed in subsequent design reports for each cell which were submitted to and commented on by the Environment Agency Wales (now NRW).

CAPPING SYSTEM

The detailed design of the capping system depends on the final waste profile achieved in the cell. As a part of the detailed design phase undertaken for the capping to Cells 1 to 4, a review of the capping stability was undertaken based on the proposed final slope profiles. This review was submitted to the Environment Agency Wales (now NRW) as part of the Design Report submitted in advance of capping works for each cell. These assessments conclude that the restored capping slopes will remain stable during construction and in the long term. A CQA verification report which details geosynthetics interface testing undertaken as part of Cell 4 capping was submitted to NRW in November 2014 (Wood report ref. 28587rr886i1).

A site inspection undertaken by NRW on 22 January 2016 indicated that the capped surface appeared to be in good condition with no evidence of instability observed (EPR Compliance Assessment Report GP3330BY/0256663). Site inspections undertaken by Gwynedd Council in 2023 show no evidence of capping instability.



5 ENERGY CONSUMPTION

The total energy consumed by the site between January and December 2023 was 143,841 kWh. This is a small increase from the total energy consumption for 2022 of approximately 110,000 kWh.

6 PRODUCTION/TREATMENT VOLUMES

6.1 INTRODUCTION

This section summarises the volumes produced and treated (if applicable) at the site of landfill leachate, surface water and/or groundwater and landfill gas between January and December 2023.

6.2 LANDFILL LEACHATE

The effective management of leachate levels is a key element in the operation of Area 3 to ensure there are no adverse impacts on groundwater.

Monitoring data for Area 3 between January and December 2023 indicates that leachate levels were below the EP compliance level of 1.5 m above base except for two marginal exceedances in Cell 2 (see Section 3.2). This demonstrates that the leachate extraction rates were effective and the on-site leachate storage capacity was sufficient to ensure leachate level compliance in Area 3. A total of 80.72 tonnes of leachate was extracted during 2023 (compared to 264.64 tonnes in 2022). The loads were removed in April. Leachate was removed by pumping from a sump in the base of each cell via a vertical or upslope riser. The leachate extracted was stored on-site in the leachate collection tanks prior to removal off-site by tanker for treatment at Llanddulas Landfill Site in Conwy.

6.3 SURFACE WATER/GROUNDWATER

No dewatering has been carried out in association with landfill construction and operation. On this basis there is no groundwater disposal or treatment at the site.

A surface water management system was installed at the site in September 2012 comprising new surface water drainage pipework and an interceptor outfalling into the drainage ditch on the northern boundary of the site. Surface water collected from the Area 3 landfill drains both into the infiltration basin north of the area, some as direct discharge into the perimeter ditches to the south and west and as local soakaway into the underlying blown sand deposits.

6.4 LANDFILL GAS

From April 2017 to August 2021, landfill gas extracted from Area 2 and Area 3 was utilised via a microturbine. In September 2021, the microturbine was replaced by a 75 m³/hour capacity low calorific enclosed high temperature flare.

The flare was operational for a total of 363 days in 2023, and in that time combusted an estimated total of 217,575 m³ of landfill gas. This is based on the average flow of 25 m³/hr.

7 WASTE SETTLEMENT AND REMAINING CAPACITY

7.1 REMAINING CAPACITY

The landfill closed to receipt of waste on 6 January 2014 and there is no residual capacity.

7.2 SETTLEMENT BEHAVIOUR

A topographical survey completed in May 2023 found no noticeable settlement when compared to the 2019 topographic survey.

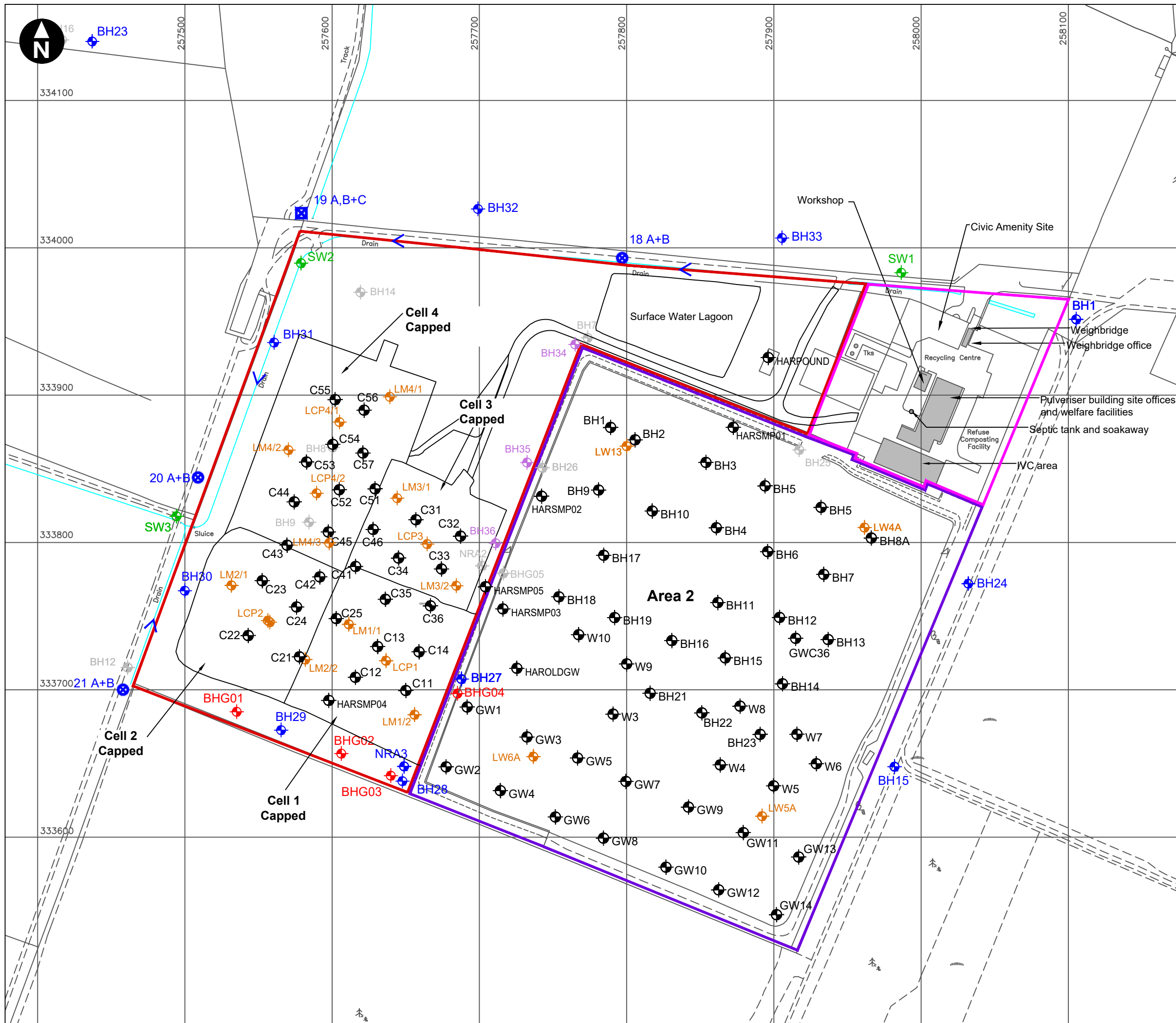


REFERENCES

Wood, 2017. Ffridd Rasus Landfill: Review of Groundwater Compliance Limits and Surface Water Investigation. Report ref 40068N003i2

Amec Foster Wheeler, 2015. Ffridd Rasus Landfill- Areas 1 and 3: Hydrogeological Risk Assessment Review. Report ref: 28587rr954i2

X:\UK\GB\BR400-SAL\FS12-SHARED\Projects\853398 Gwynedd Council Permitting Support\Deliver Stage\Design_TechnicalDrawings\AutoCad\228874-WOOD-ZZ-XX-FG-OW-00001_S0_P01.2.dwg Originator: UKVLS775



- Key
- Boundary of Area 1
 - Boundary of Area 2
 - Boundary of Area 3 (area of site to be definitively closed)
 - Single installation borehole
 - Double installation borehole
 - Triple installation borehole
 - Surface water monitoring point
 - Leachate monitoring point
 - Perimeter gas monitoring borehole
 - Boreholes lost/destroyed
 - Replacement monitoring boreholes (March 2012)
 - Surface water flow direction
 - Gas well

0 m 150 m
 Scale 1:2500 @ A3
 © Crown copyright. All rights reserved. Licence number 100020449

Ffridd Rasus Landfill
 Annual Environmental Report 2023

Figure 1.1
Site layout and monitoring locations

February 2024



Appendix A

LABORATORY ANALYSIS CERTIFICATE REFERENCES





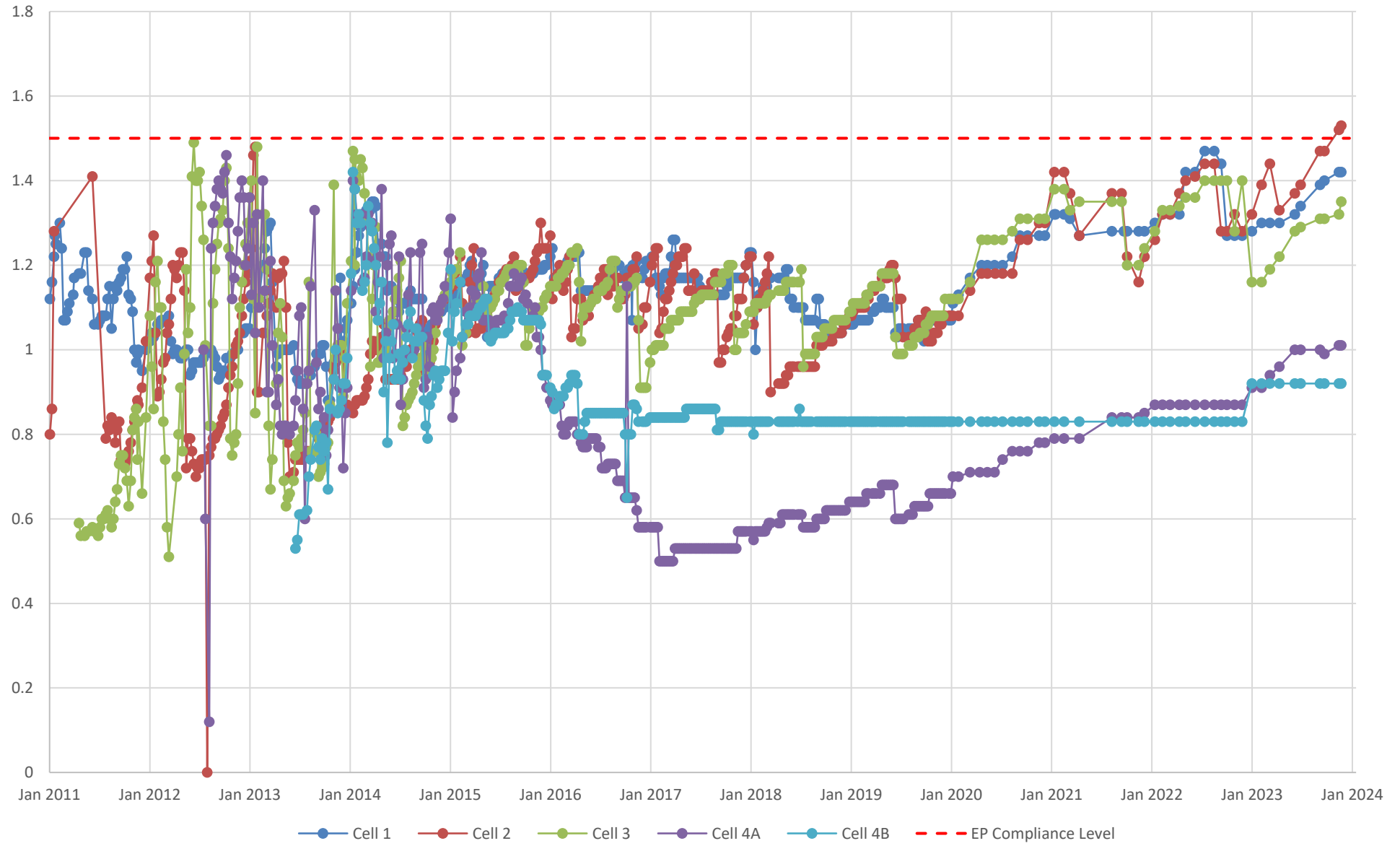
Sampling	Report number for scheduled analyses	
January (11 th and 18 th)	2425748	2428381
April (21 st and 27 th)	2471093	2474322
July (19 th)	2512830	
October (11 th and 25 th)	2555814	2562968

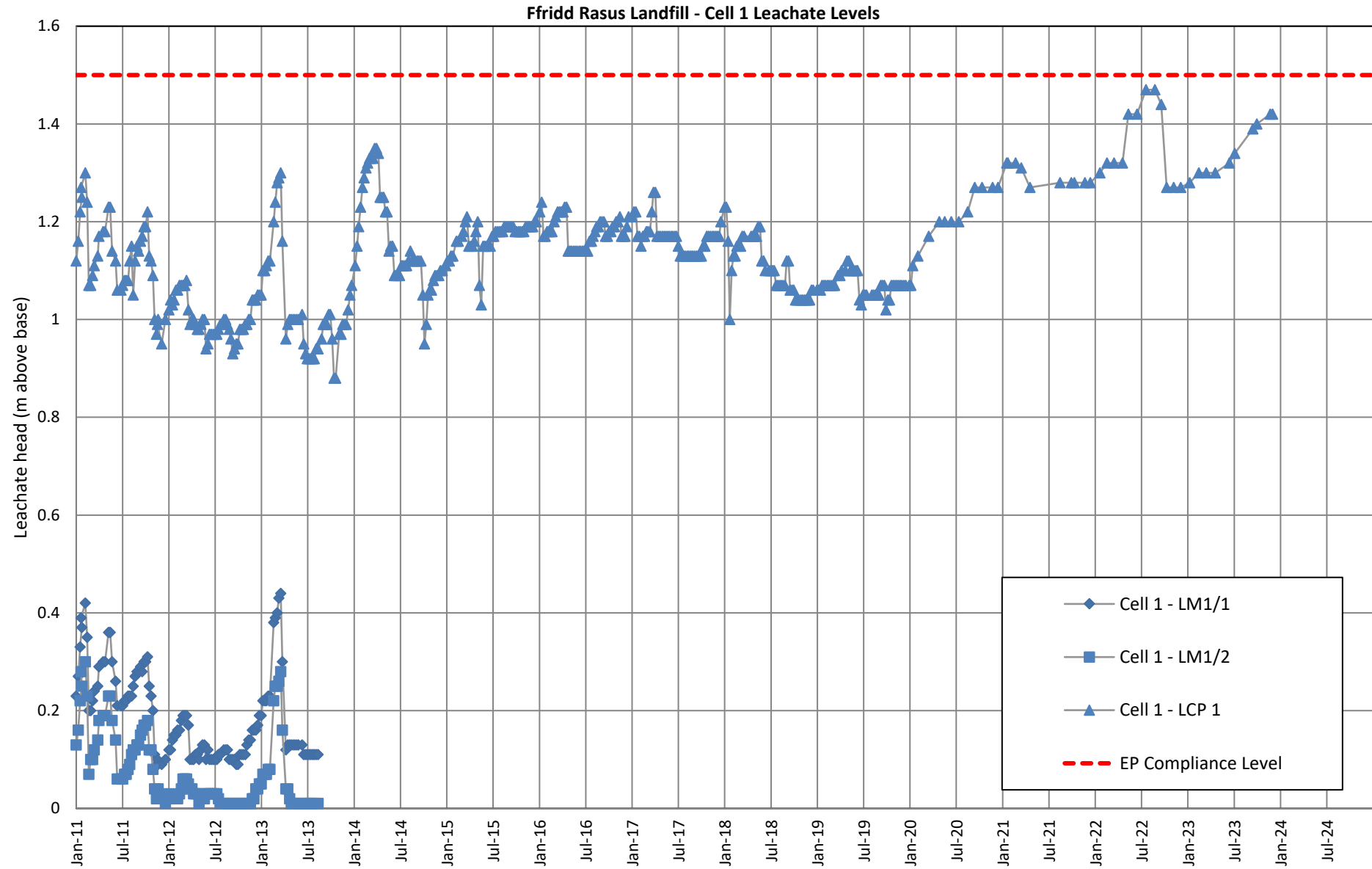
Appendix B

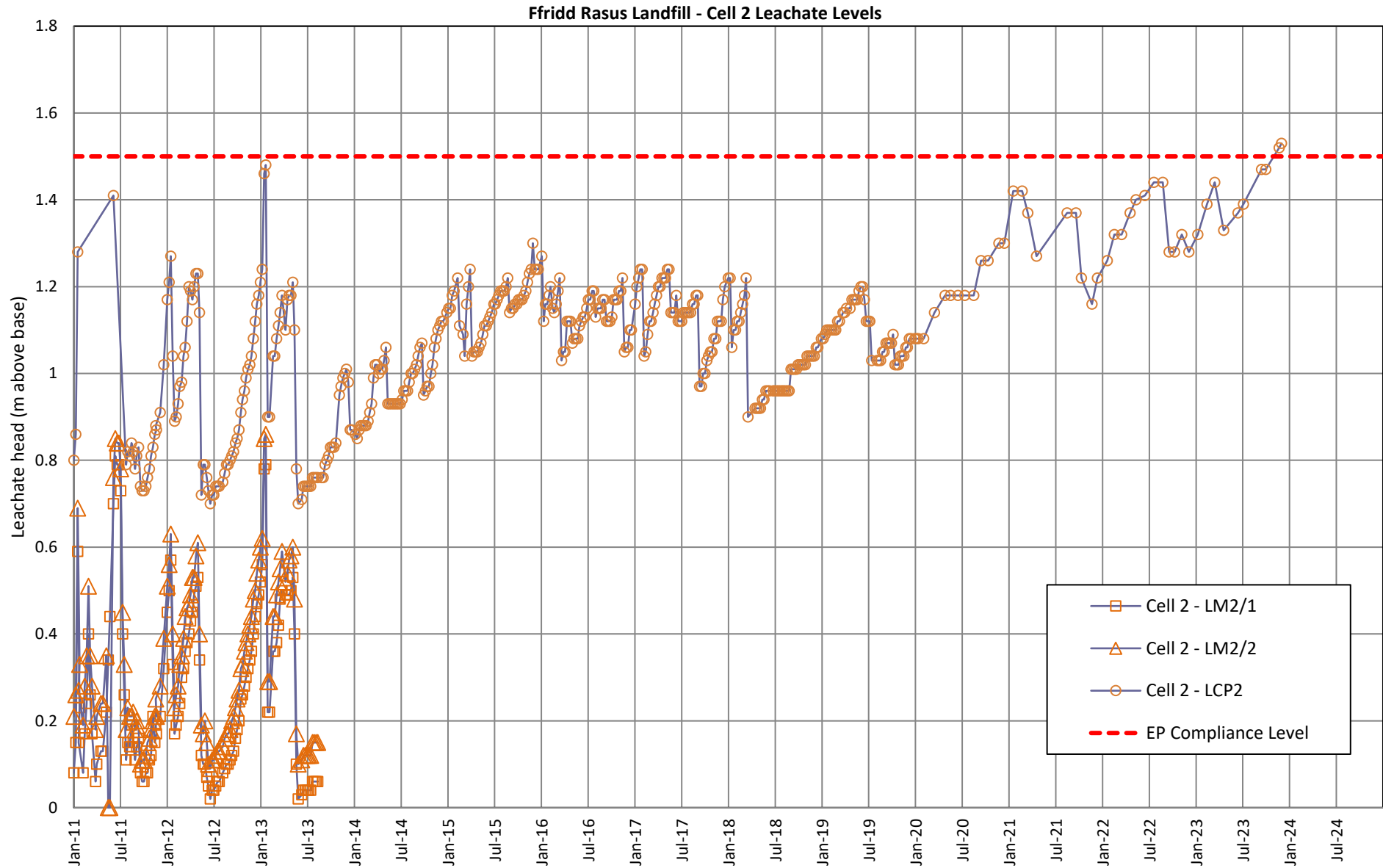
LEACHATE LEVEL AND QUALITY PLOTS

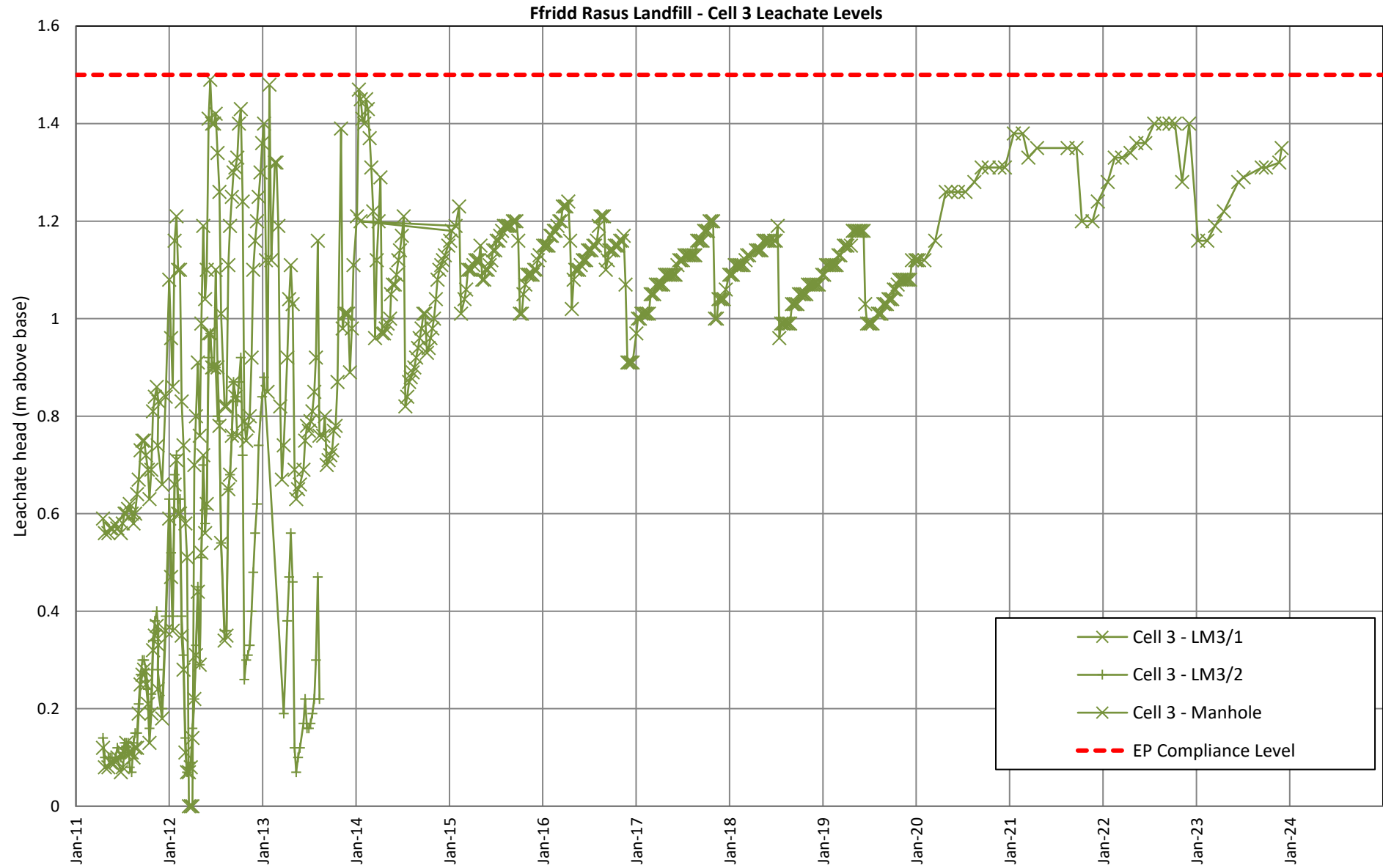


Ffridd Rasmus Landfill - Leachate Levels

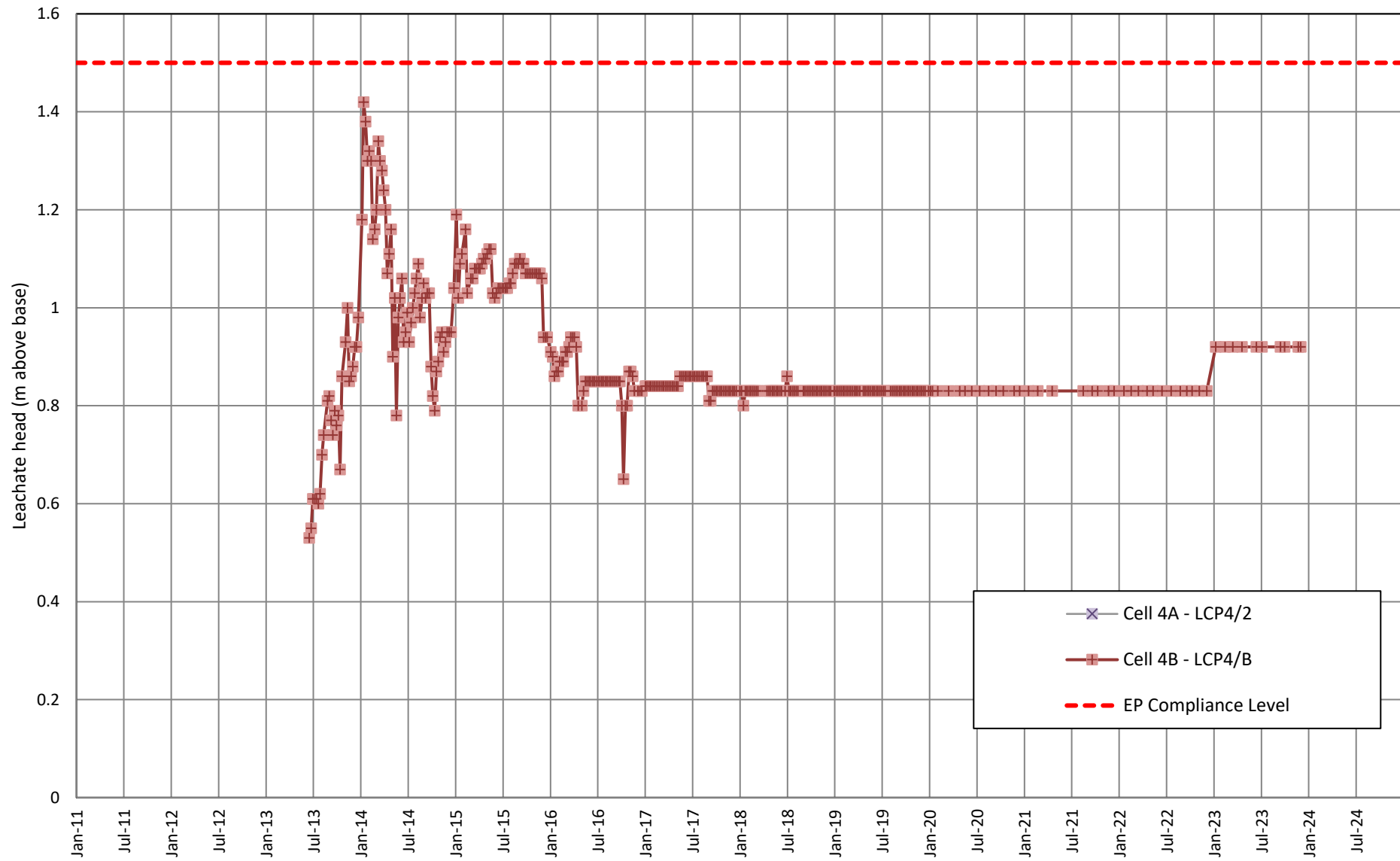




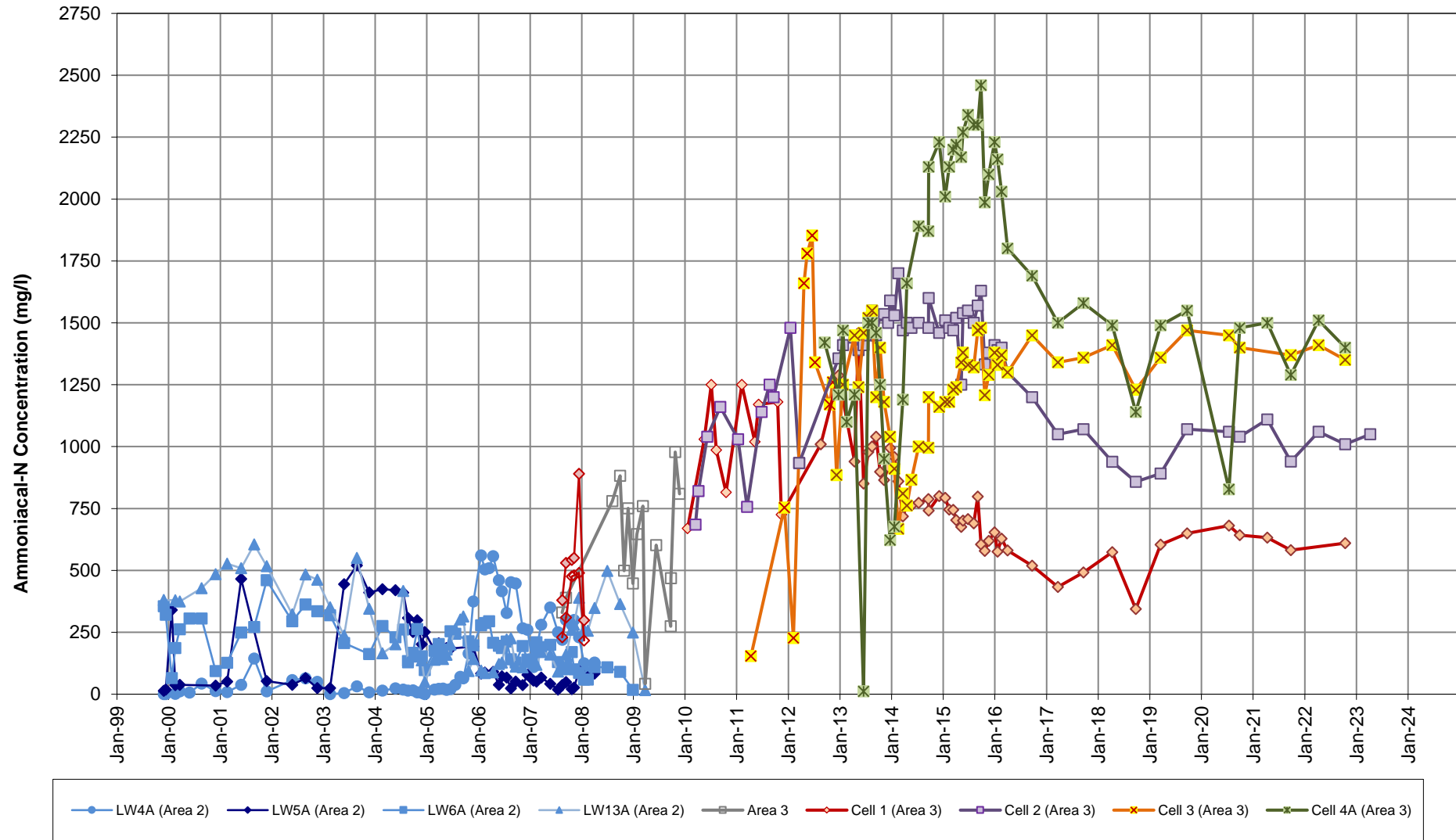




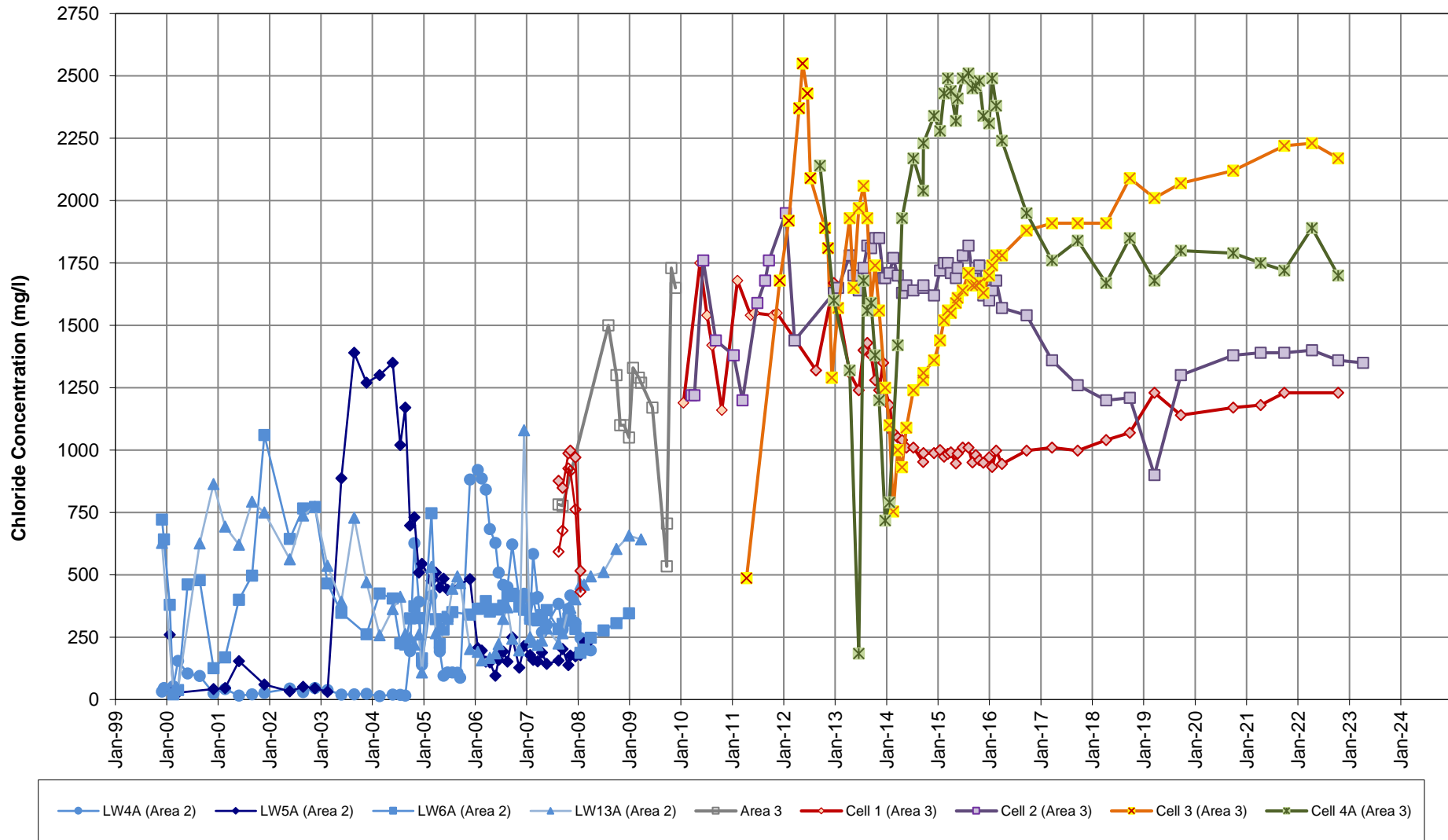
Ffridd Rasmus Landfill - Cell 4 Leachate Levels



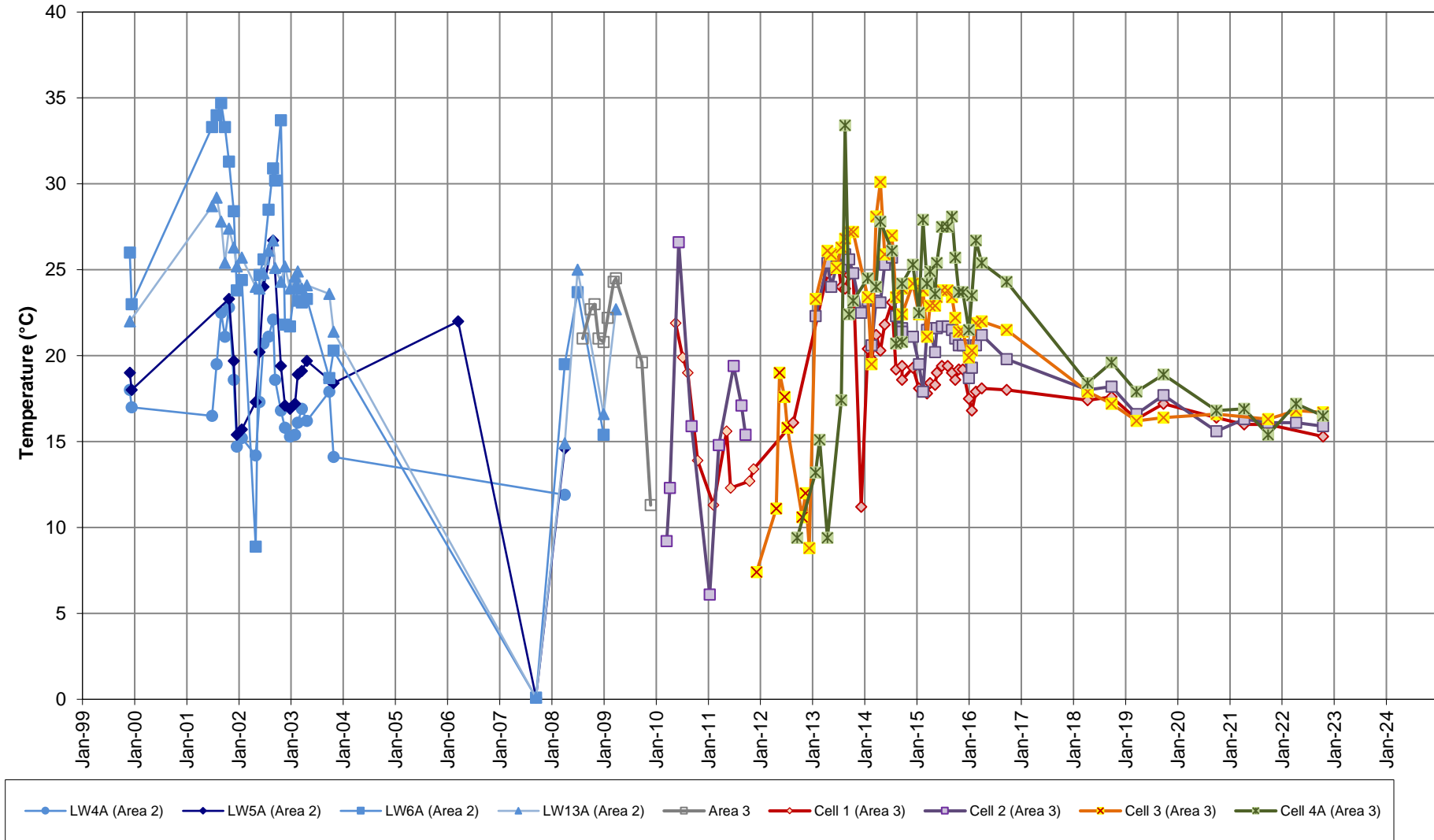
Ffridd Rasmus Landfill - Ammoniacal Nitrogen in Leachate



Ffridd Rasmus Landfill - Chloride in Leachate



Ffridd Rasmus Landfill - Leachate Temperature

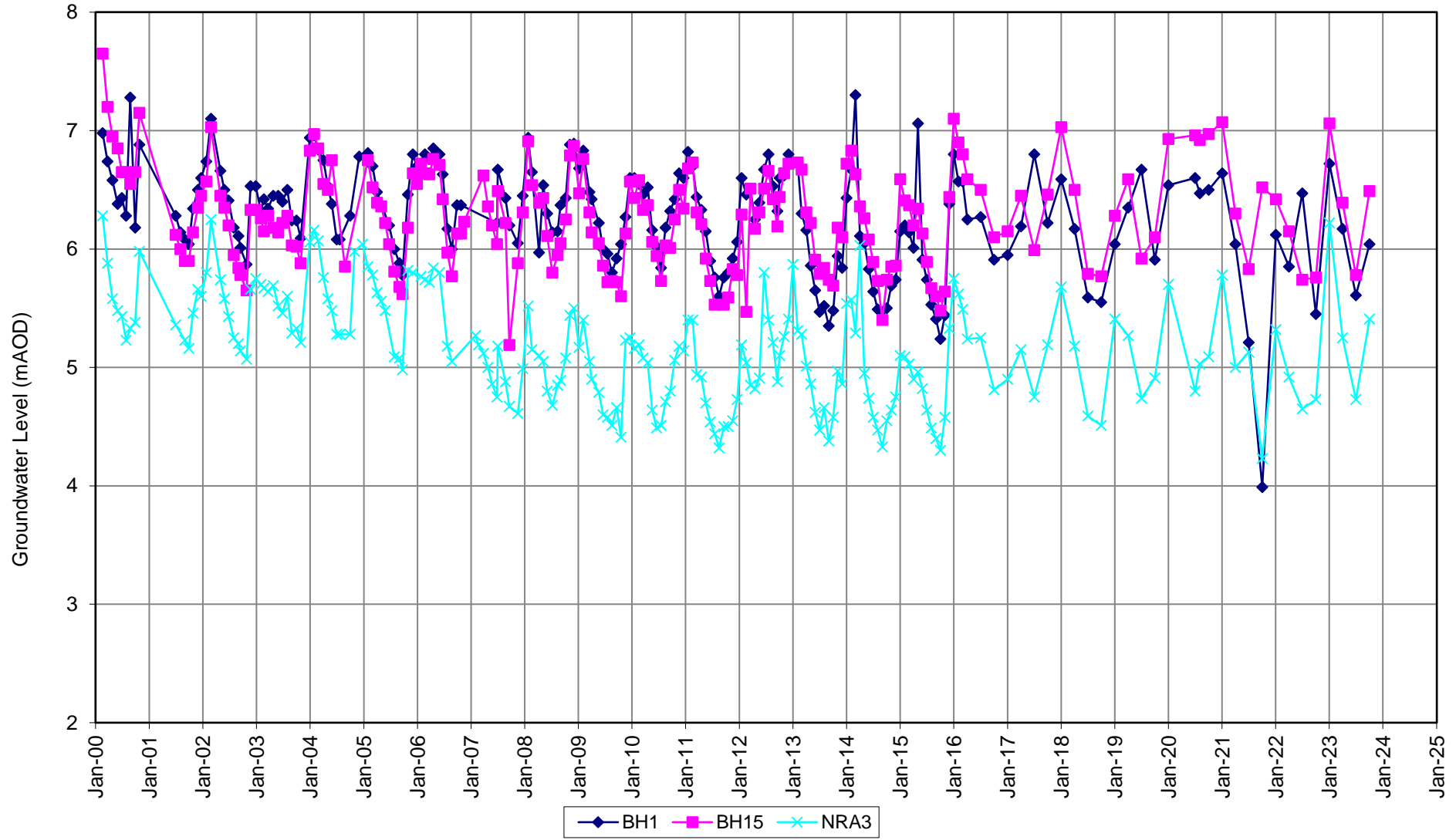


Appendix C

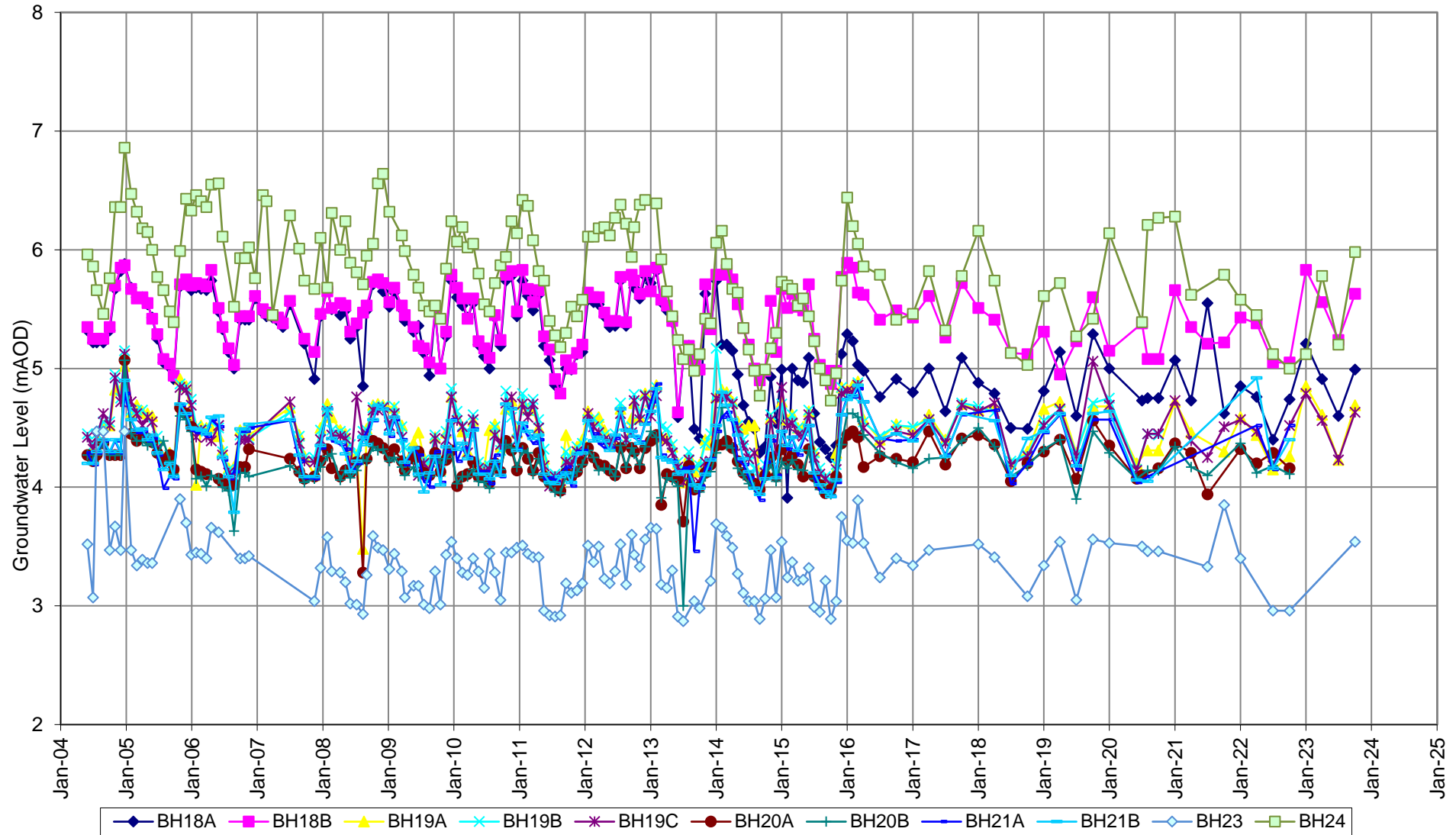
GROUNDWATER LEVEL PLOTS



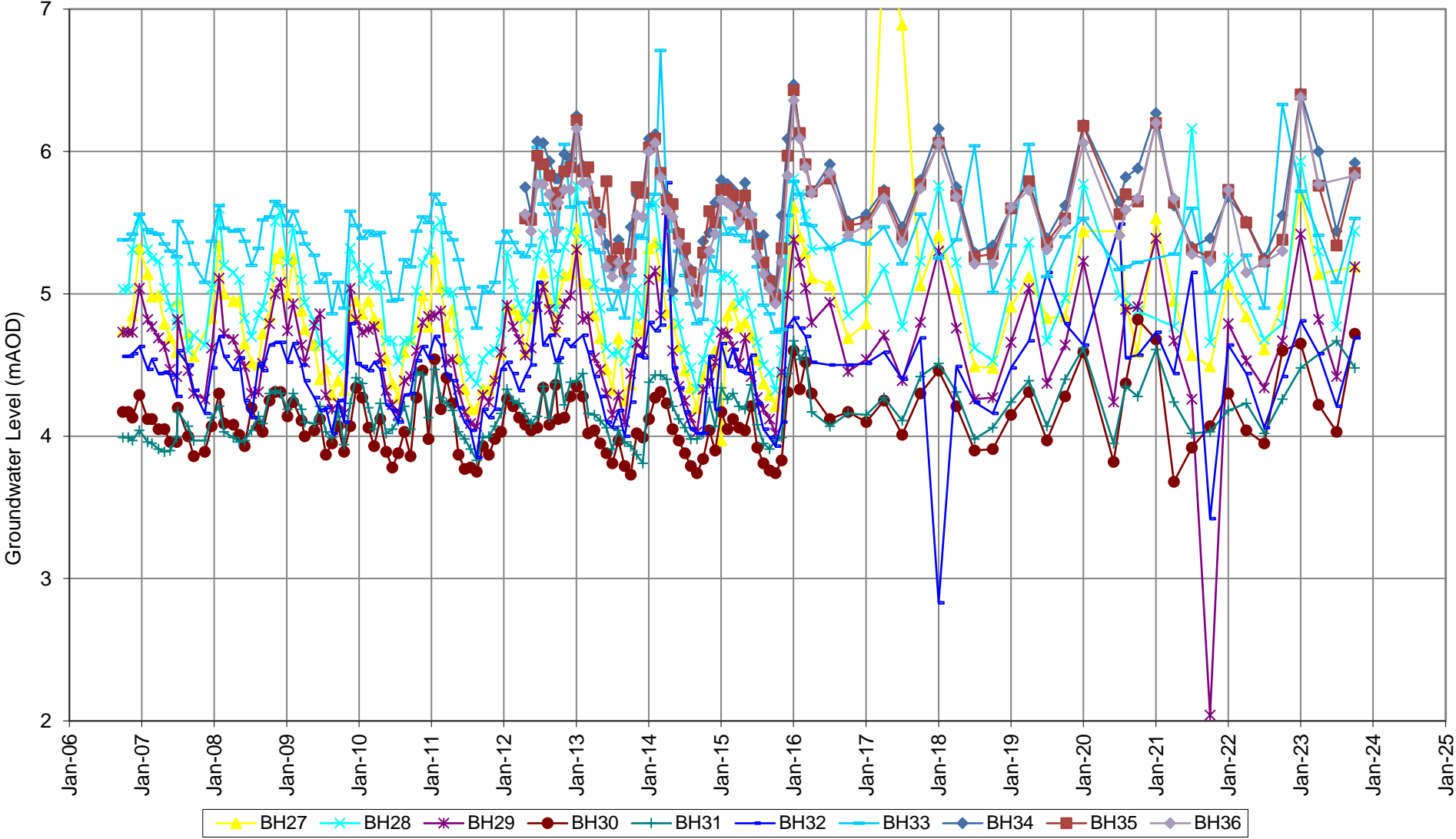
Ffridd Rasmus Landfill - Groundwater Levels (boreholes drilled pre-2004)



Ffridd Rasmus Landfill - Groundwater Levels (boreholes drilled in 2004)



Ffridd Rasmus- Groundwater Levels (boreholes drilled in 2006 and 2012)



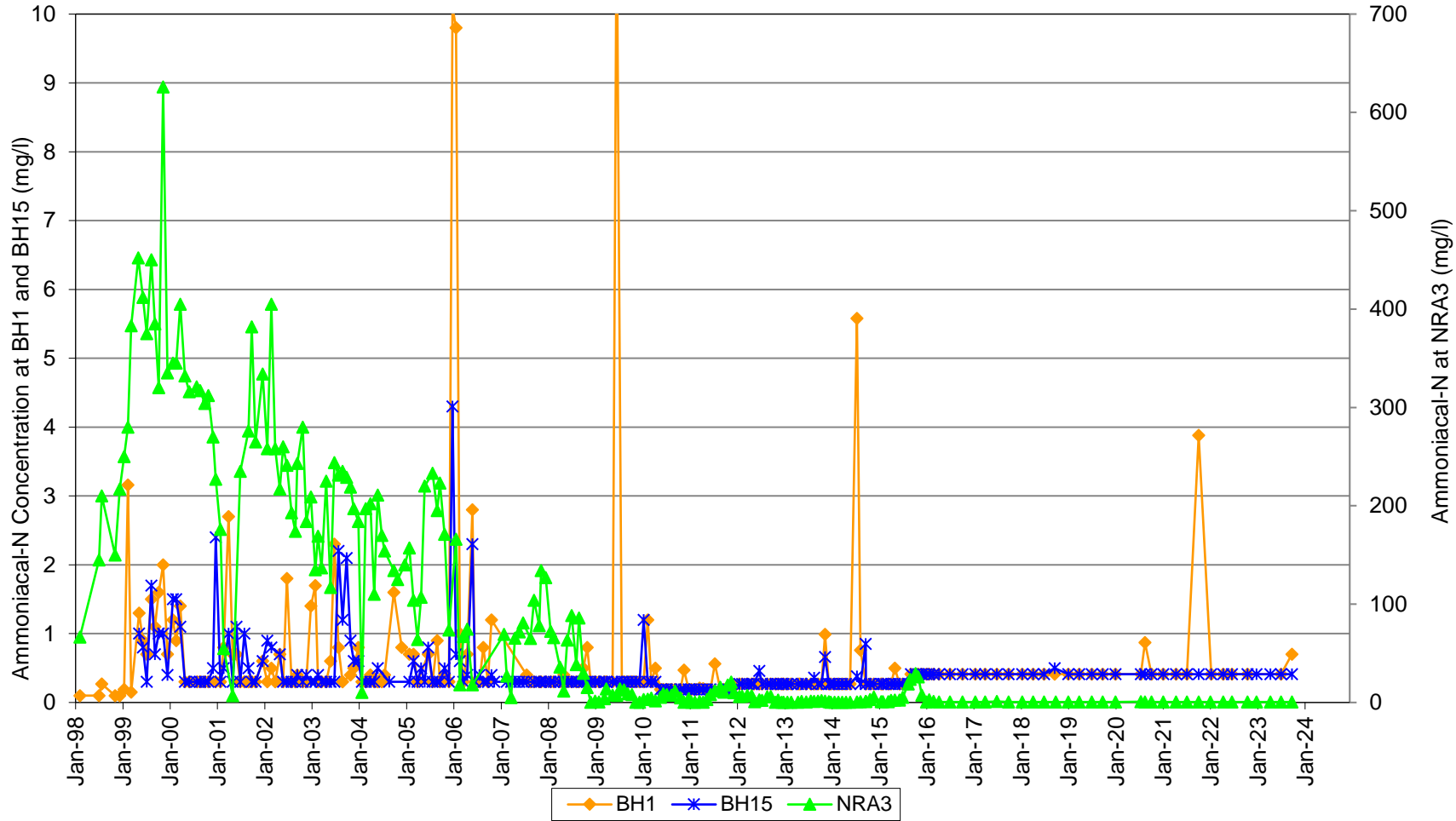
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 - Ffridd Rasmus Groundwater 2023 AER_updated2024_withaverage

Appendix D

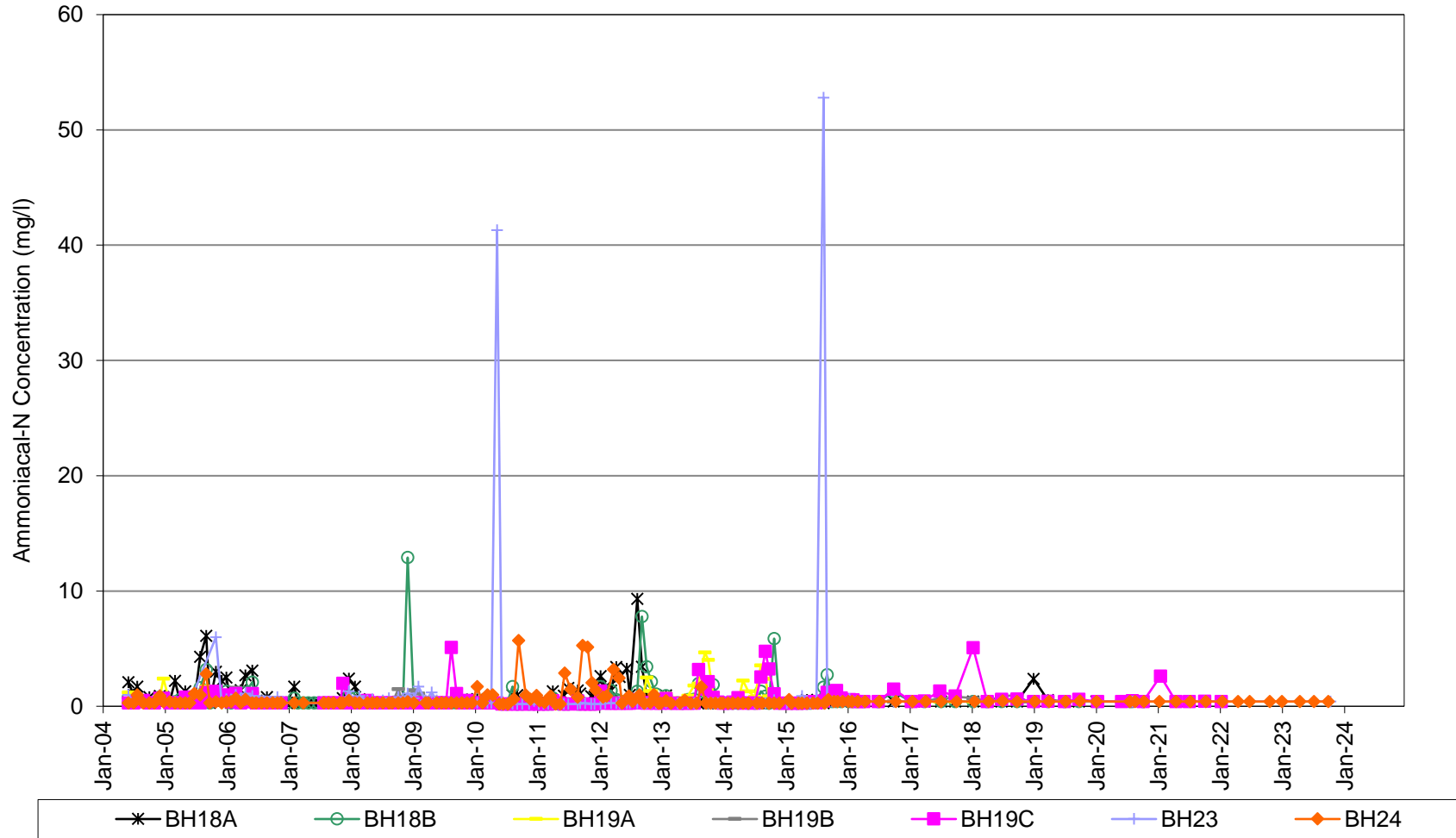
GROUNDWATER QUALITY PLOTS



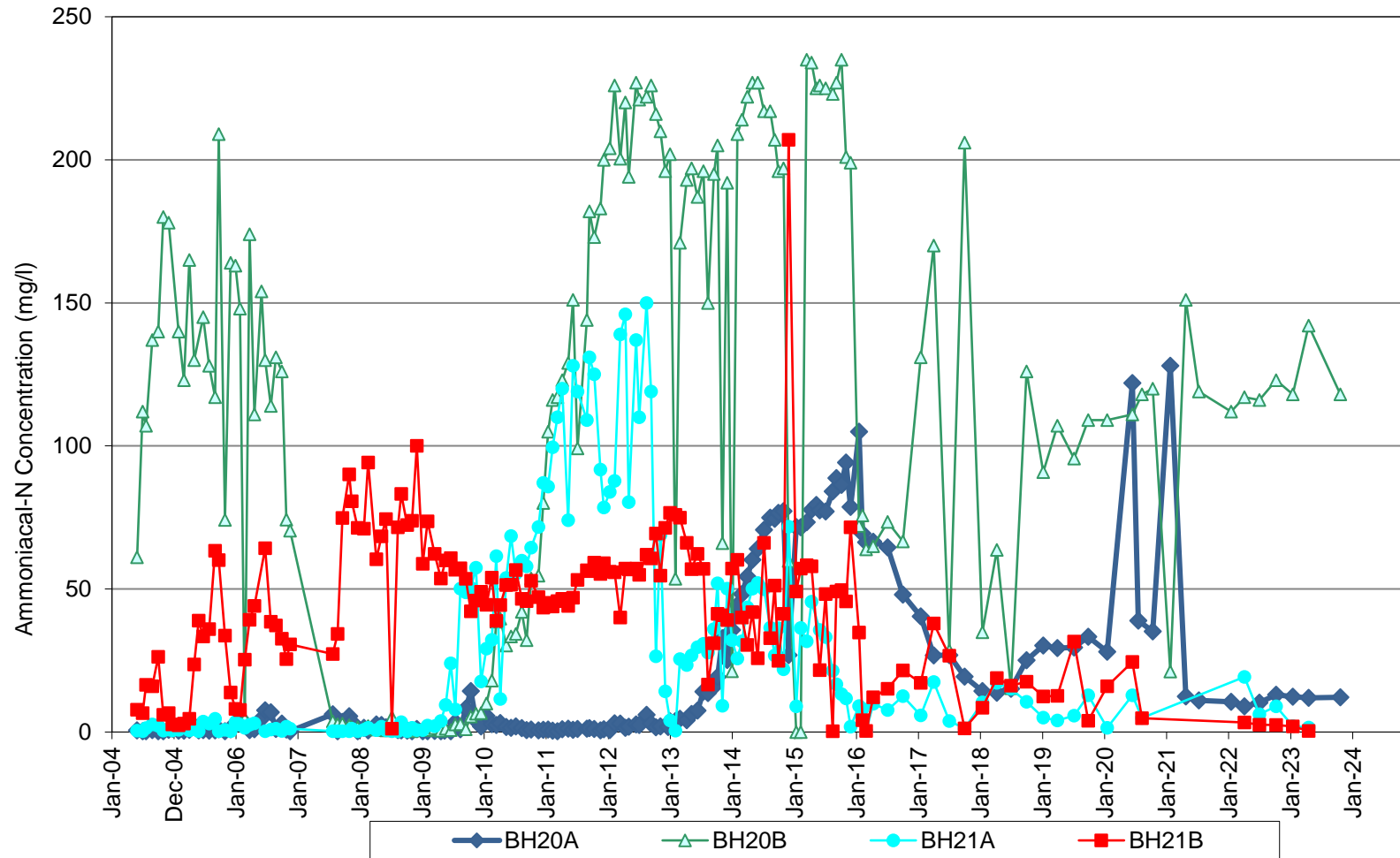
Ffridd Rasmus Landfill - Ammoniacal Nitrogen in Groundwater (Boreholes drilled pre-2004)



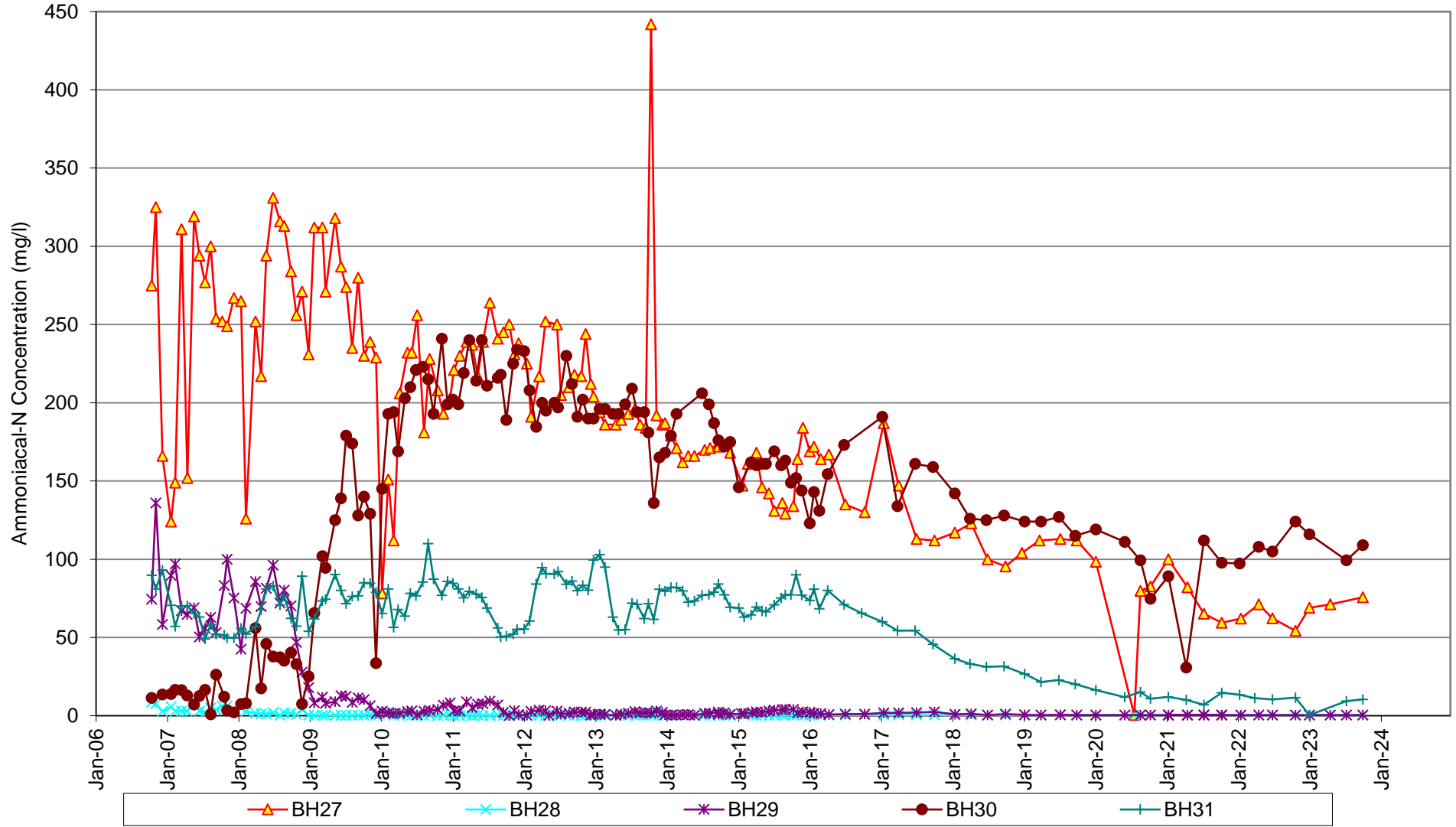
Ffridd Rasmus Landfill - Ammoniacal Nitrogen in Groundwater (boreholes drilled in 2004)



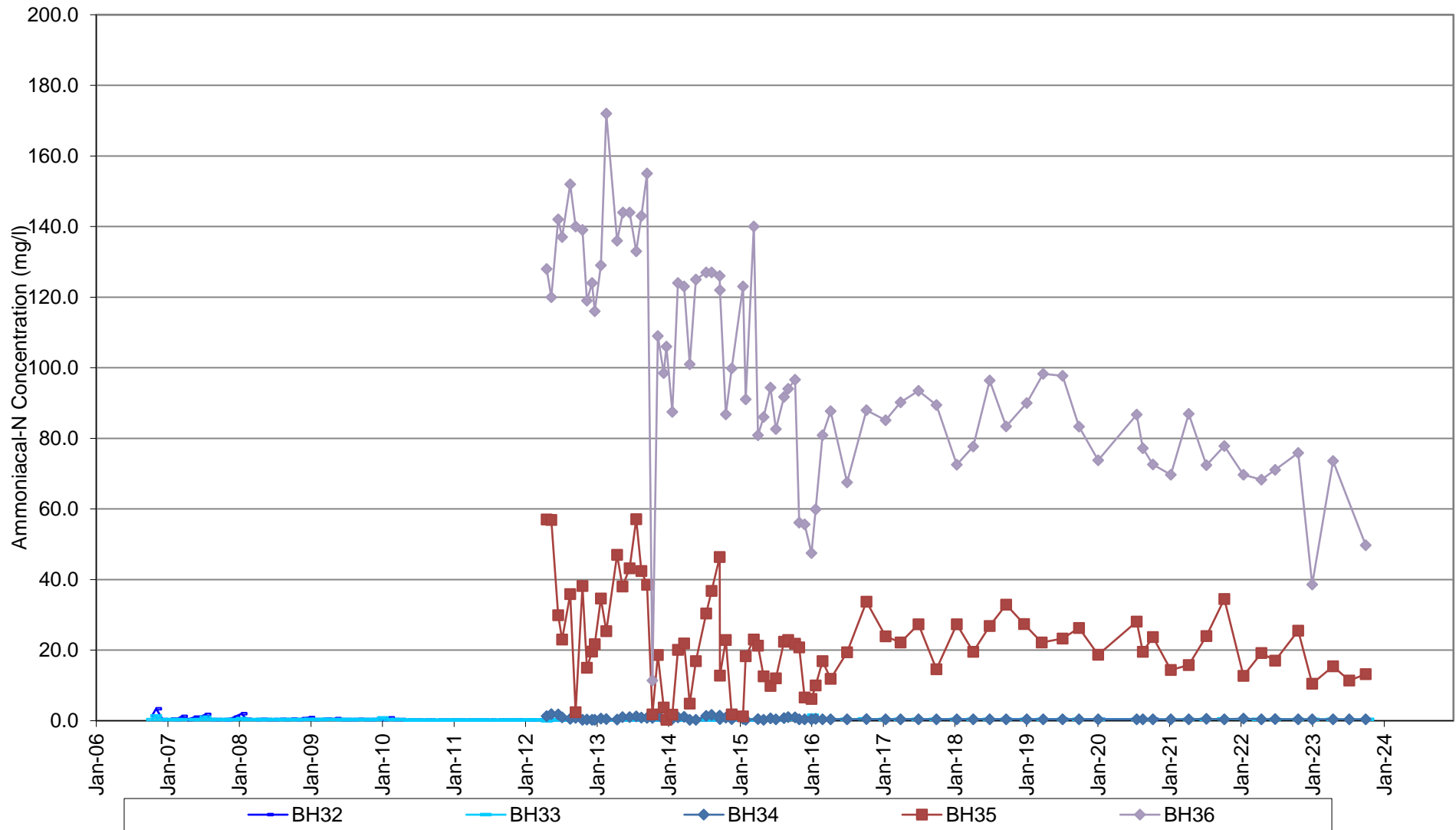
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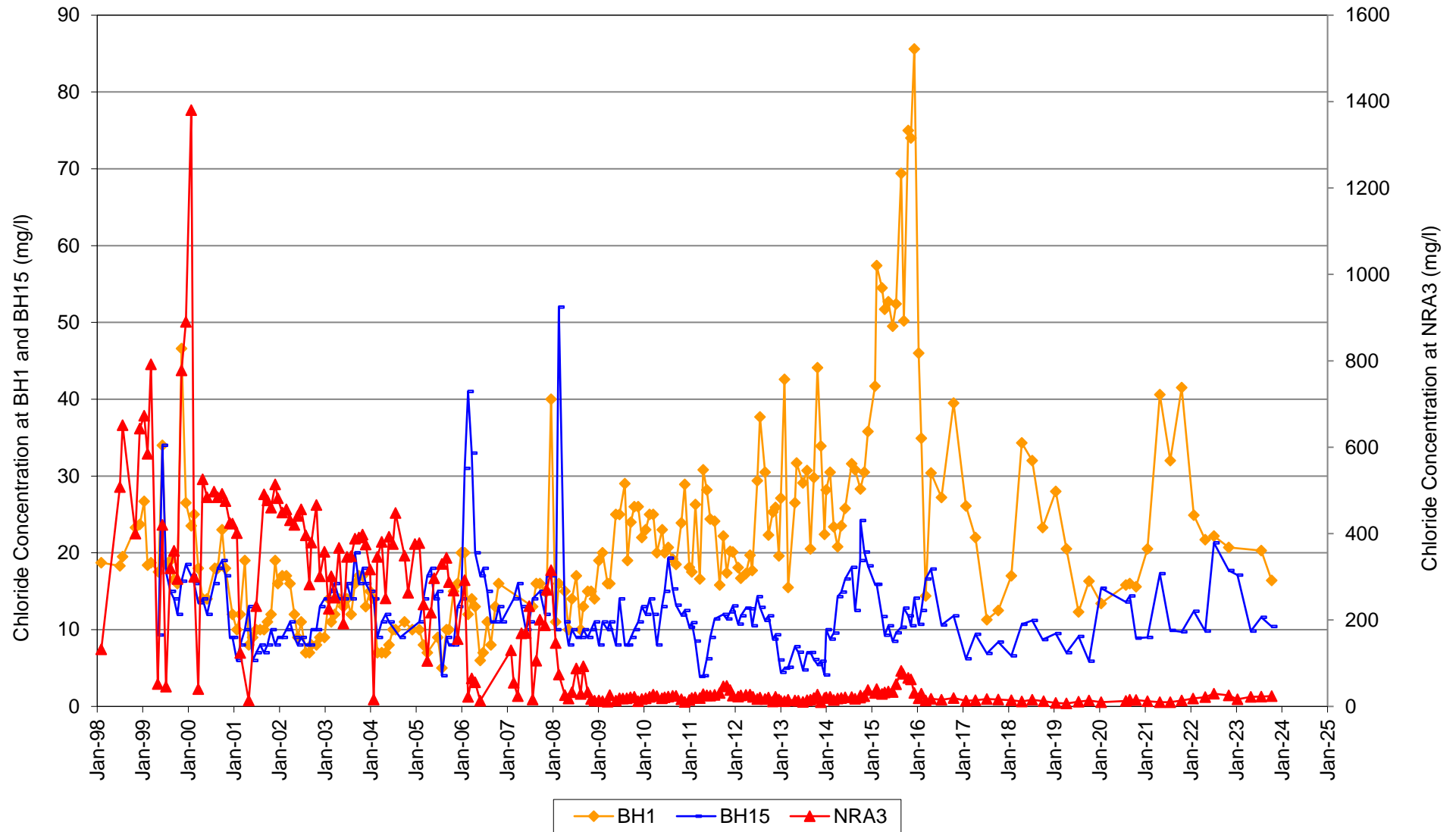
Ffridd Rasmus Landfill - Ammoniacal Nitrogen in groundwater (boreholes drilled in 2006)



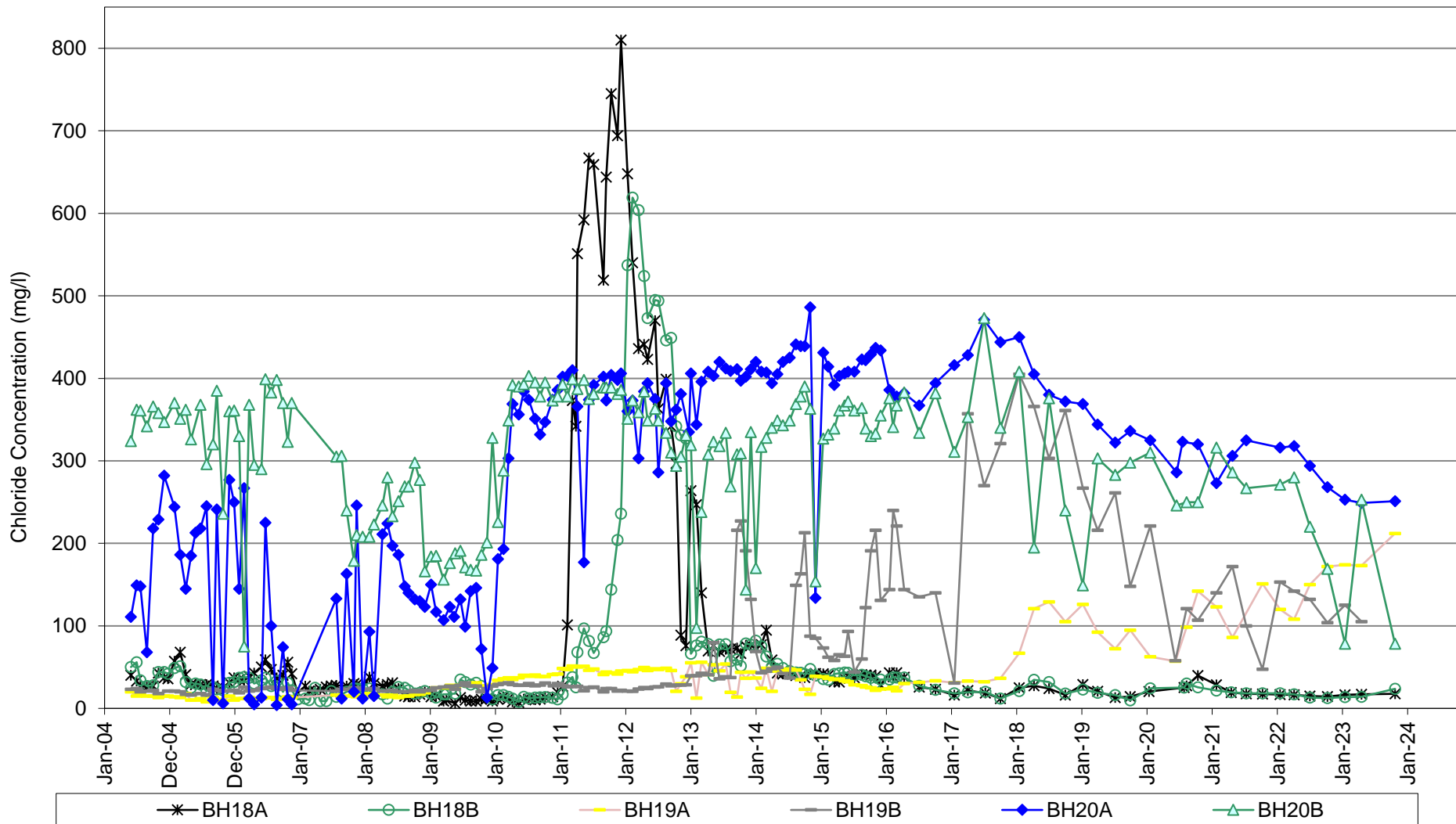
Ffridd Rasmus Landfill - Ammoniacal Nitrogen in groundwater (boreholes drilled in 2006 and 2012)



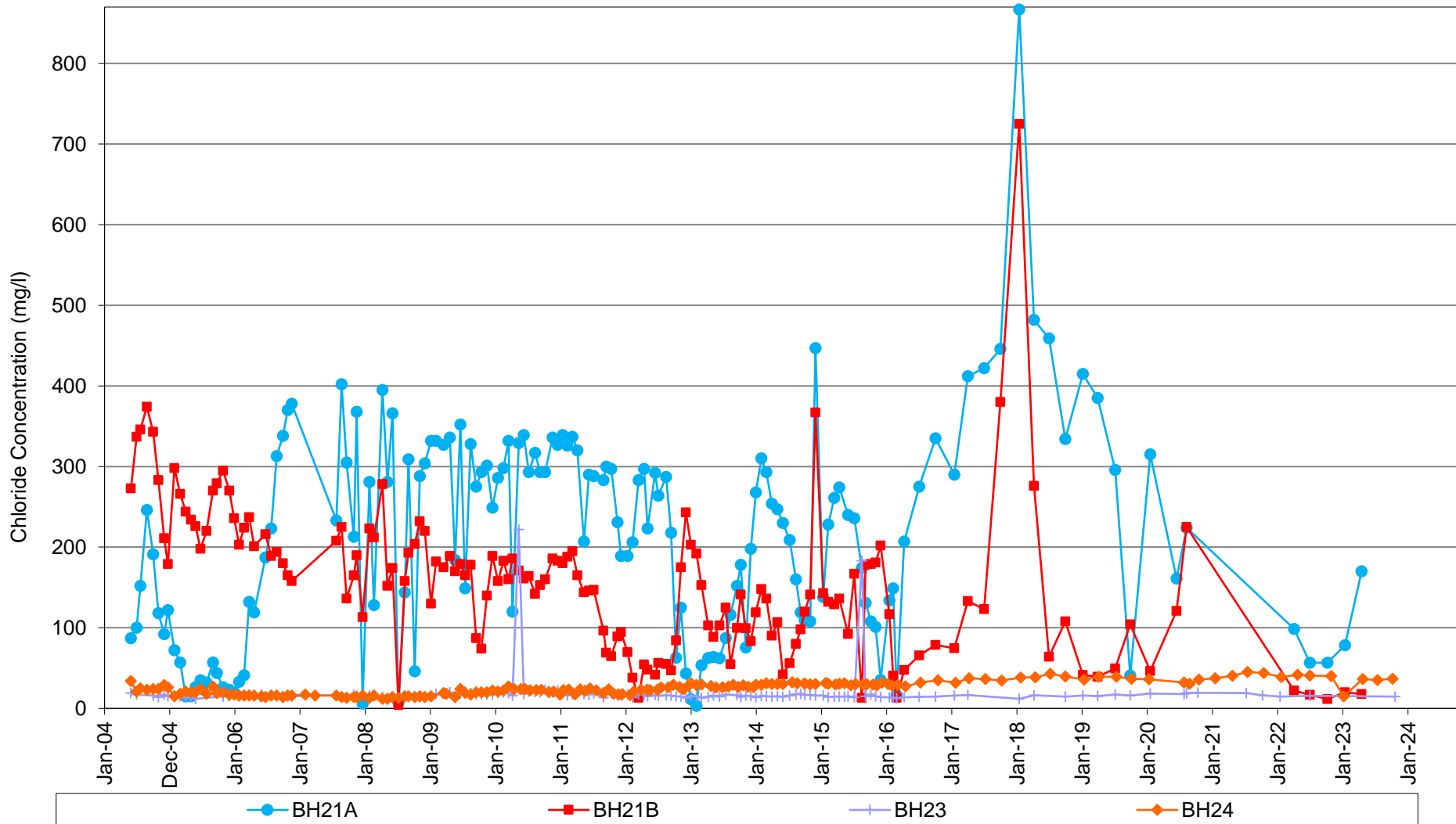
Chloride in Groundwater - boreholes drilled pre 2004



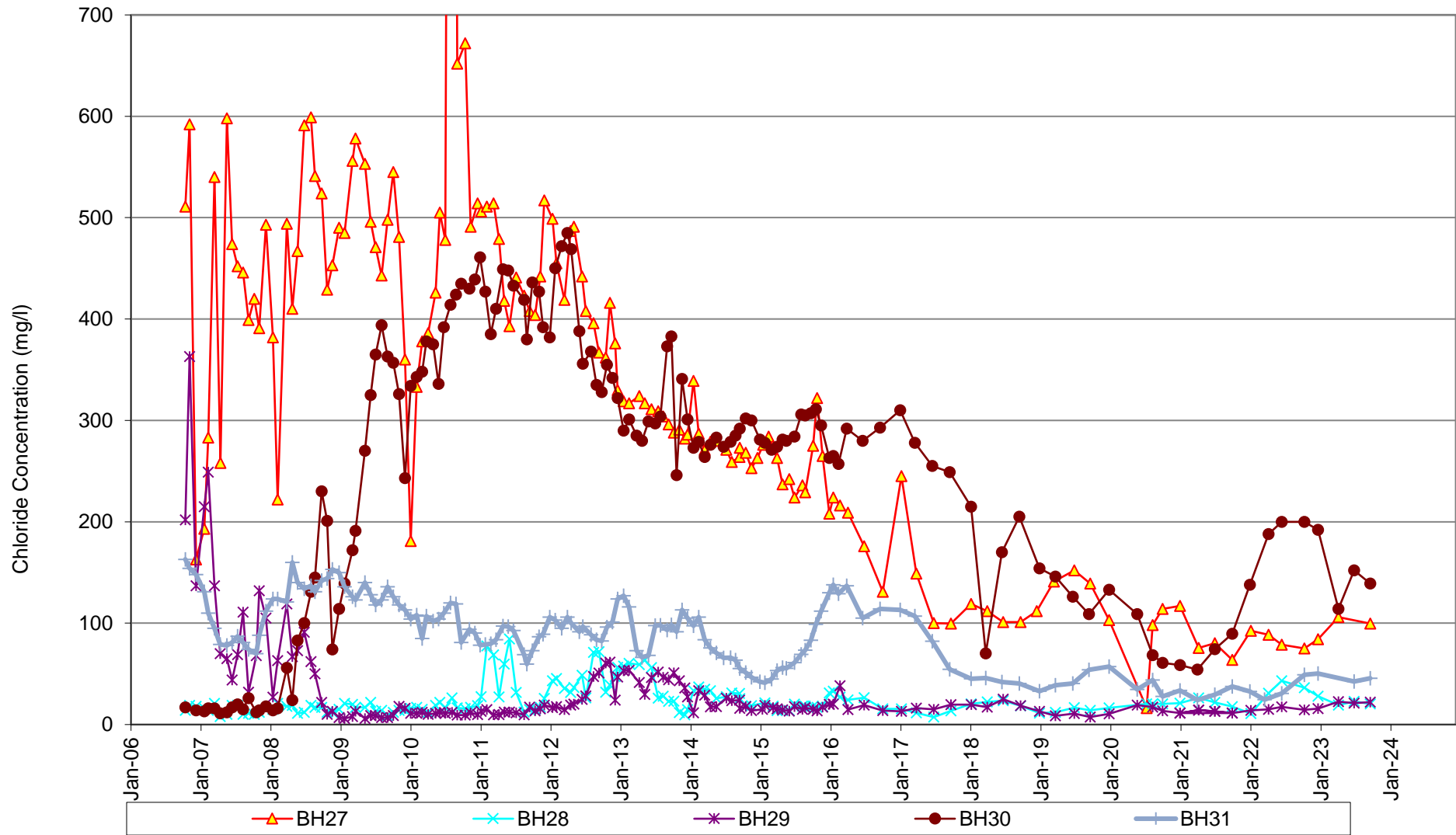
Ffridd Rasus Landfill - Chloride in Groundwater (boreholes drilled in 2004)



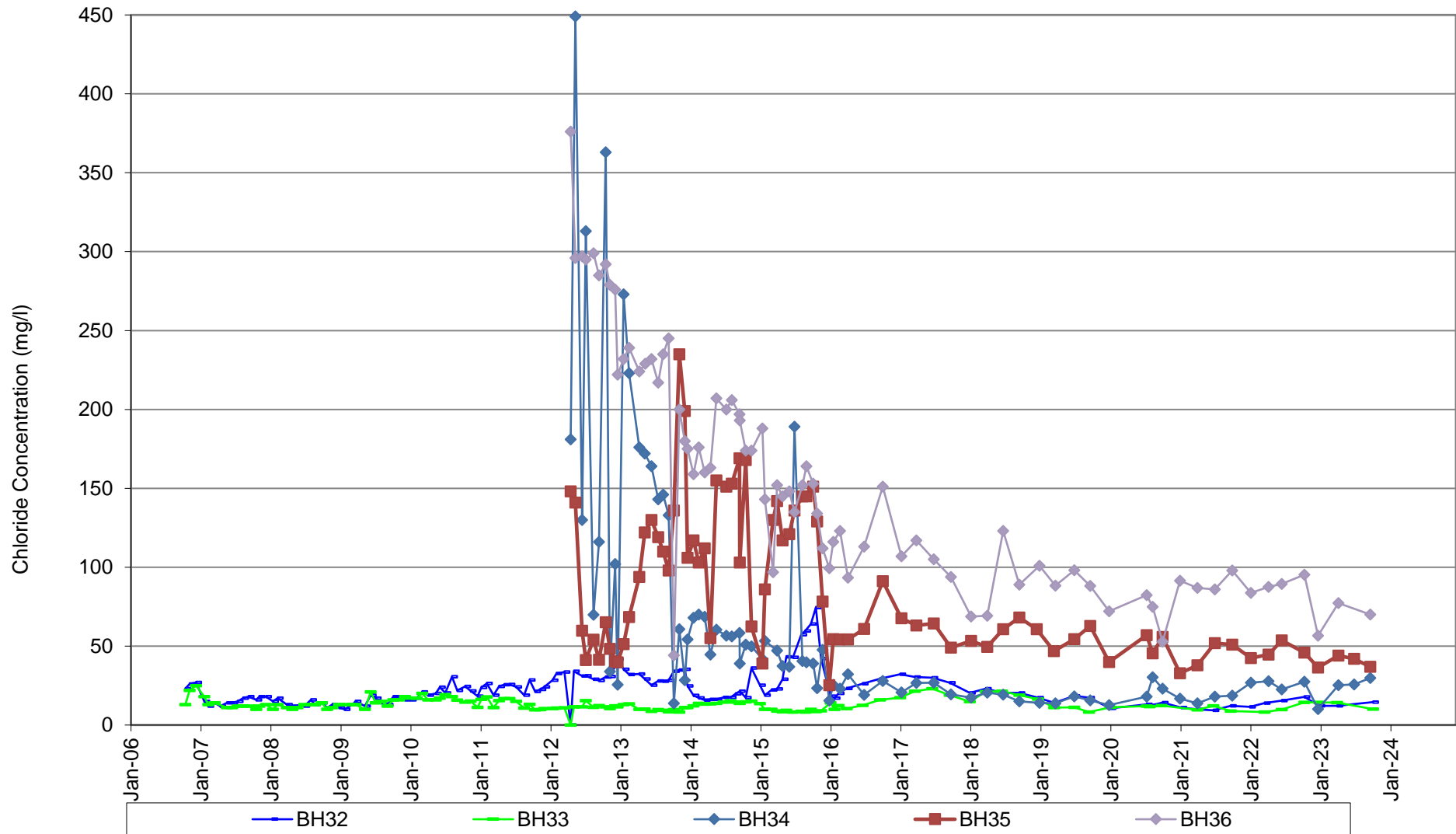
Ffridd Rasmus Landfill - Chloride in Groundwater (boreholes drilled in 2004)



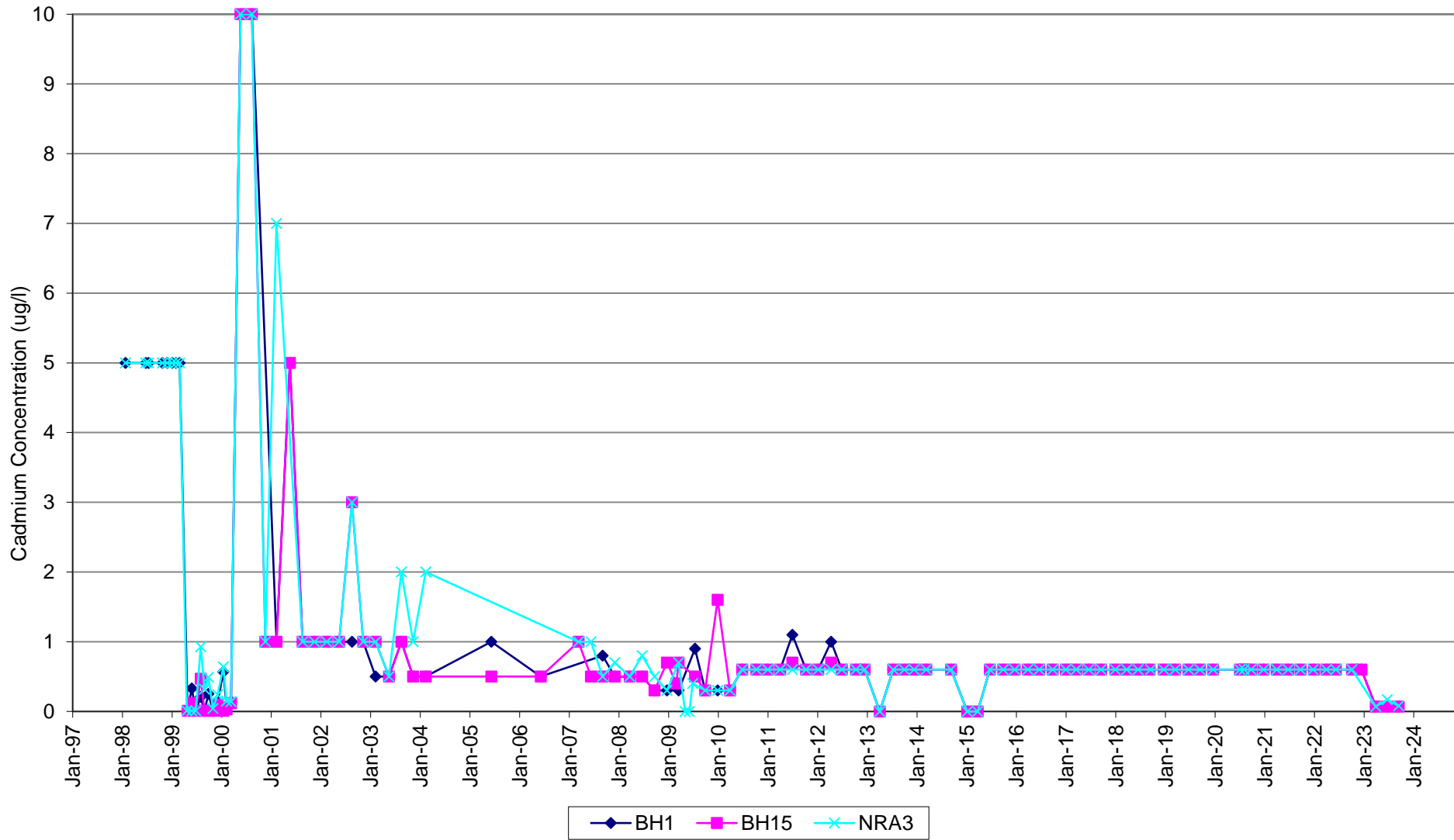
Ffridd Rasmus Landfill - Chloride in Groundwater (boreholes drilled in 2006)



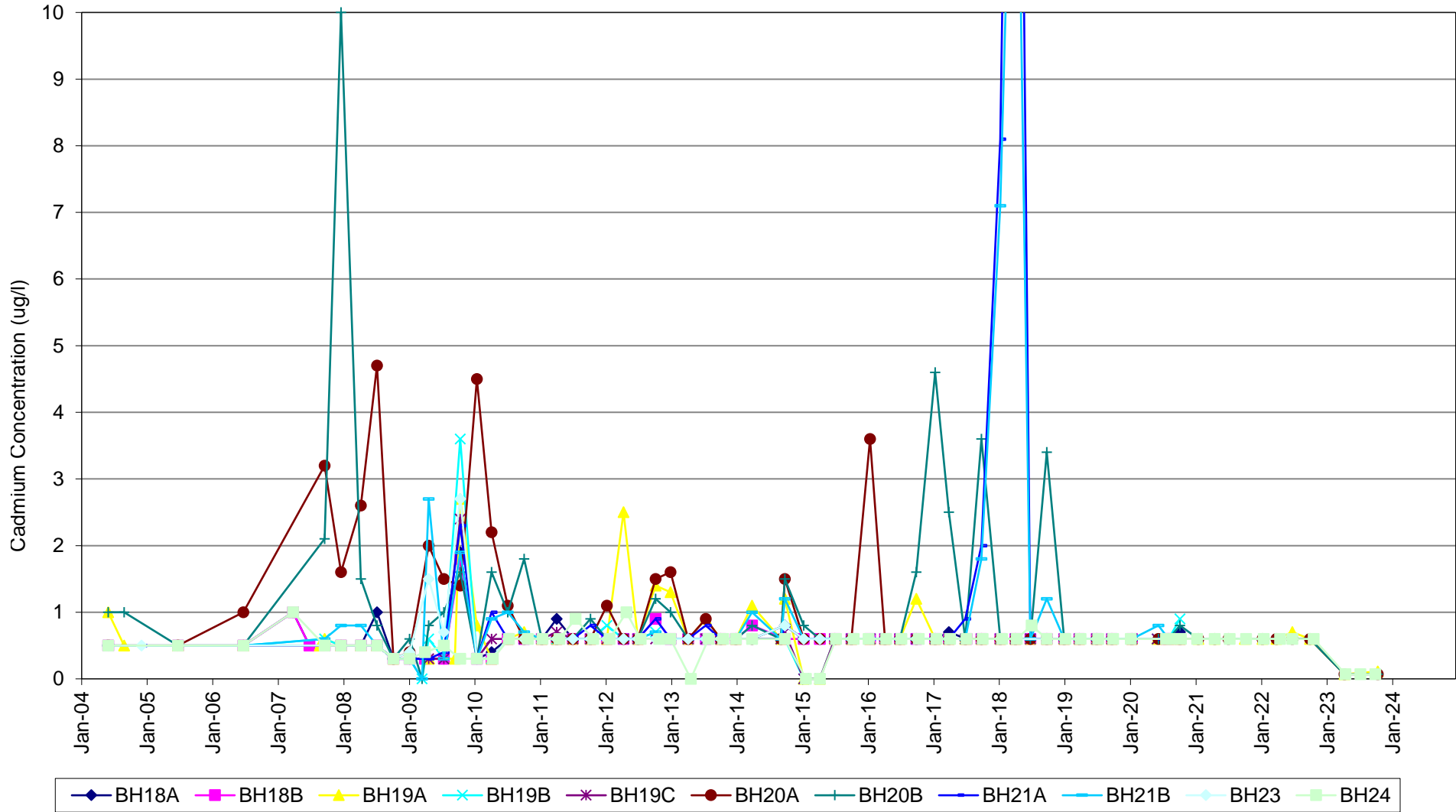
Ffridd Rasmus Landfill - Chloride in Groundwater (boreholes drilled in 2006 and 2012)



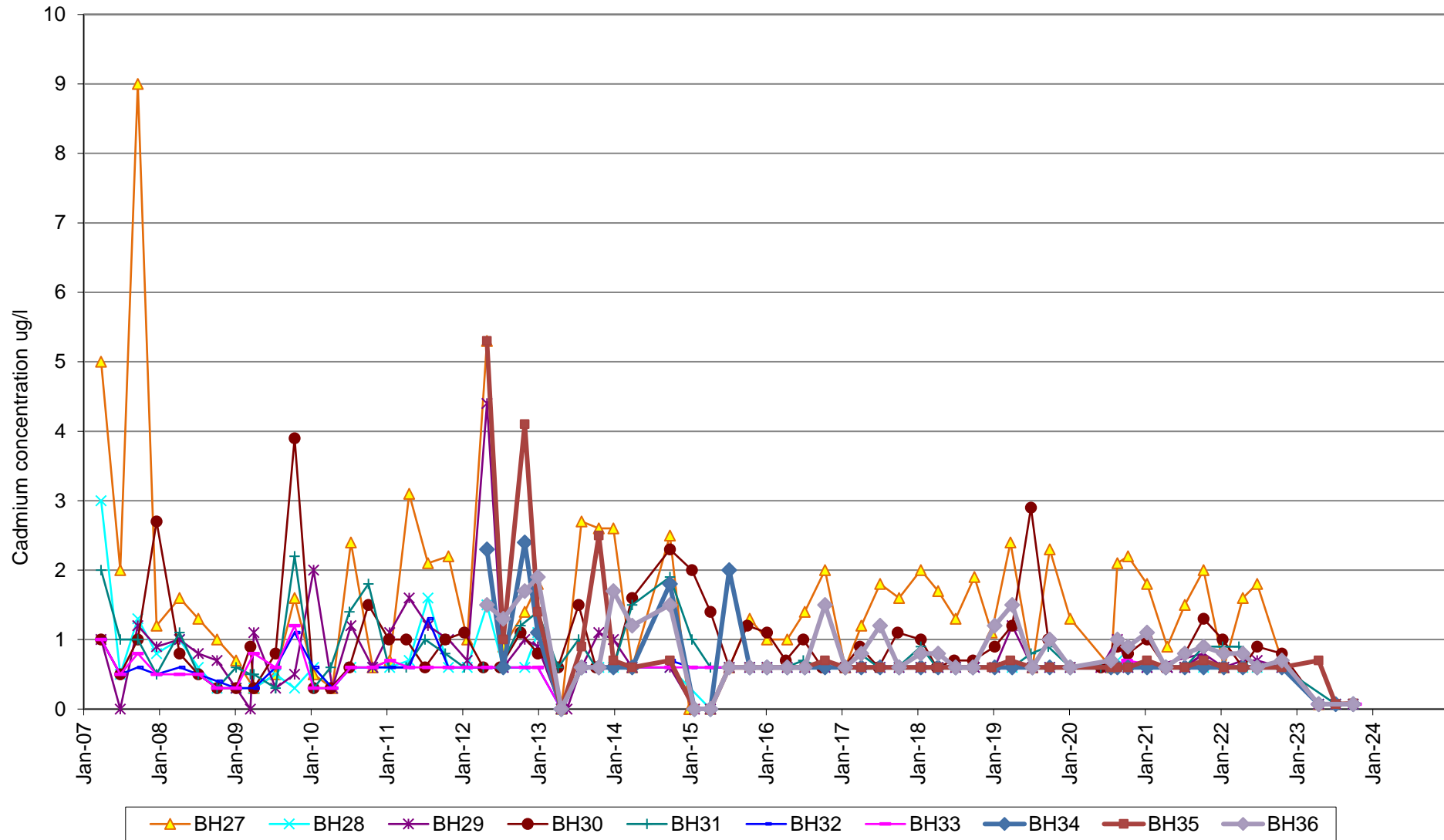
Ffridd Rasmus Landfill - Cadmium in Groundwater (boreholes drilled pre 2004)



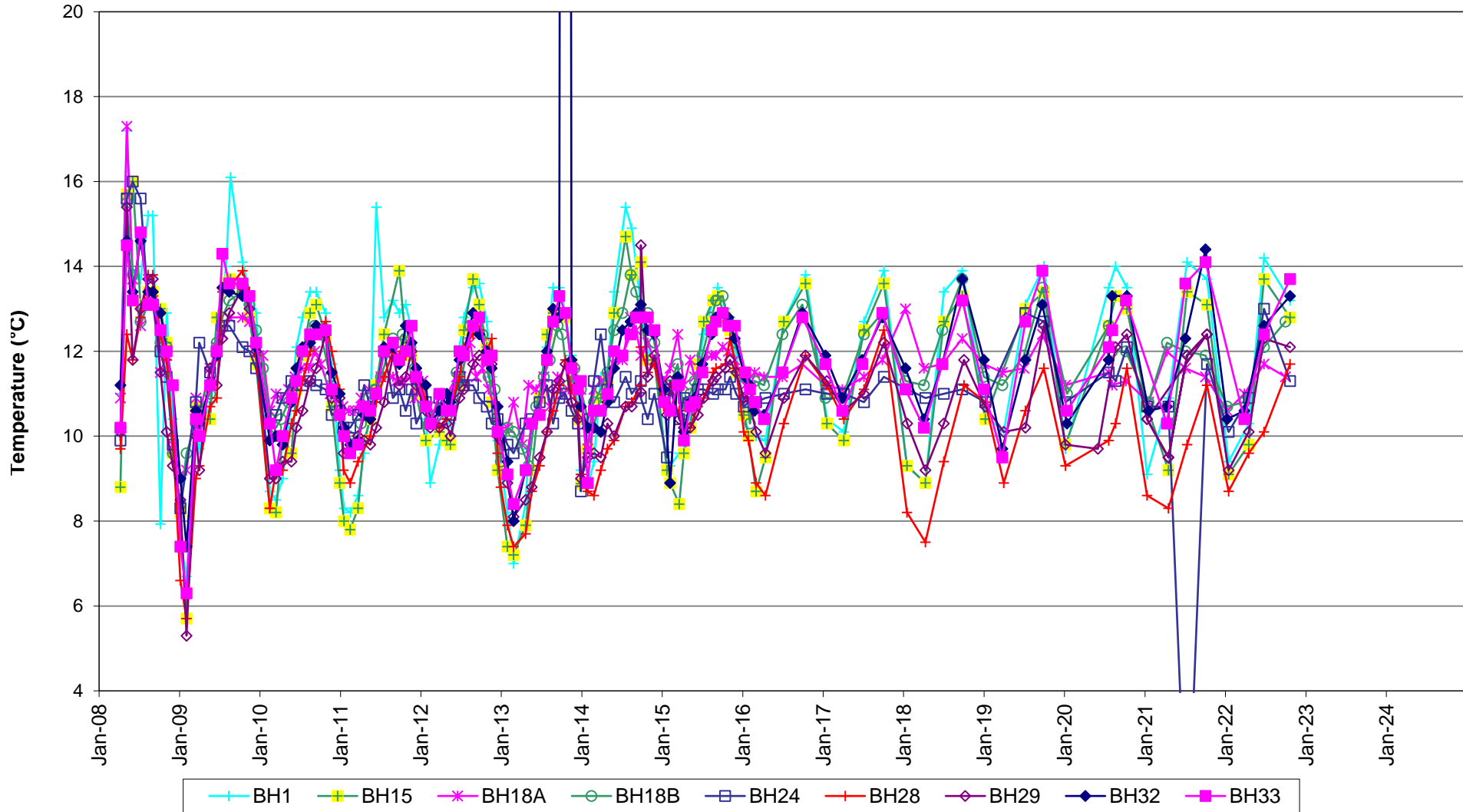
Ffridd Rasmus Landfill - Cadmium in Groundwater (boreholes drilled in 2004)



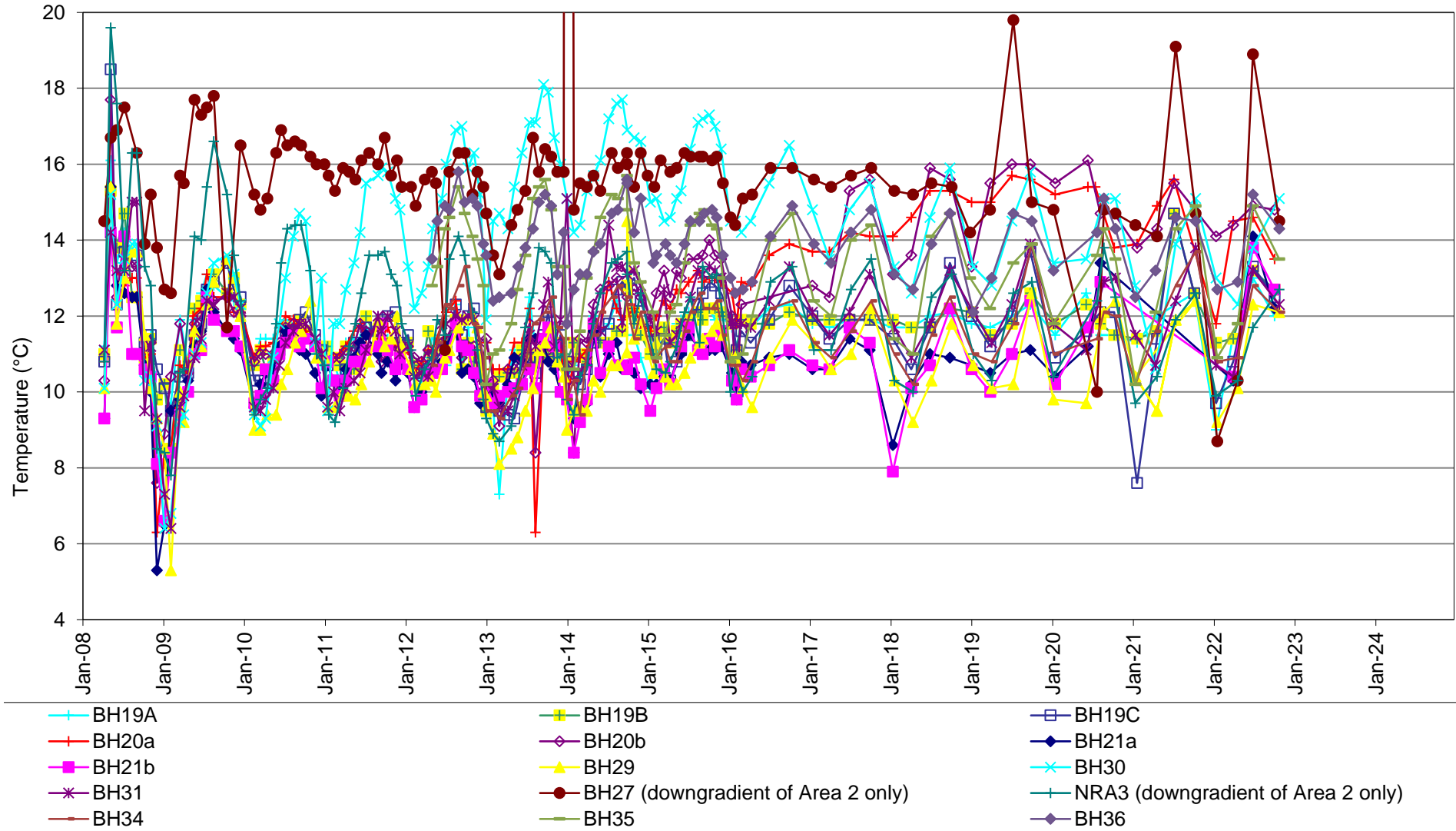
Ffridd Rasmus Landfill - Cadmium in Groundwater (boreholes drilled in 2006)



Ffridd Rasmus Landfill - Groundwater Temperature (Upgradient/Lateral to Groundwater Flow Boreholes)



Ffridd Rasmus Landfill - Groundwater Temperature (Downgradient Boreholes)



Appendix E

SUSPENSION OF TRIGGER LEVELS



From: Roberts, Anthony <Anthony.Roberts@cyfoethnaturiolcymru.gov.uk>
Sent: 14 January 2020 16:01
To: Edwards Steven (PAB) <stevenedwards@gwynedd.llyw.cymru>
Cc: Francis Susan Jane (PAB) <susanjanefrancis@gwynedd.llyw.cymru>; Bradford, Julie <Julie.Bradford@cyfoethnaturiolcymru.gov.uk>
Subject: Ffridd Rasmus - Area 2 and 3 Groundwater Breaches - Suspension of CAR Forms and Scoring

Hi Steve and Sue,

Really good to meet you both on Friday.

As we discussed during the meeting, I am proposing to suspend CAR scoring and forms for Schedule 6 reporting for the groundwater breaches for determinands in specific boreholes as follows:

	Cd	Cl	NH4
BH 21A			
BH 21B			
BH 20A			
BH 19B			
BH 19C			

This is due to the suspected leakage into the groundwater of contaminants from area 2, the COPA/WML pre Landfill Directive licenced site. This site is unlined and leaks into the uncontained sand aquifer beneath the site potentially affecting the boreholes installed to detect leakage from Area 3 which is a Landfill Directive site. This has been investigated in the HRA and the AMEC Foster Wheeler report of 2017 which attempts to re-set trigger levels. I do not think the situation has been adequately clarified to enable a proper judgement of the appropriate trigger levels under Landfill Directive Rules. I therefore propose to suspend all CAR scoring and assessment of said boreholes including any other breaches in groundwater quality which are suspected of association with Area 2 until the 30th March 2020 when I propose to review all of the evidence and come to a final conclusion on this matter.

With this in mind I will not be issuing a CAR form or score for the previous two Schedule 6 forms submitted in 2019.

Any breaches not included in this list should be recorded in a schedule 6 as normal. Please contact me before any submission for clarification if necessary. Furthermore, there will be no requirement to re-sample any of these breaches following the first scheduled sample.

I will contact you in March to arrange a follow up meeting to ensure that this matter is resolved or a decision is made with actions going forward.

If you have any queries with regard to this issues, please do not hesitate to contact me.

Best wishes

Tony

Tony Roberts

Cyfoeth Naturiol Cymru / Natural Resources Wales

Senior Officer

Waste and Industry Regulation Team, Maes Y Fynnon,
Bangor. LL57 2DW

Ffôn/Tel: 03000 653752

Ffôn symudol / Mobile: 07468 742602

E-Bost/E-mail

Anthony.Roberts@naturalresourceswales.gov.uk

Compliance Assessment Report CAR_NRW0039922

Permit being assessed: GP3330BY.

For: Ffridd Rasmus Landfill Areas 1 & 3, held by Gwynedd Council

At: Ffridd Rasmus Landfill Site , Morfa Road , Harlech, Gwynedd, LL46 2UW.

Type of assessment carried out: Site Inspection, Reason: Other.

On 14/04/2022 between 10:00 and 13:00.

Parts of permit assessed: 1. Management, 3, Emissions and Monitoring

NRW Lead Officer: Anthony Roberts.

Report sent to: Steve Edwards, Area Landfill Manager on 17/05/2022.

1. Summary of our findings (full details in section 4)

Part of permitted activity assessed (criteria)	Assessment result	Permit condition
B1 - Infrastructure - Engineering for prevention and control of emissions	Assessed (A)	
E2 - Emissions - Land and groundwater	Assessed (A)	

Result types are explained in more detail in the 'Important Information' section below.

Total number of non-compliances recorded	Total non-compliance score
0	0

How we use the non-compliance score to calculate your annual fee is explained in the 'Important Information' section below.

2. What action is required?

No action required.

3. What will happen next?

Any non-compliance we have identified and recorded on this form is an offence. It can result in criminal prosecution and/or suspension or revocation of your permit.

At this time, we do not intend to take any further action.

This statement does not stop us from taking additional enforcement action if further relevant information comes to light or offences continue.

4. Details of our assessment

Ffridd Rasmus Site Meeting and Inspection of Groundwater Infrastructure

A site meeting was conducted with Steve Edwards of Gwynedd County Council, to discuss

groundwater infrastructure and variations to the permit, including rationalising trigger levels in the light of evidence of the migration and dilution of the pollution plume from the unlined Area 2 landfill. The permit conditions in scope during this meeting and inspection are reproduced below:

1. Management

1. General Management

1.1.1 The operator shall manage and operate the activities:

- (a) in accordance with a written management system that identifies and minimises risks of pollution, including those arising from operations, maintenance, accidents, incidents, non-conformances, closure and those drawn to the attention of the operator as a result of complaints; and*
- (b) using sufficient competent persons and resources.*

3. Emissions and monitoring

3.1 Emissions to water, air or land

3.1.4 There shall be no emission from the activities into groundwater of any hazardous substances contrary to the EP Regulations.

3.1.5 There shall be no emission from the activities into groundwater of any non-hazardous pollutants so as to cause pollution.

3.1.6 The compliance limits for emissions into groundwater for the parameters and monitoring points set out in schedule 3 table S3.4 (or as otherwise agreed in writing in accordance with annual monitoring report to be carried out in accordance with condition 4.2.1 (b)) shall not be exceeded

Table S3.4 Trigger levels for emissions into groundwater and monitoring requirements

Summary

Rationalisation of groundwater trigger levels are proposed and will be submitted along with other variations which have been agreed with the operator.

The site groundwater infrastructure was inspected. No serious issues were detected but all headworks should be checked for integrity and well heads should have plate covers and be locked in between sampling episodes.

From the 01st April 2022 all future groundwater breaches will be reviewed in light of the current permit conditions and CCS scoring will resume where appropriate.

Please note that all reporting should adhere to the reporting timelines in the permit. Failure to report within the stated timeframe may result in a CCS score.

If you have any queries about this report, or to discuss completion of any actions, please contact the NRW Officer named above.

Important information

Legal status of this report

Your permit is issued to you under the Environmental Permitting Regulations. You have a responsibility to comply with the conditions of your permit and prevent pollution/harm of the environment. You must also ensure that you comply with any other relevant legislation that may apply to your site's operations.

This report explains the findings of our assessment and any action you are required to take. We categorise non-compliance using our guidance for assessing non-compliance at regulated sites.

When we find potential non-compliance/s we will normally give you advice on how to maintain compliance.

To correct non-compliance, we may:

- require you to take specific actions
- issue a notice
- review the conditions of your permit.

Any advice and guidance we give will be without prejudice to any other enforcement response that we consider may be required.

Assessment results and non-compliance categories (used in section 1):

Assessment result	Description
Assessed (A)	Assessed or assessed in part, no evidence of non-compliance found
Action only (X)	Action only relating to the activity assessment
Ongoing (O)	Ongoing non-compliance, not scored

Non-compliance category	Description	Score
C1 Major	Potential to have a major, serious, persistent and/or extensive impact or effect on the environment, people and/or property	60
C2 Significant	Potential to have a significant impact or effect on the environment, people and/or property	31
C3 Minor	Potential to have a minor or minimal impact or effect on the environment, people and/or property	4
C4 No environmental impact	Non-compliance at a regulated site that cannot foreseeably have any impact on the environment, people and/or property	0.1

How we use assessment scores

The number and severity of non-compliances recorded in a year will affect your annual subsistence fee the following year. A non-compliance factor is added to your site's Operator

Performance Risk Appraisal (OPRA) score when we calculate your fee to reflect the additional resource we use to assess permit compliance.

What are suspended scores?

In line with our guidance, we may suspend scores for up to six months to allow time for remedial action to be taken. Suspended scores will be re-instated if the action is not completed.

Full list of Industry and Waste action criteria (used in section 1 and 2):

A: Permitted activities

- A1 Specified by permit

B: Infrastructure

- B1 Infrastructure – Engineering for prevention and control of emissions
- B2 Infrastructure – Closure and decommissioning
- B3 Infrastructure – Site drainage engineering (clean and foul)
- B4 Infrastructure – Containment of stored materials
- B5 Infrastructure – Plant and equipment

C: General management

- C1 General management – Staff competency/training
- C2 General management – Management system and operating procedures
- C3 General management – Materials acceptance
- C4 General management – Storage, handling, labelling and segregation

D: Incident management

- D1 Incident management – Site security
- D2 Incident management – Accidents, emergency and incident planning

E: Emissions

- E1 Emissions – Air
- E2 Emissions – Land and groundwater
- E3 Emissions – Surface water
- E4 Emissions – Sewer
- E5 Emissions – Waste

F: Amenity

- F1 Amenity – Odour
- F2 Amenity – Noise
- F3 Amenity – Dust/fibres/particulates and litter
- F4 Amenity – Pests/birds and scavengers
- F5 Amenity – Deposits on road

G: Monitoring and records, maintenance and reporting

- G1 Monitoring and records, maintenance and reporting – Monitoring of emissions and environment
- G2 Monitoring and records, maintenance and reporting – Records of activity, site diary/journal/events
- G3 Monitoring and records, maintenance and reporting – Maintenance records
- G4 Monitoring and records, maintenance and reporting – Reporting and notification to Natural Resources Wales

H: Resources efficiency

- H1 Resource efficiency – Efficient use of raw materials
- H2 Resource efficiency – Energy efficiency

Enforcement response

Any permit condition non-compliance is an offence and we may take legal action against you. Action we take can include prosecution, serving a notice on you and/or suspension or revocation of your permit. See our Enforcement and Sanctions Guidance for further information.

Data protection notice

You should make sure that anyone named in this report knows that the information it contains will be processed by Natural Resources Wales to fulfil its regulatory and monitoring functions and to maintain the relevant public register(s).

We may also use and/or disclose the report in connection with:

- offering or providing you with our literature or services relating to environmental matters
- consulting with the public, public bodies and other organisations (e.g. Health and Safety Executive, local authorities) on environmental issues
- carrying out statistical analysis, research and development on environmental issues
- providing public register information to enquirers
- investigating possible breaches of environmental law
- assessing customer service satisfaction and improving our service
- Freedom of Information Act or Environmental Information Regulations requests.

We may also pass it on to our agents or representatives to do these things on our behalf.

Disclosure of information – this report will be available to view on-line

If you think this report contains commercially confidential information that should not be placed on our public register, you must contact your local Natural Resources Wales office within **fifteen working days** of receiving this report, using the contact details in the accompanying email or letter. You must give a full explanation of why it should not be added to our public register, including specifying which information is commercially confidential. We will assess your request and respond to you within 20 working days to let you know if we agree to your request.

What do I do if I disagree with the report or have a complaint?

If you disagree with this compliance assessment report, you should contact the lead officer without delay to discuss your concerns.

If you are unable to resolve the issue with the lead officer or their line manager you should contact our Customer Contact team on 0300 065 3000 (Monday to Friday 08:00 – 18:00), or email enquiries@naturalresourceswales.gov.uk for details of how to raise your dispute further through our Complaints and Commendations procedure.

If you are dissatisfied with our response, you can contact the Public Services Ombudsman for Wales by phone on 0300 7900203 or by email at ask@ombudsman.wales

Welsh Language Standards

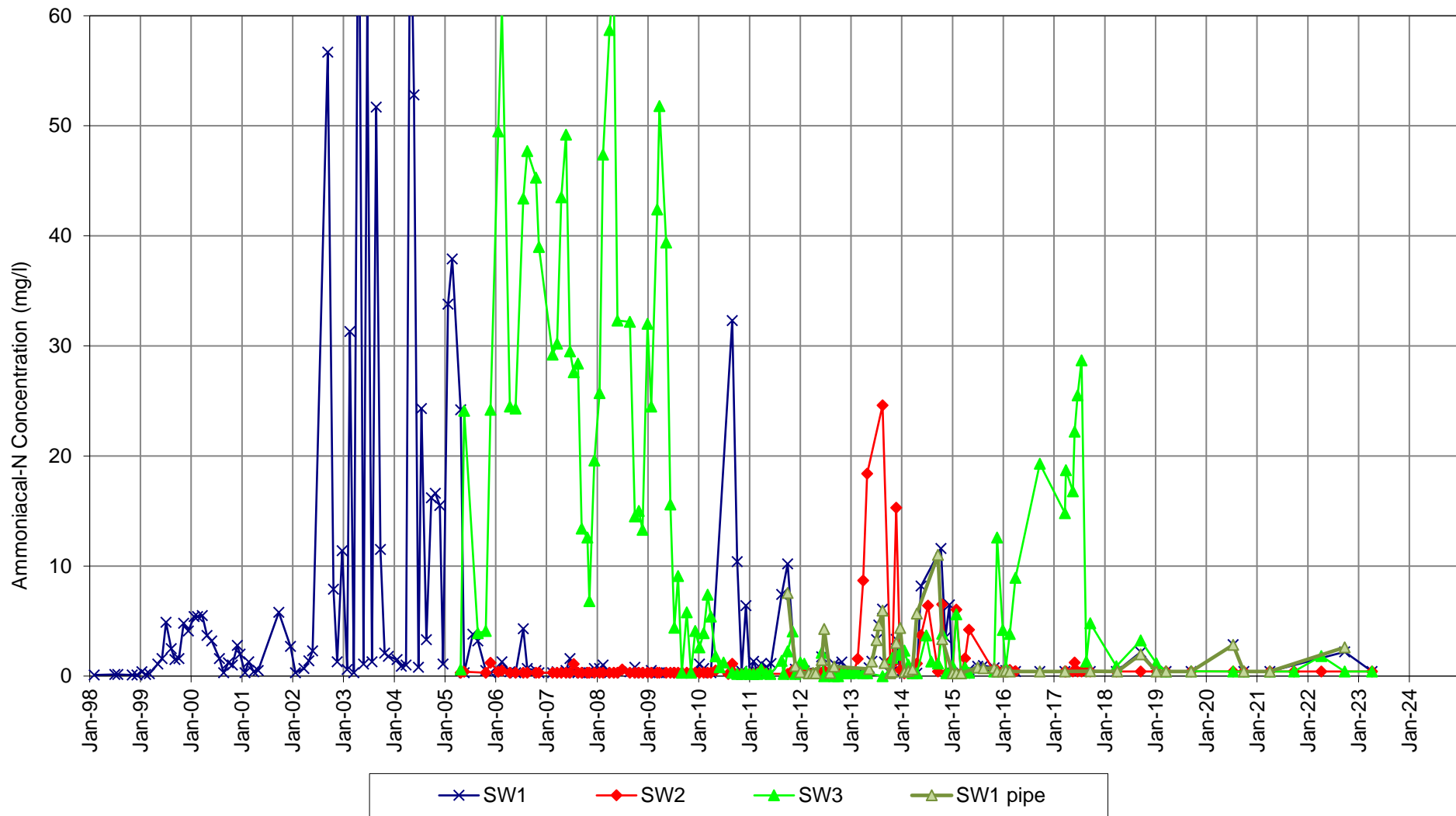
We are committed to establishing Natural Resources Wales as a naturally bilingual organisation. We will provide compliance reports in your preferred language.

Appendix F

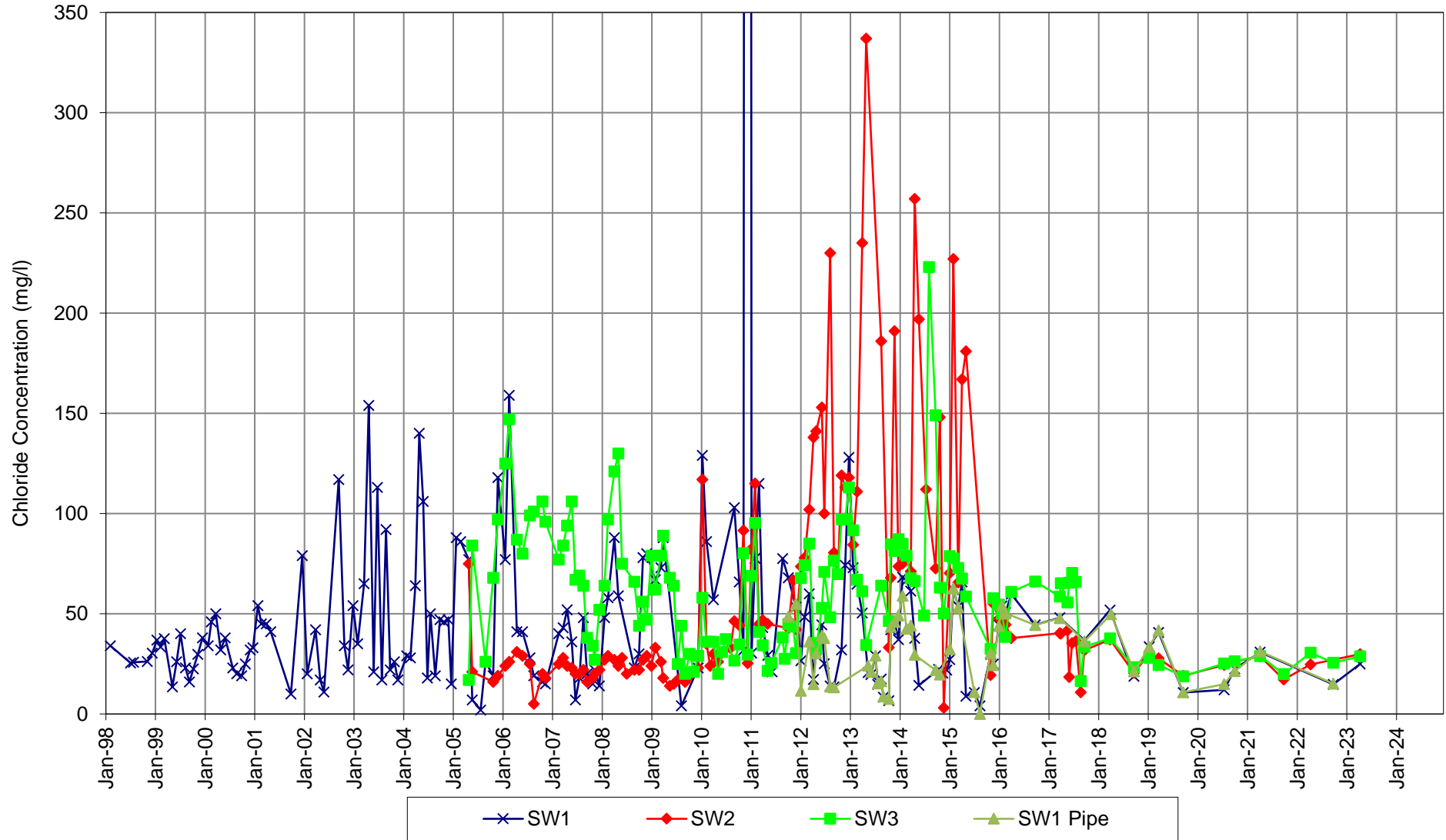
SURFACE WATER QUALITY PLOTS



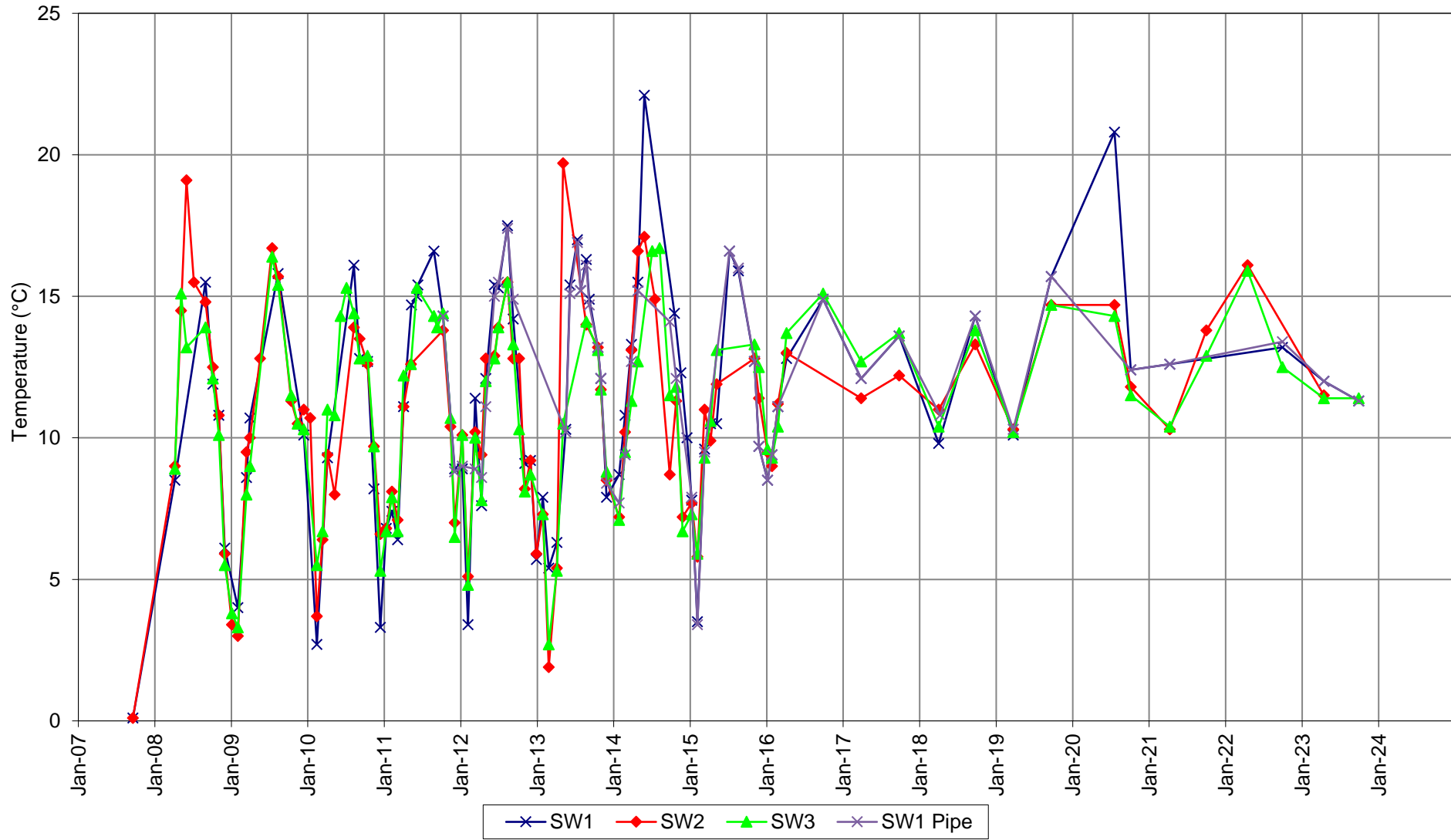
Ffridd Rasmus Landfill - Ammoniacal-Nitrogen in Surface Water



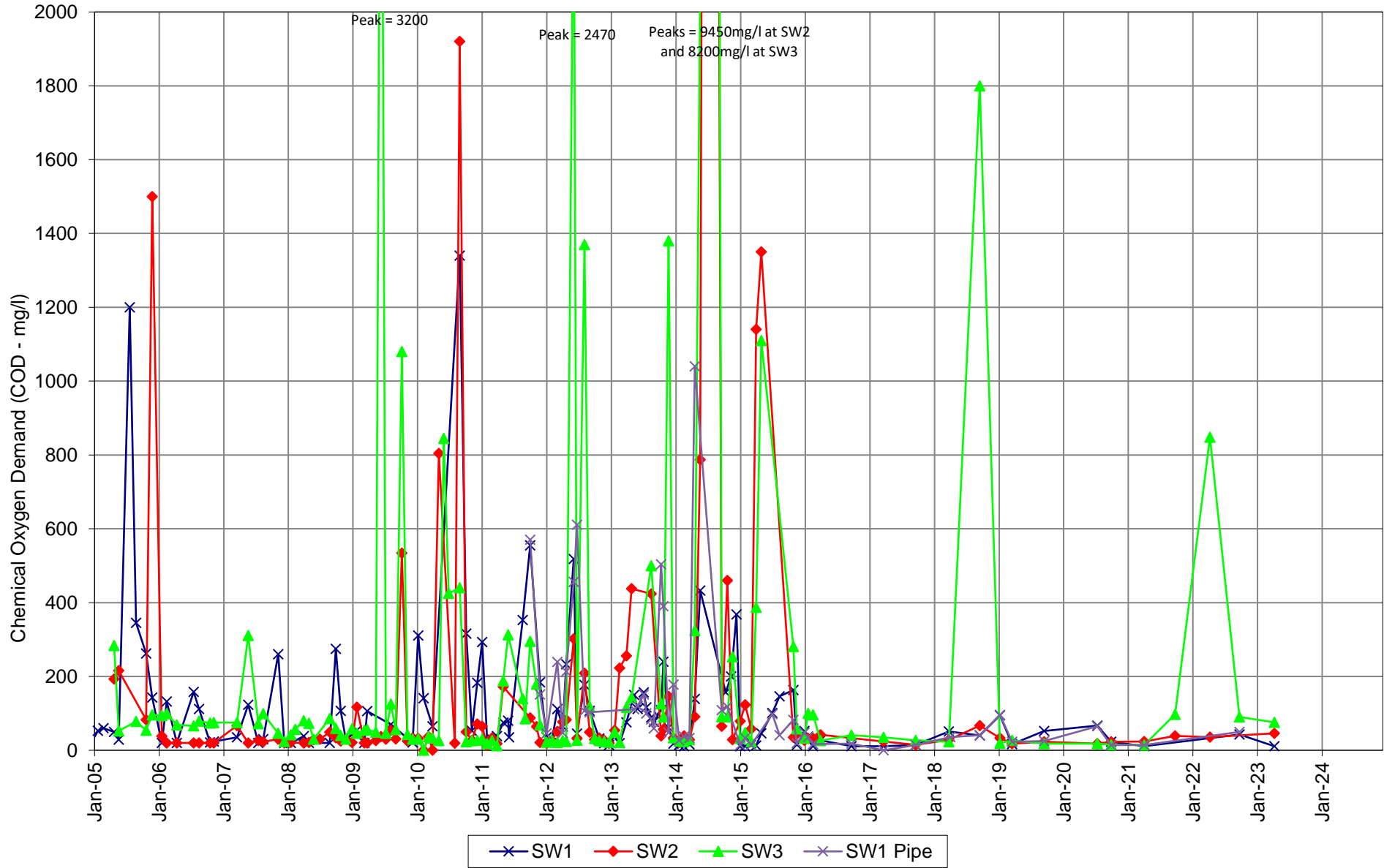
Ffridd Rasmus Landfill - Chloride in Surface Water



Ffridd Rasmus Landfill - Surface Water Temperature



Ffridd Rasmus Landfill - Recent Surface Water COD



Ffridd Rasmus Landfill Site
Point source emissions to water (table S4.3)

Interceptor drain – location SW 1
Sluice – location SW 3

Date	Location	Description of water		Further comments :- Weather
		Surface film or Oil	Is the SW location dry?	
13/4/21	SW 1	CLEAR	No	Dry/Sunny
	SW 3	CLEAR	No	Dry/Sunny
11/10/21	SW 1	CLEAR	No	Sunny
	SW 3	CLEAR	No	Sunny
16/3/22	SW 1	CLEAR	No	Rain
	SW 3	CLEAR	No	Rain
19/9/22	SW 1	CLEAR	Yes	Dry
	SW 3	CLEAR	Yes	Dry
13/4/23	SW 1	CLEAR	No	Dry
	SW 3	CLEAR	No	Dry
11/10/23	SW 1	CLEAR	No	Rain
	SW 3	CLEAR	No	Rain
	SW 1			
	SW 3			
	SW 1			
	SW 3			
	SW 1			
	SW 3			

Appendix G

METEOROLOGICAL DATA



RAINFALL / WEATHER RECORD - FFRIDD RASUS LANDFILL SITE

JANUARY 2023		RAINFALL							
DATE	HOURLY	DAILY	MONTH TODATE	WIND	CLOUD DESCRIPTION	WEATHER DESCRIPTION			
1	9.15 A.M./P.M.			3	M.P.H.	100%	DRY		5°C
2	9.15 A.M./P.M.	49	49		M.P.H.				
3	07.00 A.M./P.M.	3	52	12	M.P.H.	100%	SLOWLY		8°C
4	07.00 A.M./P.M.	18	70	11	M.P.H.	100%	DRY		10°C
5	07.00 A.M./P.M.	1	71	6	M.P.H.	100%	DRIZZLE		10°C
6	07.00 A.M./P.M.	9	80	10	M.P.H.	100%	DRY		8°C
7	A.M./P.M.				M.P.H.				
8	A.M./P.M.				M.P.H.				
9	7.30 A.M./P.M.	25	105	15	M.P.H.	100%	DRY		7°C
10	7.30 A.M./P.M.	9	114	20	M.P.H.	100%	RAIN		9°C
11	7.50 A.M./P.M.	10	124	11	M.P.H.	100%	DRY		9°C
12	07.00 A.M./P.M.	8	132	15	M.P.H.	100%	DRY		10°C
13	07.00 A.M./P.M.	1	133	19	M.P.H.	100%	DRY		8°C
14	A.M./P.M.				M.P.H.				
15	A.M./P.M.				M.P.H.				
16	07.00 A.M./P.M.	27	160	17	M.P.H.	100%	DRIZZLE		4°C
17	07.00 A.M./P.M.				M.P.H.				
18	07.00 A.M./P.M.	5	165	6	M.P.H.	100%	BRIGHT RAIN		3°C
19	A.M./P.M.				M.P.H.				
20	07.00 A.M./P.M.	1	166	2	M.P.H.	PATCHY CLOUD	DRY		2°C
21	A.M./P.M.				M.P.H.				
22	A.M./P.M.				M.P.H.				
23	9.00 A.M./P.M.	0	166	2	M.P.H.	100%	DRY		7°C
24	07.00 A.M./P.M.	0	166	1	M.P.H.	100%	DRY		6°C
25	07.00 A.M./P.M.	1	167	7	M.P.H.	100%	DRIZZLE		7°C
26	07.00 A.M./P.M.	2	169	4	M.P.H.	PATCHY CLOUD	DRY		5°C
27	11.20 A.M./P.M.	0	169	5	M.P.H.	PATCHY CLOUD	DRY		5°C
28	A.M./P.M.				M.P.H.				
29	A.M./P.M.				M.P.H.				
30	9.00 A.M./P.M.	2	171	3	M.P.H.	100%	DRY		7°C
31	7.30 A.M./P.M.	0	171	12	M.P.H.	100%	DRY		9°C

RAINFALL / WEATHER RECORD - FFRIDD RASUS LANDFILL SITE

FEBRUARY 2023		RAINFALL		MONTH TODATE	WIND	CLOUD DESCRIPTION	WEATHER DESCRIPTION			
DATE	HOUR	DAILY	MM.							
1	07:00 A.M. / P.M.	0	MM.	0	MM.	17	M.P.H.	PATCHY CLOUD	DRY	8°C
2	07:00 A.M. / P.M.	0	MM.	0	MM.	11	M.P.H.	PATCHY CLOUD	DRY	8°C
3	07:00 A.M. / P.M.	0	MM.	0	MM.	2	M.P.H.	100% CLOUD	DRY	9°C
4	A.M. / P.M.		MM.		MM.		M.P.H.			
5	A.M. / P.M.		MM.		MM.		M.P.H.			
6	8:30 A.M. / P.M.	0	MM.	0	MM.	0	M.P.H.	NO CLOUD	DRY	0°C
7	8:30 A.M. / P.M.	0	MM.	0	MM.	3	M.P.H.	100% CLOUD	DRY	5°C
8	07:00 A.M. / P.M.	0	MM.	0	MM.	3	M.P.H.	PATCHY CLOUD	DRY/CLOUD	2°C
9	9:15 A.M. / P.M.	0	MM.	0	MM.	5	M.P.H.	NO CLOUD	DRY	2°C
10	07:00 A.M. / P.M.	0	MM.	0	MM.	11	M.P.H.	100% CLOUD	DRY	6°C
11	A.M. / P.M.		MM.		MM.		M.P.H.			
12	A.M. / P.M.		MM.		MM.		M.P.H.			
13	07:00 A.M. / P.M.	2	MM.	2	MM.	0	M.P.H.	NO CLOUD	SUNNY/CLOUD	0°C
14	07:00 A.M. / P.M.	0	MM.	2	MM.	4	M.P.H.	PATCHY CLOUD	DRY	5°C
15	07:00 A.M. / P.M.	0	MM.	2	MM.	14	M.P.H.	CLOUDY	DRY	9°C
16	08:00 A.M. / P.M.	↓	MM.	3	MM.		M.P.H.	CLOUDY	MISTY/FINE DRIZZLE	
17	A.M. / P.M.		MM.		MM.		M.P.H.			
18	A.M. / P.M.		MM.		MM.		M.P.H.			
19	A.M. / P.M.		MM.		MM.		M.P.H.			
20	07:00 A.M. / P.M.	4	MM.	7	MM.	14	M.P.H.	100% CLOUD	DRY	8°C
21	07:00 A.M. / P.M.	4	MM.	11	MM.	8	M.P.H.	100% CLOUD	DRIZZLE	6°C
22	07:00 A.M. / P.M.	2	MM.	13	MM.	7	M.P.H.	100% CLOUD	RAIN	6°C
23	07:00 A.M. / P.M.	2	MM.	15	MM.	8	M.P.H.	NO CLOUD	DRY	4°C
24	07:00 A.M. / P.M.	1	MM.	16	MM.	7	M.P.H.	100%	DRY	8°C
25	A.M. / P.M.		MM.		MM.		M.P.H.			
26	A.M. / P.M.		MM.		MM.		M.P.H.			
27	07:00 A.M. / P.M.		MM.		MM.		M.P.H.			
28	07:00 A.M. / P.M.	0	MM.	16	MM.	2	M.P.H.	PATCHY CLOUD	DRY	4°C
29	A.M. / P.M.		MM.		MM.		M.P.H.			
30	A.M. / P.M.		MM.		MM.		M.P.H.			
31	A.M. / P.M.		MM.		MM.		M.P.H.			

RAINFALL / WEATHER RECORD - FFRIDD RASUS LANDFILL SITE

MARCH 2023		RAINFALL					
DATE	HOUR	DAILY	MONTH TODATE	WIND	CLOUD DESCRIPTION	WEATHER DESCRIPTION	
1	07:00 A.M./P.M.	0 MM.	0 MM.	11 M.P.H.	PATCHY CLOUD	DRY	5°C
2	07:00 A.M./P.M.	0 MM.	0 MM.	9 M.P.H.	PATCHY CLOUD	DRY	4°C
3	07:00 A.M./P.M.	0 MM.	0 MM.	8 M.P.H.	PATCHY CLOUD	DRY/COLD	3°C
4	A.M./P.M.	MM.	MM.	M.P.H.			
5	A.M./P.M.	MM.	MM.	M.P.H.			
6	07:00 A.M./P.M.	4 MM.	4 MM.	8 M.P.H.	100% CLOUD	DRY	6°C
7	07:00 A.M./P.M.	7 MM.	11 MM.	1 M.P.H.	PATCHY CLOUD	SNOW/COLD	1°C
8	07:00 A.M./P.M.	0 MM.	11 MM.	12 M.P.H.	100% CLOUD	DRY/COLD	1°C
9	07:00 A.M./P.M.	1 MM.	12 MM.	7 M.P.H.	100% CLOUD	RAIN/COLD	1°C
10	07:00 A.M./P.M.	21 MM.	33 MM.	12 M.P.H.	PATCHY CLOUD	SNOW/COLD	1°C
11	A.M./P.M.	MM.	MM.	M.P.H.			
12	A.M./P.M.	MM.	MM.	M.P.H.			
13	07:00 A.M./P.M.	26 MM.	59 MM.	19 M.P.H.	100% CLOUD	SHOWERS	9°C
14	07:00 A.M./P.M.	18 MM.	77 MM.	3 M.P.H.	NO CLOUD	DRY	3°C
15	07:00 A.M./P.M.	3 MM.	80 MM.	14 M.P.H.	100% CLOUD	DRY/COLD	0°C
16	07:00 A.M./P.M.	10 MM.	90 MM.	14 M.P.H.	100% CLOUD	SHOWERS	9°C
17	07:00 A.M./P.M.	5 MM.	95 MM.	14 M.P.H.	PATCHY CLOUD	DRY	9°C
18	A.M./P.M.	MM.	MM.	M.P.H.			
19	A.M./P.M.	MM.	MM.	M.P.H.			
20	9:00 A.M./P.M.	17 MM.	112 MM.	10 M.P.H.	100% CLOUD	RAIN	10°C
21	9:30 A.M./P.M.	8 MM.	120 MM.	8.5 M.P.H.	100% CLOUD	RAIN	10°C
22	7:30 A.M./P.M.	17 MM.	137 MM.	9 M.P.H.	NO CLOUD	DRY	8°C
23	7:00 A.M./P.M.	5 MM.	142 MM.	14 M.P.H.	100% CLOUD	DRY	9°C
24	07:00 A.M./P.M.	8 MM.	150 MM.	15 M.P.H.	100% CLOUD	DRY	9°C
25	A.M./P.M.	MM.	MM.	M.P.H.			
26	A.M./P.M.	MM.	MM.	M.P.H.			
27	9:00 A.M./P.M.	2 MM.	152 MM.	3 M.P.H.	NO CLOUD	DRY	4°C
28	7:30 A.M./P.M.	1 MM.	153 MM.	10 M.P.H.	100%	DRY	9°C
29	9:00 A.M./P.M.	3 MM.	156 MM.	10 M.P.H.	100%	DRY	12°C
30	07:00 A.M./P.M.	16 MM.	172 MM.	11 M.P.H.	100%	DRIZZLE	9°C
31	07:00 A.M./P.M.	5 MM.	177 MM.	5 M.P.H.	100%	DRY	10°C

RAINFALL / WEATHER RECORD - FFRIDD RASUS LANDFILL SITE

APRIL 2023		RAINFALL		WIND	CLOUD DESCRIPTION	WEATHER DESCRIPTION
DATE	HOUR	DAILY	MONTH TODATE			
1	A.M. / P.M.	MM.	MM.	M.P.H.		
2	7.30 A.M. / P.M.	3 MM.	3 MM.	4 M.P.H.	NO CLOUD	SONNY 2°C
3	7.30 A.M. / P.M.	0 MM.	3 MM.	1 M.P.H.	NO CLOUD	SONNY 3°C
4	A.M. / P.M.	MM.	MM.	M.P.H.		
5	A.M. / P.M.	MM.	MM.	M.P.H.		
6	07:00 A.M. / P.M.	13 MM.	16 MM.	6 M.P.H.	PATCHY CLOUD	DRY 6°C
7	7.30 A.M. / P.M.	0 MM.	16 MM.	3 M.P.H.	NO CLOUD	SONNY 3°C
8	A.M. / P.M.	MM.	MM.	M.P.H.		
9	A.M. / P.M.	MM.	MM.	M.P.H.		
10	A.M. / P.M.	MM.	MM.	M.P.H.		
11	07:00 A.M. / P.M.	15 MM.	31 MM.	6 M.P.H.	PATCHY CLOUD	SUNNY 8°C
12	07:00 A.M. / P.M.	10 MM.	41 MM.	15 M.P.H.	100% CLOUD	DRY/WINDY 6°C
13	07:00 A.M. / P.M.	12 MM.	53 MM.	7 M.P.H.	PATCHY CLOUD	DRY 6°C
14	07:00 A.M. / P.M.	1 MM.	54 MM.	6 M.P.H.	100% CLOUD	SHOWERY 6°C
15	A.M. / P.M.	MM.	MM.	M.P.H.		
16	A.M. / P.M.	MM.	MM.	M.P.H.		
17	07:00 A.M. / P.M.	3 MM.	57 MM.	1 M.P.H.	100% CLOUD	DRIZZLE 10°C
18	10.40 A.M. / P.M.	1 MM.	58 MM.	12 M.P.H.	NO CLOUD	SUNNY 10°C
19	07:00 A.M. / P.M.	0 MM.	58 MM.	22 M.P.H.	NO CLOUD	SUNNY 9°C
20	07:00 A.M. / P.M.	0 MM.	58 MM.	11 M.P.H.	NO CLOUD	SUNNY 7°C
21	07:00 A.M. / P.M.	0 MM.	58 MM.	11 M.P.H.	100% CLOUD	DRY 8°C
22	A.M. / P.M.	MM.	MM.	M.P.H.		
23	A.M. / P.M.	MM.	MM.	M.P.H.		
24	7.30 A.M. / P.M.	8 MM.	66 MM.	8 M.P.H.	100% CLOUD	RAIN 6°C
25	7.30 A.M. / P.M.	1 MM.	67 MM.	4 M.P.H.	PATCHY	SONNY 5°C
26	7.30 A.M. / P.M.	0 MM.	67 MM.	4 M.P.H.	100% CLOUD	DRY 8°C
27	7.30 A.M. / P.M.	0 MM.	67 MM.	6 M.P.H.	100% CLOUD	DRY 11°C
28	7.30 A.M. / P.M.	1 MM.	68 MM.	3 M.P.H.	100% CLOUD	FOG 10°C
29	A.M. / P.M.	MM.	MM.	M.P.H.		
30	A.M. / P.M.	MM.	MM.	M.P.H.		
31	A.M. / P.M.	MM.	MM.	M.P.H.		

RAINFALL / WEATHER RECORD - FFRIDD RASUS LANDFILL SITE

MAY 2023		RAINFALL		WIND	CLOUD DESCRIPTION	WEATHER DESCRIPTION
DATE	HOUR	DAILY	MONTH TODATE			
1	A.M. / P.M.	MM.	MM.	M.P.H.		
2	A.M. / P.M.	MM.	MM.	M.P.H.		
3	7.30 A.M. / P.M.	11 MM.	11 MM.	4 M.P.H.	PATCHY	BRAE 13°C
4	9.30 A.M. / P.M.	0 MM.	11 MM.	14 M.P.H.	PATCHY	SONNY 13°C
5	8.00 A.M. / P.M.	3 MM.	14 MM.	12 M.P.H.	100% CLOUD	DRY 13°C
6	A.M. / P.M.	MM.	MM.	M.P.H.		
7	A.M. / P.M.	MM.	MM.	M.P.H.		
8	7.30 A.M. / P.M.	13 MM.	27 MM.	17 M.P.H.	100% CLOUD	RAIN 12°C
9	9.00 A.M. / P.M.	10 MM.	37 MM.	12 M.P.H.	100% CLOUD	DRIZZLE 12°C
10	9.10 A.M. / P.M.	2 MM.	39 MM.	10 M.P.H.	100% CLOUD	DRY 12°C
11	7.50 A.M. / P.M.	2 MM.	41 MM.	2 M.P.H.	100% CLOUD	DRY 11°C
12	8.00 A.M. / P.M.	1 MM.	42 MM.	10 M.P.H.	PATCHY	DRY 13°C
13	8.00 A.M. / P.M.	MM.	MM.	M.P.H.		
14	A.M. / P.M.	MM.	MM.	M.P.H.		
15	8.00 A.M. / P.M.	1 MM.	43 MM.	8 M.P.H.	PATCHY	SONNY 10°C
16	7.30 A.M. / P.M.	0 MM.	43 MM.	3 M.P.H.	No CLOUD	SONNY 8°C
17	6.00 A.M. / P.M.	0 MM.	43 MM.	3 M.P.H.	PATCHY	DRY 12°C
18	9.00 A.M. / P.M.	0 MM.	43 MM.	6 M.P.H.	100% CLOUD	DRY 14°C
19	A.M. / P.M.	MM.	MM.	M.P.H.		
20	A.M. / P.M.	MM.	MM.	M.P.H.		
21	A.M. / P.M.	MM.	MM.	M.P.H.		
22	9.00 A.M. / P.M.	0 MM.	43 MM.	6 M.P.H.	PATCHY CLOUD	DRY 15°C
23	8.00 A.M. / P.M.	0 MM.	43 MM.	3 M.P.H.	100% CLOUD	DRY 11°C
24	A.M. / P.M.	MM.	MM.	M.P.H.		
25	A.M. / P.M.	MM.	MM.	M.P.H.		
26	A.M. / P.M.	MM.	MM.	M.P.H.		
27	A.M. / P.M.	MM.	MM.	M.P.H.		
28	A.M. / P.M.	MM.	MM.	M.P.H.		
29	A.M. / P.M.	MM.	MM.	M.P.H.		
30	A.M. / P.M.	MM.	MM.	M.P.H.		
31	A.M. / P.M.	MM.	MM.	M.P.H.		

RAINFALL / WEATHER RECORD - FFRIDD RASUS LANDFILL SITE

JUNE 2023		RAINFALL		WIND	CLOUD DESCRIPTION	WEATHER DESCRIPTION
DATE	HOUR	DAILY	MONTH TODATE			
1	A.M. / P.M.	MM.	MM.	M.P.H.		
2	A.M. / P.M.	MM.	MM.	M.P.H.		
3	A.M. / P.M.	MM.	MM.	M.P.H.		
4	A.M. / P.M.	MM.	MM.	M.P.H.		
5	A.M. / P.M.	MM.	MM.	M.P.H.		
6	7.30 A.M. / P.M.	0 MM.	0 MM.	14 M.P.H.	NO CLOUD	SUNNY 12°C
7	7.30 A.M. / P.M.	0 MM.	0 MM.	12 M.P.H.	NO CLOUD	SUNNY 13°C
8	7.30 A.M. / P.M.	0 MM.	0 MM.	13 M.P.H.	NO CLOUD	SUNNY 13°C
9	7.30 A.M. / P.M.	0 MM.	0 MM.	15 M.P.H.	NO CLOUD	SUNNY 14°C
10	A.M. / P.M.	MM.	MM.	M.P.H.		
11	A.M. / P.M.	MM.	MM.	M.P.H.		
12	7.30 A.M. / P.M.	3 MM.	3 MM.	0 M.P.H.	100% CLOUD	DRY 17°C
13	7.50 A.M. / P.M.	9 MM.	12 MM.	6 M.P.H.	PATCHY	DRY 18°C
14	7.30 A.M. / P.M.	0 MM.	12 MM.	17 M.P.H.	NO CLOUD	DRY 17°C
15	7.30 A.M. / P.M.	0 MM.	12 MM.	4 M.P.H.	NO CLOUD	DRY 20°C
16	9.15 A.M. / P.M.	0 MM.	12 MM.	5 M.P.H.	NO CLOUD	DRY 23°C
17	A.M. / P.M.	MM.	MM.	M.P.H.		
18	A.M. / P.M.	MM.	MM.	M.P.H.		
19	8.30 A.M. / P.M.	48 MM.	60 MM.	6 M.P.H.	100% CLOUD	DRY 17°C
20	A.M. / P.M.	MM.	MM.	M.P.H.		
21	A.M. / P.M.	MM.	MM.	M.P.H.		
22	A.M. / P.M.	MM.	MM.	M.P.H.		
23	9.00 A.M. / P.M.	0 MM.	MM.	M.P.H.		
24	A.M. / P.M.	MM.	60 MM.	9 M.P.H.	100% CLOUD	RAIN 17°C
25	A.M. / P.M.	MM.	MM.	M.P.H.		
26	9.00 A.M. / P.M.	19 MM.	79 MM.	15 M.P.H.	PATCHY CLOUD	DRY 16°C
27	11.00 A.M. / P.M.	2 MM.	81 MM.	10 M.P.H.	100% CLOUD	RAIN 16°C
28	A.M. / P.M.	MM.	MM.	M.P.H.		
29	10.15 A.M. / P.M.	5 MM.	86 MM.	12-5 M.P.H.	PATCHY CLOUD	DRY 16°C
30	7.30 A.M. / P.M.	2 MM.	88 MM.	7 M.P.H.	100% 100%	DAMP 14°C
31	A.M. / P.M.	MM.	MM.	M.P.H.		

RAINFALL / WEATHER RECORD - FFRIDD RASUS LANDFILL SITE

JULY 2023		RAINFALL							
DATE	HOUR	DAILY	MONTH TODATE	WIND	CLOUD DESCRIPTION	WEATHER DESCRIPTION			
1	7.30 A.M. / P.M.	2 MM.	2 MM.						
2	A.M. / P.M.								
3	7.30 A.M. / P.M.	2 MM.	2 MM.	11 M.P.H.	100%	DAMP	13.7 13°C		
4	7.30 A.M. / P.M.	4 MM.	6 MM.	12 M.P.H.	100%	SHOWERS	16°C		
5	7.30 A.M. / P.M.	0 MM.	0 MM.	12 M.P.H.	PATCHY	DRY	15°C		
6	7.30 A.M. / P.M.	0 MM.	0 MM.	10 M.P.H.	PATCHY	DRY	15°C		
7	7.30 A.M. / P.M.	1 MM.	0 MM.	12 M.P.H.	PATCHY	DRY	17°C		
8	A.M. / P.M.								
9	A.M. / P.M.								
10	7.30 A.M. / P.M.	2 MM.	2 MM.	5 M.P.H.	PATCHY	DRY	16°C		
11	7.30 A.M. / P.M.	20 MM.	22 MM.	6 M.P.H.	100%	DRY	15°C		
12	8.00 A.M. / P.M.	2 MM.	24 MM.	2 M.P.H.	100%	DRY	15°C		
13	7.30 A.M. / P.M.	0 MM.	24 MM.	7 M.P.H.	100%	DRY	15°C		
14	7.30 A.M. / P.M.	0 MM.	24 MM.	1 M.P.H.	100%	RAIN	15°C		
15	A.M. / P.M.								
16	A.M. / P.M.								
17	7.30 A.M. / P.M.	24 MM.	48 MM.	2 M.P.H.	PATCHY	DRY	14°C		
18	A.M. / P.M.								
19	7.30 A.M. / P.M.	4 MM.	52 MM.	3 M.P.H.	PATCHY	DRY	14°C		
20	A.M. / P.M.								
21	7.30 A.M. / P.M.	0 MM.	52 MM.	6 M.P.H.	100% Cloud	DRY	14°C		
22	A.M. / P.M.	47 MM.							
23	A.M. / P.M.								
24	8.00 A.M. / P.M.	47 MM.	99 MM.	10 M.P.H.	No Cloud	DRY	15°C		
25	7.30 A.M. / P.M.	1 MM.	100 MM.	1 M.P.H.	100% Cloud	DRY	12°C		
26	7.30 A.M. / P.M.	0 MM.	100 MM.	6 M.P.H.	100% Cloud	DRY	15°C		
27	7.30 A.M. / P.M.	27 MM.	127 MM.	7 M.P.H.	100% Cloud	WET	16°C		
28	7.30 A.M. / P.M.	1 MM.	128 MM.	10 M.P.H.	100% Cloud	DRIZZLE	16°C		
29	A.M. / P.M.								
30	A.M. / P.M.								
31	A.M. / P.M.								

RAINFALL / WEATHER RECORD - FFRIDD RASUS LANDFILL SITE

AUGUST 2023		RAINFALL							
DATE	HOUR	DAILY	MONTH TODATE	WIND	CLOUD DESCRIPTION	WEATHER DESCRIPTION			
1	7.30 A.M. / P.M.	26 MM.	26 MM.	12 M.P.H.	100%	CLOUDY	15°C		
2	A.M. / P.M.	MM.	MM.	M.P.H.					
3	A.M. / P.M.	MM.	MM.	M.P.H.					
4	A.M. / P.M.	MM.	MM.	M.P.H.					
5	A.M. / P.M.	MM.	MM.	M.P.H.					
6	A.M. / P.M.	MM.	MM.	M.P.H.					
7	A.M. / P.M.	MM.	MM.	M.P.H.					
8	A.M. / P.M.	MM.	MM.	M.P.H.					
9	7.30 A.M. / P.M.	21 MM.	47 MM.	3 M.P.H.	100% CLOUD	CLOUDY	13°C		
10	9.30 A.M. / P.M.	0 MM.	47 MM.	5 M.P.H.	No CLOUD	SUNNY	23°C		
11	A.M. / P.M.	MM.	MM.	M.P.H.					
12	A.M. / P.M.	MM.	MM.	M.P.H.					
13	A.M. / P.M.	MM.	MM.	M.P.H.					
14	A.M. / P.M.	MM.	MM.	M.P.H.					
15	A.M. / P.M.	MM.	MM.	M.P.H.					
16	A.M. / P.M.	MM.	MM.	M.P.H.					
17	A.M. / P.M.	MM.	MM.	M.P.H.					
18	A.M. / P.M.	MM.	MM.	M.P.H.					
19	A.M. / P.M.	MM.	MM.	M.P.H.					
20	A.M. / P.M.	MM.	MM.	M.P.H.					
21	A.M. / P.M.	MM.	MM.	M.P.H.					
22	A.M. / P.M.	MM.	MM.	M.P.H.					
23	7.30 A.M. / P.M.	47 MM.	94 MM.	4 M.P.H.	100% CLOUD	CLOUDY	15°C		
24	7.30 A.M. / P.M.	1 MM.	95 MM.	8 M.P.H.	100% CLOUD	RAIN	16°C		
25	7.30 A.M. / P.M.	3 MM.	98 MM.	6 M.P.H.	100% CLOUD	CLOUDY	16°C		
26	7.30 A.M. / P.M.	8 MM.	106 MM.	7 M.P.H.	100% CLOUD	RAIN	13°C		
27	A.M. / P.M.	MM.	MM.	M.P.H.					
28	A.M. / P.M.	MM.	MM.	M.P.H.					
29	A.M. / P.M.	MM.	MM.	M.P.H.					
30	7.30 A.M. / P.M.	12 MM.	118 MM.	12 M.P.H.	100% CLOUD	DRY	15°C		
31	7.30 A.M. / P.M.	0 MM.	118 MM.	10 M.P.H.	100% CLOUD	RAIN	14°C		

RAINFALL / WEATHER RECORD - FFRIDD RASUS LANDFILL SITE

SEPTEMBER 2023		RAINFALL							
DATE	HOUR	DAILY	MONTH TODATE	WIND	CLOUD DESCRIPTION	WEATHER DESCRIPTION			
1	7.30 A.M. / P.M.	5 MM.	5 MM.	3 M.P.H.	100% CLOUD	DRY			16°C
2	A.M. / P.M.	MM.	MM.	M.P.H.					
3	A.M. / P.M.	MM.	MM.	M.P.H.					
4	10.00 A.M. / P.M.	0 MM.	5 MM.	2 M.P.H.	NO CLOUD	SUNNY			23°C
5	11.00 A.M. / P.M.	0 MM.	5 MM.	15 M.P.H.	NO CLOUD	SUNNY			25°C
6	A.M. / P.M.	MM.	MM.	M.P.H.					
7	7.30 A.M. / P.M.	0 MM.	5 MM.	4 M.P.H.	100% CLOUD	DRY			22°C
8	7.50 A.M. / P.M.	0 MM.	5 MM.	0 M.P.H.	100% CLOUD	DRY			19°C
9	7.30 A.M. / P.M.	MM.	MM.	M.P.H.					
10	A.M. / P.M.	MM.	MM.	M.P.H.					
11	7.30 A.M. / P.M.	2 MM.	7 MM.	3 M.P.H.	100% CLOUD	SHOWERS			18°C
12	7.30 A.M. / P.M.	26 MM.	33 MM.	10 M.P.H.	100% CLOUD	SHOWERS			15°C
13	A.M. / P.M.	MM.	MM.	M.P.H.					
14	A.M. / P.M.	MM.	MM.	M.P.H.					
15	7.30 A.M. / P.M.	23 MM.	56 MM.	7 M.P.H.	100% CLOUD	DRY			16°C
16	A.M. / P.M.	MM.	MM.	M.P.H.					
17	A.M. / P.M.	MM.	MM.	M.P.H.					
18	8.00 A.M. / P.M.	14 MM.	70 MM.	9 M.P.H.	100% CLOUD	SHOWERS			15°C
19	12.00 A.M. / P.M.	24 MM.	94 MM.	11 M.P.H.	100% CLOUD	RAIN			16°C
20	7.30 A.M. / P.M.	19 MM.	113 MM.	20 M.P.H.	100% CLOUD	RAIN			16°C
21	12.30 A.M. / P.M.	12 MM.	125 MM.	3 M.P.H.	PATCHY CLOUD	SHOWERS			13°C
22	A.M. / P.M.	MM.	MM.	M.P.H.					
23	A.M. / P.M.	MM.	MM.	M.P.H.					
24	A.M. / P.M.	MM.	MM.	M.P.H.					
25	1.00 A.M. / P.M.	25 MM.	150 MM.	10 M.P.H.	100% CLOUD	DRY			18°C
26	7.30 A.M. / P.M.	0 MM.	150 MM.	6 M.P.H.	100% CLOUD	DRY			16°C
27	7.30 A.M. / P.M.	0 MM.	150 MM.	4 M.P.H.	100% CLOUD	DRY			15°C
28	A.M. / P.M.	MM.	MM.	M.P.H.					
29	9.30 A.M. / P.M.	37 MM.	187 MM.	15 M.P.H.	PATCHY CLOUD	DRY			14°C
30	A.M. / P.M.	MM.	MM.	M.P.H.					
31	A.M. / P.M.	MM.	MM.	M.P.H.					

RAINFALL / WEATHER RECORD - FFRIDD RASUS LANDFILL SITE

OCTOBER 2023		RAINFALL		WIND	CLOUD DESCRIPTION	WEATHER DESCRIPTION
DATE	HOUR	DAILY	MONTH TODATE			
1	A.M. / P.M.	MM.	MM.	M.P.H.		
2	A.M. / P.M.	MM.	MM.	M.P.H.		
3	A.M. / P.M.	MM.	MM.	M.P.H.		
4	A.M. / P.M.	MM.	MM.	M.P.H.		
5	A.M. / P.M.	MM.	MM.	M.P.H.		
6	7.30 A.M. / P.M.	59 MM.	59 MM.	17 M.P.H.	100% CLOUD	DRY 16°C
7	7.30 A.M. / P.M.	0 MM.	59 MM.	8 M.P.H.	100% CLOUD	DRY 17°C
8	A.M. / P.M.	MM.	MM.	M.P.H.		
9	A.M. / P.M.	MM.	MM.	M.P.H.		
10	7.30 A.M. / P.M.	1 MM.	60 MM.	2 M.P.H.	PATCHY CLOUD	DRY 11°C
11	7.30 A.M. / P.M.	0 MM.	60 MM.	5 M.P.H.	100% CLOUD	RAIN 10°C
12	7.30 A.M. / P.M.	31 MM.	91 MM.	7 M.P.H.	100% CLOUD	RAIN 9°C
13	7.30 A.M. / P.M.	22 MM.	113 MM.	2 M.P.H.	100%	RAIN 14°C
14	7.30 A.M. / P.M.	0 MM.	113 MM.	4 M.P.H.	100%	DRY 14°C
15	A.M. / P.M.	MM.	MM.	M.P.H.		
16	7.30 A.M. / P.M.	6 MM.	119 MM.	3 M.P.H.	PATCHY CLOUD	DRY 6°C
17	6.40 A.M. / P.M.	0 MM.	119 MM.	10 M.P.H.	PATCHY CLOUD	DRY 11°C
18	A.M. / P.M.	MM.	MM.	M.P.H.		
19	0800 A.M. / P.M.	21 MM.	140 MM.	M.P.H.	100% Cloud	Showers 18°C
20	A.M. / P.M.	MM.	MM.	M.P.H.		
21	A.M. / P.M.	MM.	MM.	M.P.H.		
22	A.M. / P.M.	MM.	MM.	M.P.H.		
23	10.00 A.M. / P.M.	25 MM.	190 MM.	12 M.P.H.	Overcast	
24	7.30 A.M. / P.M.	3 MM.	193 MM.	10 M.P.H.	100% CLOUD	DRY 10°C
25	7.15 A.M. / P.M.	0 MM.	193 MM.	13 M.P.H.	No CLOUD	DRY 7°C
26	1200 A.M. / P.M.	5 MM.	198 MM.	8 M.P.H.	Cloudy Showers	Showers
27	A.M. / P.M.	MM.	MM.	M.P.H.		
28	A.M. / P.M.	MM.	MM.	M.P.H.		
29	A.M. / P.M.	MM.	MM.	M.P.H.		
30	0730 A.M. / P.M.	5 MM.	203 MM.	3 M.P.H.	Patchy	
31	0730 A.M. / P.M.	6 MM.	209 MM.	5 M.P.H.	Patchy	Heavy Showers.

RAINFALL / WEATHER RECORD - FFRIDD RASUS LANDFILL SITE

NOVEMBER DECEMBER 2023		RAINFALL							
DATE	HOUR	DAILY	MONTH TODATE	WIND	CLOUD DESCRIPTION	WEATHER DESCRIPTION			
1	7.30 A.M. / P.M.	12 MM.	12 MM.	11 M.P.H.	100% CLOUD	DRY	12°C		
2	7.30 A.M. / P.M.	5 MM.	17 MM.	4 M.P.H.	100% CLOUD	SHOWERS			
3	7.30 A.M. / P.M.	3 MM.	20 MM.	4 M.P.H.	PATCHY CLOUD	DRY	8°C		
4	A.M. / P.M.	MM.	MM.	M.P.H.					
5	A.M. / P.M.	MM.	MM.	M.P.H.					
6	0700 A.M. / P.M.	10 MM.	30 MM.	6 M.P.H.	PATCHY	SHOWERS			
7	7.30 A.M. / P.M.	3 MM.	33 MM.	5 M.P.H.	PATCHY CLOUD	DRY	10°C		
8	7.30 A.M. / P.M.	9 MM.	42 MM.	M.P.H.	CLOUD	HEAVY SHOWERS			
9	7.30 A.M. / P.M.	8 MM.	50 MM.	6 M.P.H.	100% CLOUD	DRY	9°C		
10	7.30 A.M. / P.M.	10 MM.	60 MM.	6 M.P.H.	100% CLOUD	DRY	7°C		
11	A.M. / P.M.	MM.	MM.	M.P.H.					
12	A.M. / P.M.	MM.	MM.	M.P.H.					
13	7.30 A.M. / P.M.	20 MM.	80 MM.	24 M.P.H.	100% CLOUD	SHOWERS	13°C		
14	7.30 A.M. / P.M.	2 MM.	82 MM.	5 M.P.H.	CLOUDY	MED SHOWERS			
15	7.30 A.M. / P.M.	0 MM.	82 MM.	7 M.P.H.	100% CLOUD	DRY	10°C		
16	8.30 A.M. / P.M.	0 MM.	82 MM.	5 M.P.H.	100% CLOUD	DRY	6°C		
17	7.30 A.M. / P.M.	14 MM.	96 MM.	5 M.P.H.	PATCHY CLOUD	DRY	7°C		
18	A.M. / P.M.	MM.	MM.	M.P.H.					
19	A.M. / P.M.	MM.	MM.	M.P.H.					
20	7.50 A.M. / P.M.	13 MM.	109 MM.	5 M.P.H.	PATCHY CLOUD	SHOWERS			
21	A.M. / P.M.	MM.	MM.	M.P.H.					
22	7.30 A.M. / P.M.	1 MM.	110 MM.	5 M.P.H.	100% CLOUD	DRY	11°C		
23	7.30 A.M. / P.M.	0 MM.	110 MM.	7 M.P.H.	100% CLOUD	DRY	11°C		
24	7.30 A.M. / P.M.	0 MM.	110 MM.	16 M.P.H.	100% CLOUD	DRY	9°C		
25	A.M. / P.M.	MM.	MM.	M.P.H.					
26	A.M. / P.M.	MM.	MM.	M.P.H.					
27	9.30 A.M. / P.M.	45 MM.	155 MM.	8 M.P.H.	100% CLOUD	SHOWERS			
28	0800 A.M. / P.M.	10 MM.	165 MM.	3 M.P.H.	overcast	SHOWERS	4°C		
29	0945 A.M. / P.M.	6 MM.	171 MM.	3 M.P.H.	PATCHY CLOUD	DRY	4°C		
30	7.30 A.M. / P.M.	0 MM.	171 MM.	17 M.P.H.	PATCHY CLOUD	DRY	1°C		
31	A.M. / P.M.	MM.	MM.	M.P.H.					

RAINFALL / WEATHER RECORD - FFRIDD RASUS LANDFILL SITE

DECEMBER		NOVEMBER 2023				RAINFALL		WIND		CLOUD DESCRIPTION	WEATHER DESCRIPTION
DATE	HOUR	DAILY		MONTH TODATE		WIND		CLOUD DESCRIPTION	WEATHER DESCRIPTION		
1	7.20 A.M. / P.M.	0	MM.	0	MM.	5	M.P.H.	No cloud	DRY	-2°C	
2	A.M. / P.M.		MM.		MM.		M.P.H.				
3	A.M. / P.M.		MM.		MM.		M.P.H.				
4	7.15 A.M. / P.M.	27	MM.	27	MM.	10	M.P.H.	100% Cloud	SHOWERS	4°C	
5	A.M. / P.M.		MM.		MM.		M.P.H.				
6	7.10 A.M. / P.M.	1	MM.	28	MM.	5	M.P.H.	100% Cloud	DRY	5°C	
7	7.10 A.M. / P.M.	0	MM.	28	MM.	10	M.P.H.	100% Cloud	DRY	11°C	
8	7.35 A.M. / P.M.	55	MM.	83	MM.		M.P.H.	100% Cloud	SHOWERS	8°C	
9	A.M. / P.M.		MM.		MM.		M.P.H.				
10	A.M. / P.M.		MM.		MM.		M.P.H.				
11	7.10 A.M. / P.M.	29	MM.	112	MM.	6	M.P.H.	100% Cloud	RAIN	9°C	
12	A.M. / P.M.		MM.		MM.		M.P.H.				
13	7.10 A.M. / P.M.	20	MM.	132	MM.	10	M.P.H.	100% Cloud	RAIN	7°C	
14	08.15 A.M. / P.M.	8	MM.	140	MM.	3	M.P.H.	100% Cloud	SHOWERS	8°C	
15	09.30 A.M. / P.M.	1	MM.	141	MM.	3	M.P.H.				
16	A.M. / P.M.		MM.		MM.		M.P.H.				
17	A.M. / P.M.		MM.		MM.		M.P.H.				
18	7.10 A.M. / P.M.	76	MM.	157	MM.	17	M.P.H.	100% Cloud	SHOWERS	11°C	
19	09.30 A.M. / P.M.	20	MM.	237	MM.	5	M.P.H.	100% Cloud	OVERCAST SHOWERS	11°C	
20	09.30 A.M. / P.M.	8	MM.	155	MM.	14	M.P.H.	100% Cloud	SHOWERS	9°C	
21	07.30 A.M. / P.M.	5	MM.	168	MM.	26	M.P.H.	100% Cloud	SHOWERS	11°C	
22	07.30 A.M. / P.M.	2	MM.	170	MM.	18	M.P.H.	100% Cloud	Heavy Showers	10°C	
23	A.M. / P.M.		MM.		MM.		M.P.H.				
24	A.M. / P.M.		MM.		MM.		M.P.H.				
25	A.M. / P.M.		MM.		MM.		M.P.H.				
26	A.M. / P.M.		MM.		MM.		M.P.H.				
27	09.30 A.M. / P.M.	20	MM.	190	MM.	20	M.P.H.	100% Cloud	SHOWERS		
28	08.50 A.M. / P.M.	10	MM.	200	MM.	15	M.P.H.	overcast	Windy Showers	10°C	
29	09.30 A.M. / P.M.	3	MM.	203	MM.	9	M.P.H.			8°C	
30	A.M. / P.M.		MM.		MM.		M.P.H.				
31	A.M. / P.M.	25	MM.	228	MM.	6	M.P.H.	overcast	SHOWERS		

Appendix H

GAS BALANCING DATA



Security code [EF02472D]

ID	DATE	CH4 %	CO2 %	O2 %	BALANCE %	Res Nitrog %	CO ppm	H2S ppm	BARO mb	REL.PRESS mb	ANSWER 1
FFRFLARE	26/01/2023 09:30	57.1	20.4	2.2	20.3	11.98	0	0	6	1054	-1.42
FFRIWEIG	27/01/2023 07:34	0.3	0.2	21.6	77.9	0	0	0	0	1053	0.23
FFRIBH14	27/01/2023 07:39	0.3	0.4	21.5	77.8	0	0	0	0	1053	0.54
FFRIBH13	27/01/2023 07:42	0.2	0.4	21.2	78.2	0	0	0	0	1052	0.18
FRSKBN08	27/01/2023 07:47	0.3	0.3	21.5	77.9	0	0	0	0	1053	0.23
FRSKBN09	27/01/2023 07:49	0.2	0.2	21.6	78	0	0	0	0	1050	0.09
FRSKBN10	27/01/2023 07:51	0.2	0.2	21.6	78	0	0	0	0	1053	0.19
FRSKBN11	27/01/2023 07:53	0.2	0.2	21.7	77.9	0	0	0	0	1053	0.12
FFRIBH34	27/01/2023 08:03	0.2	0.5	20.5	78.8	1.31	0	0	0	1051	-0.91
FFRIBH35	27/01/2023 08:08	0.2	1.1	20.2	78.5	2.14	0	0	0	1052	0.4
FFRIBH36	27/01/2023 08:13	0.2	1.3	20.3	78.2	1.47	0	0	0	1052	0.19
FFRID3#2	27/01/2023 08:18	17.3	18.6	0.5	63.6	61.71	0	1	1	1051	-0.25
FFRILCP3	27/01/2023 08:21	3.5	2.8	18.3	75.4	6.23	0	0	0	1053	-0.18
FFRLM1#2	27/01/2023 08:25	3.1	16.2	0.2	80.5	79.74	1	7	7	1052	0.3
FFRILCP1	27/01/2023 08:27	0.9	4.5	15.8	78.8	19.08	0	0	0	1051	0.07
FFRLM1#1	27/01/2023 08:30	30.8	16.5	0.6	52.1	49.83	1	0	0	1050	-0.11
FFRID2#2	27/01/2023 08:32	35.4	20.9	0.2	43.5	42.74	1	9	9	1053	-0.32
FFRID4#1	27/01/2023 08:39	65.6	35.8	0.2	0	0	3	11	11	1052	-0.32
FFRID3#1	27/01/2023 08:42	41.2	27.8	0.3	30.7	29.57	1	0	0	1052	-0.07
FFRID4#2	27/01/2023 08:46	35.5	27	0.3	37.2	36.07	1	0	0	1052	-0.28
FFRID2#1	27/01/2023 08:50	55.7	29.8	0.3	14.2	13.07	1	1	1	1054	0.86
FFRBHG01	27/01/2023 08:54	0.2	0.5	21.9	77.4	0	0	0	0	1053	-0.07
FFRBHG02	27/01/2023 08:57	0.2	0.6	17.8	81.4	14.12	0	0	0	1052	-2.4
FFRBHG03	27/01/2023 09:01	0.2	1.6	21.1	77.1	0	0	0	0	1054	0.86
FFRBHG04	27/01/2023 09:05	0.2	0.4	22.1	77.3	0	0	0	0	1052	0.46
FFRFLARE	30/01/2023 11:50	54	19.2	1.9	24.9	17.72	2	6	6	1048	-1.59
FFRFLARE	02/02/2023 09:28	56.6	19.3	1.7	22.4	15.97	2	8	8	1045	-1.24
FFRFLARE	10/02/2023 08:58	56.2	19.3	1.9	22.6	15.42	1	8	8	1053	-1.17
FFRFLARE	15/02/2023 14:48	55.6	19	2	23.4	15.84	1	8	8	1040	-0.7
FFRIWEIG	23/02/2023 11:14	0.2	0.2	21.2	78.4	0	0	0	0	1045	0.21
FFRIBH13	23/02/2023 11:15	0.2	0.4	20.8	78.6	0	0	0	0	1045	0.46
FFRIBH14	23/02/2023 11:17	0.1	0.4	20.7	78.8	0.55	0	0	0	1044	0.14
FRSKBN11	23/02/2023 11:20	0.1	0.2	20.9	78.8	0	0	0	0	1047	0.26
FRSKBN10	23/02/2023 11:21	0.1	0.2	21	78.7	0	0	0	0	1044	0.09
FRSKBN09	23/02/2023 11:22	0.1	0.2	21	78.7	0	0	0	0	1042	0.16
FRSKBN08	23/02/2023 11:24	0.1	0.2	21	78.7	0	0	0	0	1044	0.18
FFRBHG04	23/02/2023 11:27	0.1	0.4	20.8	78.7	0.08	0	0	0	1044	0.11
FFRBHG03	23/02/2023 11:31	0.1	1.6	19.5	78.8	5.09	0	0	0	1045	0.18
FFRBHG02	23/02/2023 11:37	0.1	0.7	18.9	80.3	8.86	0	0	0	1025	-0.53
FFRBHG01	23/02/2023 11:39	0.1	0.2	21	78.7	0	0	0	0	1026	-0.14
FFRID2#2	23/02/2023 11:42	35.8	20	0.4	43.8	42.29	1	4	4	1025	0.02
FFRLM1#1	23/02/2023 11:43	26.6	15.9	0.6	56.9	54.63	1	0	0	1025	0.16
FFRILCP1	23/02/2023 11:46	0.6	6	12.1	81.3	35.56	1	0	0	1025	0.32
FFRLM1#2	23/02/2023 11:48	1.4	10.1	9.8	78.7	41.66	0	0	0	1024	0.19
FFRID2#1	23/02/2023 11:51	61.4	29	0.7	8.9	6.25	1	1	1	1024	0.11
FFRID4#2	23/02/2023 11:54	58.2	28.6	0.3	12.9	11.77	1	0	0	1025	0.04
FFRID4#1	23/02/2023 11:56	64.2	33.3	1.1	1.4	0	3	3	3	1024	0.09
FFRID3#1	23/02/2023 11:58	42.6	26.4	0.4	30.6	29.09	2	0	0	1025	0
FFRID3#2	23/02/2023 12:01	22.2	18.4	0.6	58.8	56.53	2	12	12	1024	-0.05
FFRILCP3	23/02/2023 12:03	2.2	2.5	17.7	77.6	10.69	2	0	0	1025	-0.09
FFRIBH36	23/02/2023 12:05	0	0.9	20.6	78.5	0.63	1	0	0	1025	0.14
FFRIBH35	23/02/2023 12:08	0	1.3	19.9	78.8	3.58	1	0	0	1025	0.18
FFRIBH34	23/02/2023 12:10	0	1	19.1	79.9	7.7	1	0	0	1025	-27.99
FFRFLARE	23/02/2023 12:15	53.3	18.6	2	26.1	18.54	2	6	6	1025	-0.91
FFRFLARE	03/03/2023 09:37	53.5	19.1	2.5	24.9	15.45	0	5	5	1052	-0.98
FFRFLARE	07/03/2023 08:59	57.2	19.5	1.9	21.4	14.22	1	8	8	1020	-0.93
FFRFLARE	15/03/2023 14:16	59.1	18.1	1.6	21.2	15.15	1	4	4	1030	0.7
FFRFLARE	23/03/2023 09:24	57.1	19.4	1.8	21.7	14.9	1	5	5	1011	-1.02
FFRIWEIG	27/03/2023 08:14	0.2	0.2	21.5	78.1	0	0	0	0	1044	0.23
FFRIBH14	27/03/2023 09:32	0.1	0.5	21.2	78.2	0	0	0	0	1035	0.14
FFRIBH13	27/03/2023 09:36	0.1	0.5	21.1	78.3	0	0	0	0	1044	0.18
FRSKBN08	27/03/2023 09:38	0.1	0.2	21.6	78.1	0	0	0	0	1043	0.21
FRSKBN09	27/03/2023 09:40	0.1	0.2	21.6	78.1	0	0	0	0	1046	0.14
FRSKBN10	27/03/2023 09:42	0.1	0.2	21.6	78.1	0	0	0	0	1045	-0.05
FRSKBN11	27/03/2023 09:44	0.1	0.2	21.5	78.2	0	0	0	0	1044	0.09
FFRIBH34	27/03/2023 11:50	0.1	1.6	16.6	81.7	18.95	0	0	0	1046	-21.76
FFRIBH35	27/03/2023 11:53	0.1	1.8	18.3	79.8	10.63	0	0	0	1045	0.14

FFRIBH36	27/03/2023 11:57	0	1.2	20	78.8	3.2	0	0	1045	-5.79
FFRID3#2	27/03/2023 12:01	17.9	11.3	9.4	61.4	25.87	0	0	1044	-0.3
FFRILCP3	27/03/2023 12:03	3.7	4.1	15	77.2	20.5	1	0	1047	-0.35
FFRLM1#2	27/03/2023 12:07	0	3.5	16.9	79.6	15.72	0	0	1046	0
FFRILCP1	27/03/2023 12:09	0.5	3.4	15.3	80.8	22.97	0	0	1045	-0.12
FFRLM1#1	27/03/2023 12:12	26.5	15.7	0.6	57.2	54.93	1	0	1045	-0.09
FFRID2#2	27/03/2023 12:14	37.7	19.9	0.4	42	40.49	2	4	1043	-0.3
FFRID3#1	27/03/2023 12:18	51.7	28.5	0.3	19.5	18.37	1	0	1044	-0.21
FFRID4#1	27/03/2023 12:21	62.3	32.5	1.1	4.1	0	4	2	1046	-0.16
FFRID4#2	27/03/2023 12:26	47.6	27.7	0.4	24.3	22.79	3	0	1046	-0.25
FFRID2#1	27/03/2023 12:29	18.8	21.5	0.8	58.9	55.88	4	0	1046	-0.46
FFRBHG01	27/03/2023 12:33	0	0.2	21.5	78.3	0	1	0	1043	0.14
FFRBHG02	27/03/2023 12:37	0	0.8	19.7	79.5	5.03	1	0	1045	-0.02
FFRBHG03	27/03/2023 12:39	0	0.6	21.1	78.3	0	1	0	1046	0.05
FFRBHG04	27/03/2023 12:43	0	0.3	21.5	78.2	0	1	0	1046	0.42
FFRFLARE	28/03/2023 08:02	59.3	18.2	1.3	21.2	16.29	1	3	1035	-0.28
FFRFLARE	03/04/2023 15:16	44.4	14.8	3	37.8	26.46	1	0	1050	-0.21
FFRFLARE	12/04/2023 13:52	66.2	19.8	0.3	13.7	12.57	1	6	1002	-1.23
FFRFLARE	19/04/2023 08:55	51.9	17.8	2.2	28.1	19.78	1	4	1049	-0.86
FFRFLARE	26/04/2023 15:03	49.9	17.2	2	30.9	23.34	1	1	1035	-0.47
FFRIWEIG	03/05/2023 11:06	0.1	0.1	21	78.8	0	0	0	1045	0.14
FFRIBH13	03/05/2023 11:45	0.1	0.4	20.7	78.8	0.55	0	0	1043	0.18
FFRIBH14	03/05/2023 11:50	0	0.4	20.7	78.9	0.65	0	0	1044	0.11
FRSKBN08	03/05/2023 11:52	0	0.1	21.1	78.8	0	0	0	1045	0.04
FRSKBN09	03/05/2023 11:54	0	0.1	21.1	78.8	0	0	0	1044	0.07
FRSKBN10	03/05/2023 11:56	0	0.1	21	78.9	0	0	0	1042	-0.18
FRSKBN11	03/05/2023 11:59	0	0.1	21.1	78.8	0	0	0	1044	0.12
FFRIBH34	03/05/2023 12:05	0	1.2	19.1	79.7	7.5	0	0	1044	-0.49
FFRIBH35	03/05/2023 12:08	0	2.9	17.7	79.4	12.49	0	0	1044	0.09
FFRIBH36	03/05/2023 12:13	0	1.1	19.5	79.4	5.69	0	0	1043	0.07
FFRID3#2	03/05/2023 12:16	17.5	11.9	8.2	62.4	31.4	1	0	1042	-0.02
FFRILCP3	03/05/2023 12:20	2.1	3.9	14.9	79.1	22.78	2	0	1044	0.07
FFRLM1#2	03/05/2023 12:24	2	15.8	0.3	81.9	80.77	7	2	1042	0.16
FFRILCP1	03/05/2023 12:26	0.2	2.9	15.7	81.2	21.85	1	0	1043	0.14
FFRLM1#1	03/05/2023 12:29	26.4	14.9	0.6	58.1	55.83	2	0	1043	0.25
FFRID2#2	03/05/2023 12:31	36.2	19.5	0.3	44	42.87	3	2	1043	0
FFRID4#1	03/05/2023 14:00	65.7	33.2	0.5	0.6	0	5	0	1043	0.4
FFRID3#1	03/05/2023 14:03	50.9	27.9	0.3	20.9	19.77	4	28	1041	0.4
FFRID4#2	03/05/2023 14:06	51.8	29.4	0.3	18.5	17.37	4	0	1043	0.56
FFRID2#1	03/05/2023 14:09	24.8	22.1	0.3	52.8	51.67	4	1	1043	0.26
FFRBHG01	03/05/2023 14:13	0	0.1	21.3	78.6	0	2	0	1041	0.05
FFRBHG02	03/05/2023 14:15	0	0.4	20.9	78.7	0	2	0	1043	0.26
FFRBHG03	03/05/2023 14:18	0	2.2	19	78.8	6.98	2	0	1043	0.16
FFRBHG04	03/05/2023 14:21	0	0.2	21.3	78.5	0	1	0	1041	0.07
FRSKBE01	03/05/2023 14:27	0	0	22.5	77.5	0	2	0	1043	-0.02
FRSKBE02	03/05/2023 14:29	0	0	21.9	78.1	0	2	0	1041	-0.05
FRSKBE03	03/05/2023 14:31	0	0	21.4	78.6	0	2	0	1040	0.11
FRSKBE04	03/05/2023 14:33	0	0	21.4	78.6	0	2	0	1041	0.05
FRSKBE05	03/05/2023 14:35	0	0	21.6	78.4	0	1	0	1040	0
FRSKBE06	03/05/2023 14:37	0	0	21.5	78.5	0	2	0	1040	-0.16
FRSKBE07	03/05/2023 14:39	0	0	21.6	78.4	0	2	0	1040	-0.04
FFRFLARE	03/05/2023 14:58	52.3	17.6	1.2	28.9	24.36	4	3	1032	-0.26
FRSKBN01	04/05/2023 11:46	0.1	0.1	21.7	78.1	0	0	0	1034	0.11
FRSKBN02	04/05/2023 11:48	0.1	0.1	21.3	78.5	0	0	0	1033	0.11
FRSKBN03	04/05/2023 11:50	0.1	0.1	21.4	78.4	0	0	0	1035	-0.23
FRSKBN04	04/05/2023 11:53	0	0.1	21.5	78.4	0	0	0	1032	0.18
FRSKBN05	04/05/2023 11:55	0	0.1	21.4	78.5	0	0	0	1033	0.18
FRSKBN06	04/05/2023 11:57	0	0.1	21.3	78.6	0	0	0	1032	0.07
FRSKBN07	04/05/2023 11:59	0	0.1	21.3	78.6	0	0	0	1032	0.11
FFRFLARE	11/05/2023 14:53	51.7	17.7	2.3	28.3	19.61	2	2	1035	-0.89
FFRIWEIG	12/05/2023 11:47	0.2	0.2	21.2	78.4	0	0	0	1048	0.16
FFRIBH14	12/05/2023 11:53	0.1	0.5	20.5	78.9	1.41	0	0	1047	0.16
FFRIBH13	12/05/2023 11:57	0.1	0.5	20.7	78.7	0.45	0	0	1045	0.14
FRSKBN08	12/05/2023 12:00	0.1	0.1	21.2	78.6	0	0	0	1048	0.07
FRSKBN09	12/05/2023 12:02	0.1	0.1	21.4	78.4	0	0	0	1047	0.14
FRSKBN10	12/05/2023 12:03	0	0.1	20.9	79	0	0	0	1048	0.05
FRSKBN11	12/05/2023 12:05	0	0.1	20.8	79.1	0.48	0	0	1047	0.02
FFRIBH34	12/05/2023 12:18	0	1.5	18.9	79.6	8.16	0	0	1046	-10.71
FFRIBH35	12/05/2023 12:20	0	3.3	17.1	79.6	14.96	0	0	1046	0.07
FFRIBH36	12/05/2023 12:50	0	1.4	19.4	79.2	5.87	0	0	1047	0.07
FFRID3#2	12/05/2023 12:52	15.1	9.9	10.7	64.3	23.85	1	0	1046	-0.14

FFRILCP3	12/05/2023 12:54	3	4.1	14.8	78.1	22.16	2	0	1047	-0.42
FFRLM1#2	12/05/2023 14:09	2.5	13.2	5.1	79.2	59.92	1	0	1045	0.16
FFRILCP1	12/05/2023 14:11	0.3	3.5	15.2	81	23.54	1	0	1047	-0.05
FFRLM1#1	12/05/2023 14:13	26.8	14.9	0.6	57.7	55.43	2	0	1046	-0.12
FFRID2#2	12/05/2023 14:16	36.7	19.6	0.3	43.4	42.27	3	0	1046	-0.05
FFRID4#1	12/05/2023 14:21	57.3	30	2.6	10.1	0.27	5	0	1046	0.07
FFRID3#1	12/05/2023 14:24	57.6	29.1	0.3	13	11.87	4	19	1046	-0.05
FFRID4#2	12/05/2023 14:26	56.8	30.8	0.3	12.1	10.97	4	0	1045	-0.05
FFRID2#1	12/05/2023 14:29	22.5	21.3	0.3	55.9	54.77	4	1	1047	-0.04
FFRBHG01	12/05/2023 14:33	0	0.1	21.1	78.8	0	2	0	1047	0.02
FFRBHG02	12/05/2023 14:36	0	0.4	20.8	78.8	0.18	2	0	1048	-0.44
FFRBHG03	12/05/2023 14:39	0	2.2	18.9	78.9	7.46	2	0	1048	0.07
FFRBHG04	12/05/2023 14:42	0	0.2	21.1	78.7	0	2	0	1047	0.14
FFRFLARE	23/05/2023 11:27	51.7	18.1	2.3	27.9	19.21	2	4	1050	-0.61
FFRFLARE	05/06/2023 09:21	53.3	18.3	2	26.4	18.84	2	1	1045	-0.68
FFRFLARE	13/06/2023 11:03	54.5	18.6	2.1	24.8	16.86	2	3	1026	-0.6
LLIFTRG3	15/06/2023 12:22	0.1	1.1	19.6	79.2	5.11	1	0	1026	0.16
LLIFTRG4	15/06/2023 12:28	0	0.1	21	78.9	0	1	0	1024	0.07
LLIFTRG2	15/06/2023 12:38	0	0	21	79	0	2	0	1024	-0.02
LLIFTR1A	15/06/2023 12:56	0	4.8	15.2	80	22.54	2	0	1015	-0.02
LLIFTRG7	15/06/2023 13:00	0	0	21	79	0	2	0	1024	-0.07
LLIFTRG5	15/06/2023 13:07	0	0	21.4	78.6	0	2	0	1025	-0.07
LLIFTRG6	15/06/2023 13:14	0.4	3.3	7.1	89.2	62.36	2	0	1024	-0.04
FFRIBH14	29/06/2023 10:20	0.1	0.6	20.7	78.6	0.35	0	0	1040	0.16
FFRIBH13	29/06/2023 10:24	0.1	0.6	20.5	78.8	1.31	0	0	1039	0.12
FRSKBN08	29/06/2023 10:26	0.1	0.1	21.1	78.7	0	0	0	1039	0.07
FRSKBN09	29/06/2023 10:28	0.1	0.1	21.1	78.7	0	0	0	1040	-0.07
FRSKBN10	29/06/2023 10:30	0.1	0.1	20.9	78.9	0	0	0	1040	0.05
FRSKBN11	29/06/2023 10:32	0.1	0.1	21	78.8	0	0	0	1039	0.12
FFRIBH34	29/06/2023 10:38	0	1.7	19.3	79	6.05	0	0	1042	0.23
FFRIBH35	29/06/2023 10:41	0	1.8	19.2	79	6.42	0	0	1040	0.11
FFRIBH36	29/06/2023 10:45	0	1.4	20	78.6	3	0	0	1041	0.07
FFRID3#2	29/06/2023 10:48	33.1	17.5	3.7	45.7	31.71	2	1	1039	0.05
FFRILCP3	29/06/2023 10:51	19.3	10.9	6.9	62.9	36.82	3	1	1041	-0.23
FFRID3#1	29/06/2023 10:54	64.3	33.1	0.4	2.2	0.69	2	26	1039	0.04
FFRID4#1	29/06/2023 10:57	57.1	32.3	2	8.6	1.04	5	1	1039	0.09
FFRID4#2	29/06/2023 11:01	58.2	32.9	0.2	8.7	7.94	4	6	1041	-0.04
FFRID2#1	29/06/2023 11:06	43.3	25.9	0.3	30.5	29.37	4	5	1039	0.04
FFRID2#2	29/06/2023 11:09	46.4	20.2	0.3	33.1	31.97	4	9	1041	-0.19
FFRLM1#1	29/06/2023 11:12	29.6	14	0.7	55.7	53.05	6	0	1038	-0.11
FFRLM1#1	29/06/2023 11:33	0	0	20.9	79.1	0.1	2	0	1040	0.05
FFRILCP1	29/06/2023 11:36	9.3	15.7	0.6	74.4	72.13	5	1	1038	0.04
FFRBHG03	29/06/2023 11:43	0	1.4	19.1	79.5	7.3	2	0	1039	0.04
FFRBHG02	29/06/2023 11:45	0	0.4	20.4	79.2	2.09	2	0	1039	-0.02
FFRFLARE	29/06/2023 12:01	59.3	20.3	0.6	19.8	17.53	5	7	1039	-0.11
FFRFLARE	03/07/2023 12:36	61.5	21	0.7	16.8	14.15	2	1	1018	-1.28
FFRIWEIG	05/07/2023 08:13	0.2	0.2	21.3	78.3	0	0	0	1030	0.16
FFRIBH14	05/07/2023 08:15	0.1	0.6	20.9	78.4	0	0	0	1032	0.07
FFRIBH13	05/07/2023 08:17	0.1	0.6	20.8	78.5	0	0	0	1031	0.19
FRSKBN08	05/07/2023 08:20	0.1	0.1	21.2	78.6	0	0	0	1031	0.11
FRSKBN09	05/07/2023 08:22	0.1	0.1	21.5	78.3	0	0	0	1032	0.05
FRSKBN10	05/07/2023 08:26	0.1	0.1	22.7	77.1	0	0	0	1031	0.16
FRSKBN11	05/07/2023 08:28	0	0.1	21.3	78.6	0	0	0	1031	0.07
FFRIBH34	05/07/2023 08:33	0	1.3	20.2	78.5	2.14	0	0	1031	0.12
FFRIBH35	05/07/2023 08:36	0	1.7	20.2	78.1	1.74	0	0	1032	0.07
FFRIBH36	05/07/2023 08:40	0	1.4	20.5	78.1	0.61	0	0	1031	0.11
FFRID3#2	05/07/2023 08:43	36.2	19.2	3.2	41.4	29.3	2	3	1030	-0.11
FFRILCP3	05/07/2023 08:45	18	10	8.6	63.4	30.89	2	0	1031	-0.21
FFRID3#1	05/07/2023 08:49	64.7	34.1	0.4	0.8	0	2	30	1031	-0.25
FFRID4#1	05/07/2023 08:52	55.2	32.2	2.7	9.9	0	4	2	1033	-0.14
FFRID4#2	05/07/2023 08:55	64.4	33.8	0.2	1.6	0.84	3	10	1031	-0.09
FFRID2#1	05/07/2023 08:58	54.5	28.2	0.5	16.8	14.91	3	4	1031	0
FFRBHG01	05/07/2023 09:03	0.2	0.6	20.9	78.3	0	1	0	1031	-0.11
FFRBHG02	05/07/2023 09:06	0	0.4	21.3	78.3	0	1	0	1032	0.05
FFRBHG03	05/07/2023 09:08	0	1.3	20.1	78.6	2.62	1	0	1030	0.12
FFRBHG04	05/07/2023 09:12	0	0.3	21.3	78.4	0	1	0	1032	-0.02
FFRLM1#2	05/07/2023 09:15	12.8	16.7	0.5	70	68.11	3	2	1032	0
FFRILCP1	05/07/2023 09:17	0.3	1.3	19.1	79.3	7.1	1	0	1031	0
FFRLM1#1	05/07/2023 09:20	32	14.3	0.7	53	50.35	4	0	1031	-0.07
FFRID2#2	05/07/2023 09:22	47.9	20.6	0.3	31.2	30.07	3	10	1031	-0.33
FFRFLARE	14/07/2023 07:38	66.7	20.9	0.2	12.2	11.44	2	10	1030	0.26

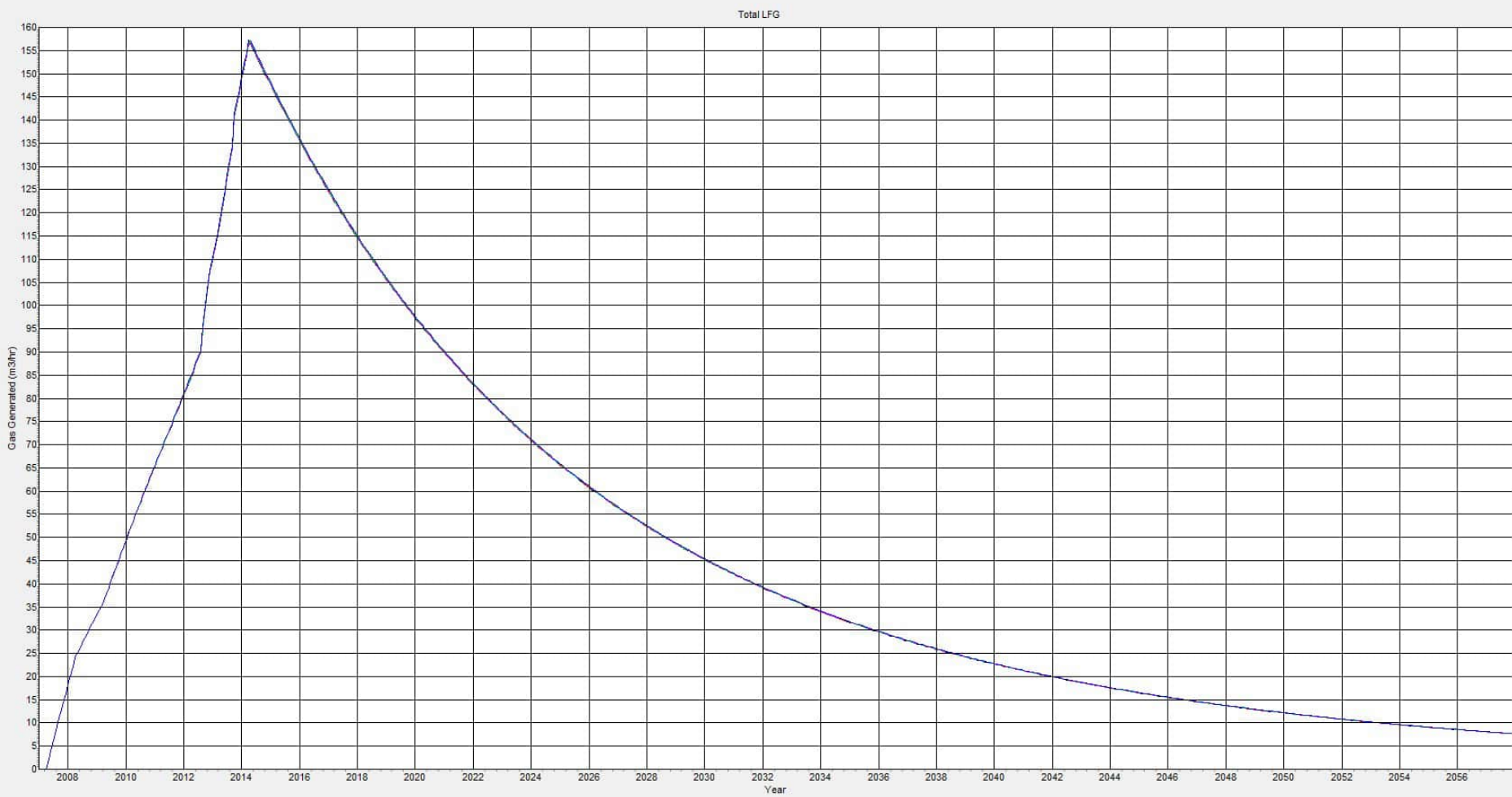
FFRFLARE	17/07/2023 08:04	61.1	21.2	0.7	17	14.35	2	5	1024	-1.4
FFRFLARE	24/07/2023 09:00	62.3	21	0.6	16.1	13.83	2	5	1013	-2.64
FFRFLARE	01/08/2023 08:06	63.5	21.2	0.5	14.8	12.91	2	5	1022	-0.58
FFRFLARE	23/08/2023 13:54	62	21.1	0.3	16.6	15.47	2	1	1041	-0.21
FFRFLARE	31/08/2023 11:56	65.1	22.3	0.3	12.3	11.17	2	10	1017	-0.16
FFRIWEIG	07/09/2023 11:06	0	0.2	20.7	79.1	0.85	1	1	1038	0.12
FFRIBH14	07/09/2023 11:15	0	0.5	20.2	79.3	2.94	0	1	1037	0.09
FFRIBH13	07/09/2023 11:19	0	0.6	20.3	79.1	2.37	0	1	1037	0.11
FRSKBN08	07/09/2023 11:22	0	0	20.7	79.3	1.05	1	1	1037	0.07
FRSKBN09	07/09/2023 11:24	0	0	20.8	79.2	0.58	1	1	1038	0
FRSKBN10	07/09/2023 11:27	0	0	20.9	79.1	0.1	1	1	1038	-0.18
FRSKBN11	07/09/2023 11:29	0	0	20.8	79.2	0.58	1	1	1038	0.04
FFRIBH34	07/09/2023 11:38	0	1.6	19.7	78.7	4.23	1	1	1037	0.07
FFRIBH35	07/09/2023 11:41	0	2.6	18.5	78.9	8.97	1	1	1036	0.04
FFRIBH36	07/09/2023 11:48	0	1.8	19.5	78.7	4.99	1	1	1037	0.07
FFRILCP3	07/09/2023 11:54	14.4	7.8	10.1	67.7	29.52	4	1	1037	0.28
FFRLM1#2	07/09/2023 11:59	10.7	16.4	0.4	72.5	70.99	7	1	1036	0.16
FFRILCP1	07/09/2023 12:01	1.3	4.8	12.5	81.4	34.15	2	1	1038	0.05
FFRLM1#1	07/09/2023 12:03	46.1	12.9	0.7	40.3	37.65	4	1	1035	0.16
FFRID2#2	07/09/2023 12:06	50	21.2	0.2	28.6	27.84	5	5	1036	0.16
FFRID4#1	07/09/2023 14:08	64.3	35.2	0.7	0	0	6	0	1036	0.37
FFRID3#1	07/09/2023 14:11	63.9	34.4	0.3	1.4	0.27	4	30	1037	0.37
FFRID4#2	07/09/2023 14:15	63	35.7	0.2	1.1	0.34	5	8	1037	0.33
FFRID2#1	07/09/2023 14:19	67.5	30.7	0.3	1.5	0.37	5	3	1036	0.02
FFRBHG01	07/09/2023 14:23	0	0.3	20.7	79	0.75	2	0	1035	0.07
FFRBHG02	07/09/2023 14:26	0	0.3	20.5	79.2	1.71	2	0	1037	0.07
FFRBHG03	07/09/2023 14:29	0.1	2.3	18.8	78.8	7.74	2	0	1036	-0.25
FFRBHG04	07/09/2023 14:33	0	0.7	20.1	79.2	3.22	2	0	1035	0.05
FFRFLARE	07/09/2023 14:46	63.6	21.9	0.3	14.2	13.07	6	8	1035	-0.26
FFRFLARE	13/09/2023 13:50	63.9	22	0.4	13.7	12.19	2	5	1045	-0.19
FFRFLARE	21/09/2023 13:35	65.4	22.3	0.3	12	10.87	1	8	1014	-0.61
FFRIWEIG	10/10/2023 09:32	0.2	0.1	19.6	80.1	6.01	0	0	1037	0.12
FFRIBH14	10/10/2023 09:35	0.1	0.7	19.6	79.6	5.51	0	1	1037	0.11
FFRIBH13	10/10/2023 09:37	0.1	0.8	19.6	79.5	5.41	0	1	1039	0.07
FRSKBN08	10/10/2023 09:44	0.1	0.1	20.6	79.2	1.33	0	1	1039	0.16
FRSKBN09	10/10/2023 09:46	0.1	0.1	20.7	79.1	0.85	0	1	1039	-0.19
FRSKBN10	10/10/2023 09:48	0.1	0.1	21	78.8	0	0	1	1039	0.12
FRSKBN11	10/10/2023 09:51	0	0.1	21	78.9	0	0	1	1039	0.11
FFRIBH34	10/10/2023 10:57	0	1.6	19.9	78.5	3.28	0	0	1037	-2.88
FFRIBH35	10/10/2023 11:02	0	3.6	16.8	79.6	16.1	0	0	1039	0.14
FFRIBH36	10/10/2023 11:06	0	2.3	19.2	78.5	5.92	0	1	1037	0.12
FFRID3#2	10/10/2023 11:09	49.8	24.3	0.9	25	21.6	1	10	1038	0.33
FFRILCP3	10/10/2023 11:11	13.6	7	11.6	67.8	23.95	1	1	1038	0.42
FFRLM1#2	10/10/2023 11:16	14.2	16.7	0.2	68.9	68.14	3	61	1036	0.16
FFRILCP1	10/10/2023 11:19	1.1	5.3	12.8	80.8	32.42	1	1	1037	0.86
FFRLM1#1	10/10/2023 11:21	48.1	12.9	0.7	38.3	35.65	2	1	1038	0.23
FFRID2#2	10/10/2023 11:23	55.4	22.1	0.2	22.3	21.54	2	16	1037	0.14
FFRID3#1	10/10/2023 11:51	62.8	34.9	0.2	2.1	1.34	2	35	1037	0.23
FFRID4#1	10/10/2023 11:55	64.3	35.8	0.2	0	0	6	1	1037	0.61
FFRID4#2	10/10/2023 11:59	64.1	35.1	0.2	0.6	0	4	7	1036	0.68
FFRID2#1	10/10/2023 12:03	66.2	31.6	0.2	2	1.24	4	6	1037	0.26
FFRBHG01	10/10/2023 12:08	0	0.3	20.8	78.9	0.28	2	0	1036	0.09
FFRBHG02	10/10/2023 12:11	0	0.4	20.9	78.7	0	1	0	1037	0.09
FFRBHG03	10/10/2023 12:15	0	3.1	18	78.9	10.86	1	0	1036	-0.42
FFRBHG04	10/10/2023 12:19	0	0.5	20.6	78.9	1.03	1	0	1037	0.11
FFRFLARE	10/10/2023 13:30	59.6	20.7	0.6	19.1	16.83	3	2	1035	-0.09
FFRFLARE	16/10/2023 07:55	65.5	22	0.2	12.3	11.54	2	9	1042	-0.25
FFRFLARE	30/10/2023 12:03	59.3	22.6	0.7	17.4	14.75	1	3	1001	-1.02
FFRFLARE	06/11/2023 14:35	57	21.8	0.8	20.4	17.38	1	2	1020	-1.21
FFRFLARE	15/11/2023 07:45	55.3	21.7	0.9	22.1	18.7	1	6	1036	-1.37
FFRFLARE	23/11/2023 07:37	61.3	22.3	0.5	15.9	14.01	1	5	1038	-0.68
FFRIWEIG	23/11/2023 13:05	0.2	0.1	21.1	78.6	0	0	0	1047	0.21
FFRIBH14	23/11/2023 13:09	0.1	0.5	20.8	78.6	0	0	0	1046	0.44
FFRIBH13	23/11/2023 13:12	0.1	0.5	20.7	78.7	0.45	0	0	1047	0.23
FRSKBN08	23/11/2023 13:17	0.1	0.1	21.2	78.6	0	0	0	1045	0.23
FRSKBN09	23/11/2023 13:19	0.1	0.1	21.4	78.4	0	0	0	1047	0.19
FRSKBN10	23/11/2023 13:21	0.1	0.1	21.4	78.4	0	0	0	1046	0.28
FRSKBN11	23/11/2023 13:23	0.1	0.1	21.5	78.3	0	0	0	1047	0.19
FFRIBH34	23/11/2023 13:28	0	2.9	18.6	78.5	8.19	0	0	1046	-2.28
FFRIBH35	23/11/2023 13:31	0	2.3	19	78.7	6.88	0	0	1045	0.23
FFRIBH36	23/11/2023 13:35	0	2	20	78	2.4	0	0	1045	0.16

FFRID3#2	23/11/2023 13:37	35	23.7	0.3	41	39.87	1	28	1045	0.11
FFRILCP3	23/11/2023 13:39	4.7	4.2	15.9	75.2	15.1	0	0	1045	0.19
FFRLM1#2	23/11/2023 13:43	4.2	17.4	0.5	77.9	76.01	3	0	1046	0.4
FFRILCP1	23/11/2023 13:45	1	5.3	13.7	80	28.21	0	0	1045	0.26
FFRLM1#1	23/11/2023 13:48	42.1	19.8	0.2	37.9	37.14	1	10	1045	0.56
FFRID2#2	23/11/2023 13:50	45.3	22.2	0.2	32.3	31.54	1	9	1046	0.54
FFRID3#1	23/11/2023 13:54	53.4	32.9	0.2	13.5	12.74	1	6	1046	0.58
FFRID4#1	23/11/2023 13:57	66.9	35.1	0.2	0	0	3	0	1037	0.53
FFRID4#2	23/11/2023 14:00	58	33.4	0.2	8.4	7.64	3	0	1044	0.6
FFRID2#1	23/11/2023 14:03	47.6	28.2	0.2	24	23.24	3	20	1046	0.97
FFRBHG01	23/11/2023 14:07	0	0.8	20.5	78.7	1.21	1	0	1048	0.12
FFRBHG02	23/11/2023 14:10	0	0.4	21.4	78.2	0	1	0	1047	-0.26
FFRBHG03	23/11/2023 14:12	0	2.9	19.3	77.8	4.85	0	0	1046	0.04
FFRBHG04	23/11/2023 14:16	0	0.2	21.6	78.2	0	0	0	1045	0.14
FFRFLARE	30/11/2023 10:30	58.7	22.3	1.2	17.8	13.26	1	6	1026	-0.76
FFRFLARE	06/12/2023 07:59	63.5	22.8	0.9	12.8	9.4	0	5	1036	-0.39
FFRIWEIG	13/12/2023 09:08	0.2	0.1	21.4	78.3	0	0	0	1029	0.3
FFRIBH14	13/12/2023 09:13	0.2	0.4	21.3	78.1	0	0	0	1030	0.35
FFRIBH13	13/12/2023 09:16	0.1	0.4	21.3	78.2	0	0	0	1029	0.19
FRSKBN08	13/12/2023 09:20	0.1	0.1	21.6	78.2	0	0	0	1028	0.18
FRSKBN09	13/12/2023 09:22	0.1	0.1	21.7	78.1	0	0	0	1029	0.18
FRSKBN10	13/12/2023 09:25	0.1	0.1	21.8	78	0	0	0	1027	0.25
FRSKBN11	13/12/2023 09:27	0.1	0.1	21.8	78	0	0	0	1028	0.26
FFRIBH34	13/12/2023 09:34	0.1	3.5	18.8	77.6	6.54	0	0	1028	1.3
FFRIBH35	13/12/2023 09:41	0.1	1.6	20.9	77.4	0	0	0	1028	-1.07
FFRID3#2	13/12/2023 09:44	28.5	18.5	5	48	29.1	0	2	1028	-2.79
FFRILCP3	13/12/2023 09:47	2.6	3.1	18.2	76.1	7.3	0	0	1030	-1.48
FFRLM1#2	13/12/2023 09:55	4.8	14.7	1.9	78.6	71.42	2	40	1026	-0.95
FFRILCP1	13/12/2023 09:57	0.7	4.6	14.9	79.8	23.48	0	0	1029	-1
FFRLM1#1	13/12/2023 09:59	35.4	19	0.3	45.3	44.17	1	6	1028	-0.83
FFRID2#2	13/12/2023 10:02	44.3	22.3	0.2	33.2	32.44	1	13	1029	-1.95
FFRID4#1	13/12/2023 11:07	68.5	34.9	0.2	0	0	2	9	1029	-1.7
FFRID3#1	13/12/2023 11:10	44.6	29.4	0.2	25.8	25.04	1	6	1030	-1.7
FFRID4#2	13/12/2023 11:14	14.3	22.6	1	62.1	58.32	3	0	1032	-1.53
FFRID2#1	13/12/2023 11:17	48.4	27.5	0.2	23.9	23.14	2	18	1031	-2.72
FFRBHG01	13/12/2023 11:21	0.2	2.3	18.8	78.7	7.64	0	0	1031	3.97
FFRBHG02	13/12/2023 11:25	0.1	1.4	19.3	79.2	6.25	0	0	1028	-0.37
FFRBHG03	13/12/2023 11:30	0.1	0.5	21.6	77.8	0	0	0	1027	-1.81
FFRBHG04	13/12/2023 11:34	0.1	0.4	21.6	77.9	0	0	0	1029	-3.37
FFRFLARE	13/12/2023 11:41	50.5	20.8	1.5	27.2	21.53	2	8	1030	-3.02
FFRFLARE	19/12/2023 11:40	57.5	21	0.8	20.7	17.68	1	1	1042	-0.54
FFRIWEIG	04/01/2024 12:00	0.2	0.1	20.9	78.8	0	0	1	1020	0.14
FFRIBH14	04/01/2024 12:03	0.1	0.3	20.7	78.9	0.65	0	1	1021	0.42
FFRIBH13	04/01/2024 12:05	0.1	0.4	20.8	78.7	0.08	0	0	1020	0.18
FRSKBN08	04/01/2024 12:08	0.1	0.1	21.2	78.6	0	0	0	1019	0.18
FRSKBN09	04/01/2024 12:10	0.1	0.1	21.1	78.7	0	0	0	1021	0
FRSKBN10	04/01/2024 12:13	0.1	0.1	21.3	78.5	0	0	0	1020	0.11
FRSKBN11	04/01/2024 12:15	0.1	0.1	21.4	78.4	0	0	0	1019	0.16
FFRIBH34	04/01/2024 15:01	0.4	2.2	18.4	79	9.45	0	1	1020	0.19
FFRIBH35	04/01/2024 15:03	0.3	0.7	18.6	80.4	10.09	0	1	1020	-0.19
FFRIBH36	04/01/2024 15:07	0.3	1.9	19.1	78.7	6.5	0	1	1020	0.23
FFRID3#2	04/01/2024 15:09	36.7	22.4	0.3	40.6	39.47	0	2	1021	-0.3
FFRILCP3	04/01/2024 15:11	2.5	3.1	17.3	77.1	11.71	0	1	1021	0.25
FFRILCP1	05/01/2024 13:47	0.7	5	13.6	80.7	29.29	0	0	1027	0.05
FFRLM1#1	05/01/2024 13:49	35.5	19.1	0.3	45.1	43.97	0	5	1028	-0.33
FFRID2#2	05/01/2024 13:51	44.8	22.3	0.2	32.7	31.94	1	9	1026	-1.25
FFRID3#1	05/01/2024 13:55	47.7	30.5	0.2	21.6	20.84	0	2	1026	-0.47
FFRID4#1	05/01/2024 13:58	67.2	34.4	0.6	0	0	2	3	1028	-0.23
FFRID4#2	05/01/2024 14:01	27.8	26.2	0.4	45.6	44.09	2	0	1025	-0.11
FFRID2#1	05/01/2024 14:03	44.7	27	0.2	28.1	27.34	2	12	1028	-0.16
FFRFLARE	05/01/2024 14:20	54.9	21.3	0.9	22.9	19.5	2	5	1026	-1.07
FFRLM1#2	05/01/2024 14:27	4.9	7.2	12.1	75.8	30.06	1	2	1026	-0.21
FFRFLARE	08/01/2024 09:05	53.6	20.5	0.9	25	21.6	2	4	1058	-0.88

Appendix I

LANDFILL GAS PRODUCTION CURVE





- Percentiles
- 95% Less Than
 - 90% Less Than
 - 75% Less Than
 - 50% Less Than
 - 25% Less Than
 - 10% Less Than
 - 5% Less Than

— 5% Less Than — 10% Less Than — 25% Less Than — 50% Less Than — 75% Less Than — 90% Less Than — 95% Less Than



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