Hendy Quarry Landfill

Annual Report

Permit Reference BT1088ID

01 January to 31 December 2022

CONTENTS

APPENDICES

1.0 Introduction

1.1 Background

This report has been compiled in compliance with condition 4.2.1 of the Environmental Permit EPR/BT1088ID for Hendy Quarry Landfill.

The Permit was originally issued to Tarmac on 17 September 2002. The EP was varied by Tarmac in December 2005 in order to remove a daily limit for the importation of waste. A further variation reference XP3933MR was issued on 22 June 2007 by the Environment Agency to introduce the standard Permit template and conditions for landfills, combine the separate discharge consent into the single permit, introduce trigger levels for groundwater and increase the monitoring frequency.

As a result of changes to the conditions of the new EP, Tarmac submitted an application to vary the Permit further to revise the groundwater trigger levels, and also to increase the annual permitted tonnage from 200,000t to 450,000t. Before the trigger levels could be amended, Tarmac installed a further 8 perimeter monitoring boreholes at the request of the Environment Agency. The monitoring frequency of groundwater at the site was increased to obtain enough data for a detailed review of the hydrogeology to be undertaken. The independent hydrogeological assessment identified contaminants in the groundwater which were arising from an up-stream source. As a result of this contamination in the locality, the site could not comply with groundwater trigger levels, even in up-stream boreholes. This was accepted by the Environment Agency following extensive investigation and sampling and a varied EP establishing revised site trigger levels was issued on 09 October 2009, reference PP3738XM. The varied Permit contained a number of Improvement Conditions which have been discharged.

A further variation was accepted in May 2019, to increase the surface water discharge limits, and change the waste types to be accepted.

Section 4.2.1 of the Permit, requires that a report on the performance of the activities over the previous year shall be submitted to the Environment Agency (now Natural Resources Wales) by 31 January.

The report shall include as a minimum:

a) A review of the monitoring and assessment carried out in accordance with the Permit against the relevant assumptions, parameters and results in the risk assessments submitted with the Application;
b) Where the operator's management system encompasses annual improvement targets, a summary report of the previous year's progress against such targets;
c) The energy consumed at the Site, reported in the format set out in Schedule 5 Table S5.3;
d) The water consumed at the Site, reported in the format set out in Schedule 5 Table S5.3;
e) The annual production/treatment set out in Schedule 5 Table S5.2;
f) Details of any contamination or decontamination of the site which has occurred;
g) The topographical surveys required by condition 3.6.3 other than those submitted as part of a CQA validation report;

h) The volumetric difference (reported in cubic metres) between the most recent topographical survey and the previous annual topographical survey i.e. the additional volume of the landfill void that is occupied by waste;
i) An assessment of the settlement behaviour of the landfill body based on the difference between the most recent topographical survey and previous annual topographical survey for the areas of the landfill which did not receive waste between the surveys;
j) A calculation of the remaining capacity (reported in cubic metres) derived from the pre-settlement contours and the most recent topographical survey;
k) The compliance testing undertaken in the period.

The review period consists of 12 months of monitoring, from 1 January to 31 December 2022.

1.2 Site Location and Surrounding Land-use

Hendy Quarry Landfill is located at Grid Reference ST 05423 81045.

The site is located to the east of Miskin in Rhondda Cynon Taf, Wales. To the east of the site is the A4119 road. To the south of the site is Glyn Park, which comprises of the Miskin Wood and Mill Wood. The B4264 (School Road) is situated to the north of the site.

2.0 Landfill Gas

2.1 Introduction

The Permit requires monitoring for landfill gas at "All Landfill Gas Monitoring points", the specific monitoring requirements are outlined in the approved Gas Management Plan[1] GMP (as required in CAR_NRW0038704).

Following the submission of the 2008 Gas Management Plan it was proposed to progressively install 18 in-waste gas monitoring points at a frequency of 2 per hectare. In 2008 eleven monitoring points were drilled within the existing waste mass at the site. As the monitoring points were installed within areas of the site that were still operational over time a number of these boreholes have been lost due to vehicle movements and waste placement activities and only five now remain (BH02, 05, 07, 08 and 09). Following discussions with NRW, Tarmac proposed to install replacement in-waste gas monitoring points and future in-waste gas monitoring points once area of the site were restored. In addition, it was agreed to undertake FID walkover surveys and update the GMP to reflect the changes; this was completed in 2019.

The approved GMP sets out the monitoring requirements as follows:

[1] Plan Reference: HNDY/GMP April 2019 Version 2.0

Table 1: LFG monitoring schedule

Location	Frequency	Determinands
External Boreholes		
B, H, PZ01/08, PZ02/08, PZ03/08, PZ05/08, PZ06/08, PZ07/08 and PZ08/08	Quarterly	Methane (%v/v), carbon dioxide (%v/v), oxygen (%v/v), Atmospheric pressure (Mb), Other meteorological data.
Internal Boreholes		
BH2, 5, 7, 8 and 9. In-waste boreholes installed following completion to restoration levels.	Quarterly	Methane (%v/v), carbon dioxide (%v/v), oxygen (%v/v), Atmospheric pressure (Mb), relative pressure, Other meteorological data.
Walk over gas survey (FID or Leak Dectector)	Six Monthly	Flammable gas (ppm)

Gas monitoring borehole locations are shown on the Monitoring Plan in Appendix A. Landfill gas data is presented in Appendix B.

BHB has been lost, BH07 is unsafe to access for the whole period, and BH02 was destroyed prior to the October monitoring round.

Compliance limits are set for perimeter wells as per Table S4.3 of the Permit; these are reproduced in Table 2.

Table 2: EP Limits for Landfill Gas in external wells

LFG parameter	EP Limit
Methane (CH_4)	1.0 % v/v
Carbon dioxide (CO_2)	1.5 % v/v

2.2 Landfill Gas Data

The following general points can be made with regard to the gas data from the gas wells over the review period:

In Waste Boreholes

Zero to negligible (0.1%) methane concentrations were detected in the in-waste monitoring boreholes during the review period.

Carbon dioxide concentrations ranged from 0% to a maximum of 2.4% v/v in the in-waste boreholes.

Perimeter Boreholes

Zero to negligible (0.1%) was recorded in any of the perimeter monitoring locations during the review period. As such the compliance limit was not exceeded.

Carbon dioxide concentrations ranged from 0.1% to a maximum of 3.2%. The 1.5% compliance limit was breached on two occasions during the period.

FID Walkover survey

FID walkovers were conducted and submitted in quarters 2 and 4 and found flammable gas concentrations at 0ppm in all locations.

Groundwater

Four boreholes are specified in Table S4.4 of the Permit as requiring sampling on a quarterly basis these are PZ2/08 and PZ3/08 which are considered to be up gradient locations and PZ07/08 and PZ08/08 which are considered down gradient (see graph below) and as such have quality compliance limits as presented in Table S4.2 of the Permit. These limits have been reviewed in the 2018 HRA review[2] and the compliance limit for Nickel reduced; limits are presented in Table 3, and groundwater quality during the study period is reviewed on this basis. During May 2021, 2 new boreholes were drilled to replace down gradient locations PZ07/08 & PZ08/08, these have been labelled PZ07/08R & PZ08/08R

Table 3: Groundwater Compliance Limits (PZ07/08 & PZ08/08)

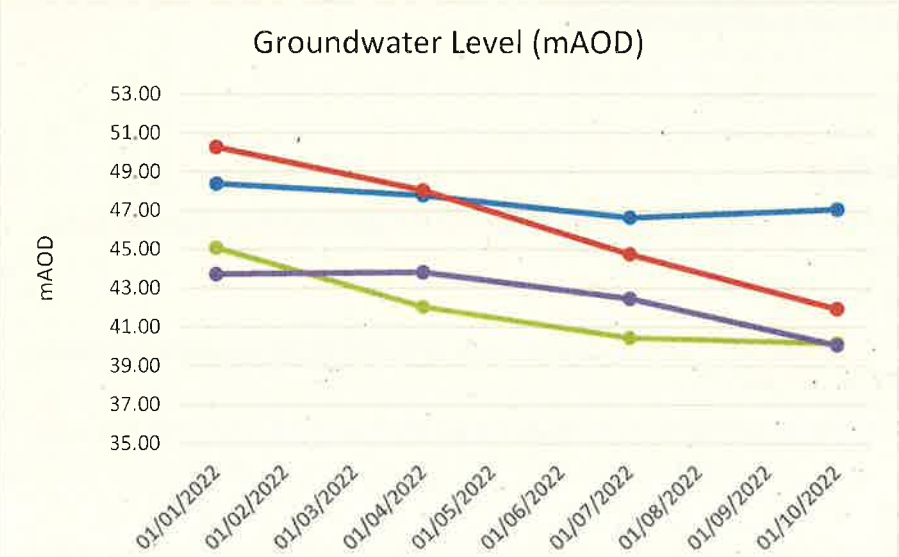
Parameter	Permit Limits	HRA Review Limits
Chloride (mg/l)	150	150
Ammoniacal Nitrogen (mg/l)	0.5	0.5
Cadmium (mg/l)	0.001	0.001
Nickel (mg/l)	0.2	0.034
Sulphate (mg/l)	200	200
Napthalene (mg/l) (ug/l)	0.01	0.01

The locations of the boreholes are shown on the Monitoring Plan in Appendix A.

Tables of groundwater quality and time series graphs are presented in Appendix C.

2.3 Groundwater Level

Groundwater levels showed a downward trend throughout the period, the graph below validates the groundwater flow direction and the choice of compliance boreholes.



	26/01/2022	27/04/2022	18/07/2022	18/10/2022
PZ02/08	48.40	47.79	46.65	47.09
PZ03/08	50.29	48.06	44.76	41.96
PZ07/08R	45.09	42.05	40.46	40.20
PZ08/08R	43.73	43.83	42.47	40.09

[2] 3145-CAU-XX-XX-RP-O-0301: HENDY LANDFILL SITE HYDROGEOLOGICAL RISK ASSESSMENT REVIEW 2017. CAULMERT LTD 12 JANUARY 2018.

2.4 Groundwater Quality

Groundwater quality data was collected on a monthly frequency (in excess of the permit minimum) in order to gather a suitable dataset for the re-drilled wells.

The data shows the following:

- Ammoniacal nitrogen concentrations ranged from below the laboratory LOD to a maximum of 0.11mg/l, and so were below the compliance limit throughout the study period.
- Chloride concentrations were low ranging from 14mg/l at PZ02/08 to a maximum of 79mg/l also at PZ03/08 and so were below the compliance limit throughout the study period.
- Sulphate concentrations ranged from 4mg/l to 105mg/l with the maximum at PZ08/08R in July 2022. The compliance limit was not breached in the study period.
- Cadmium concentrations ranged from <0.00002mg/l 0.0065mg/l. The compliance limit was not breached in the study period.
- Nickel concentrations ranged from below detection limits to a maximum of 0.003mg/l, and so below the compliance limit.
- Naphthalene concentrations were ≤0.01mg/l at all locations on all occasions with the exception of PZ08/08R in October 2022, when a concentration of 0.41mg/l was detected. It is considered likely that this is an outlier, with the concentrations reducing back down to <0.01 in November.
- Concentrations of total petroleum hydrocarbons (TPH in the range C10 to C40) were recorded, ranging between <0.01 and 0.44mg/l; the maximum concentration was detected at PZ08/08R in October 2022.

* Typos Should read 0.41 mg/l

3.0 Surface Water

The permit requires the collection of samples quarterly from the discharge to determine the quality of point source emissions to soak-away from the site.

The discharge is to be analysed for: pH, suspended solids, and mineral oil. In addition, there are limits on discharge volumes and rates. Surface water limits are set out in Table 4 below.

Table 4: Point Source emissions to water; emission limits and monitoring requirements

Monitoring point	Parameter	Limit	Monitoring frequency
Discharge to soakaway at NGR ST 0538 8136	Volume	5,000 m^3/day	Daily
	Rate of discharge	58 l/s	Weekly
	Suspended solids	100mg/l	Quarterly
	Mineral Oil	5 mg/l	Quarterly
	pH	6-9	Quarterly

There was no discharge during the monitoring visits in Q2, Q3 or Q4 and as such a sample was only taken in Q1, with the following results.

* Email confirmation received from Tarmac on 23/2/23 Eform NRW

Table 5: Discharge Quality

Sample Point	Date	pH	SS (mg/l)	TPH (mg/l)	Data Comments (Unit not Set)
Discharge	26/01/2022	8	<5	<0.01	Sample is clear/colourless
Discharge	23/02/2022	7.5	<5	0.09	Sample is colourless and odourless
Discharge	27/04/2022				No flow/discharge
Discharge	18/07/2022				No flow/discharge
Discharge	18/10/2022				No flow/discharge through sample point

These parameters were therefore within consented limits.

The site meter is not able to monitor discharge rate. The site is currently unmanned, and as such obtaining daily meter readings is not possible. Monthly readings are taken, and averages presented in Table 6 below.

Table 6: Discharge volumes (m^3)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Meter Reading	1205185	1224714	1251242	1252831	1252831	1252831	1252831	1252831	1252831	No Reading	1279441	No Reading
Monthly Volume	20,084	29,529	16,528	1,589	0	0	0	0	0	No Reading	26,610	No Reading
Daily Average	648	1,055	533	53	0	0	0	0	0	No Reading	858	No Reading

There was no pumping from May to September, no meter readings were taken in October or December. The maximum monthly volume was in February, assuming that the pump was running full time in this month, the daily average was 1,055m^3, meaning that the compliance limit of 5,000m^3/day was not exceeded.

4.0 Annual Performance Data

Annual production/treatment at Hendy Quarry Landfill during the period 01 January to December 2022 is reported in accordance with the Permit for the site. Information required by Table S5.2 and 5.3 of the Permit is presented as Table 7 below.

Table 7: Annual Production/Treatment and performance parameters

Surface water and/or groundwater	**Cubic metres/year**
Disposed of off site:	94,340
Disposed of to any onsite effluent treatment plant:	0
Parameter	**Annual total**
Total Energy Consumption:	No data available

5.0 Management improvements

The following management improvements are required in 2023:

1. Install a suitable meter to allow the monitoring and recording discharge flow rate and monitor on a weekly basis.
2. Report daily discharge readings.
3. Maintain access to all permit monitoring points.

6.0 Annual Topographical Surveys and Waste Volumes.

6.1 Annual Topographical Survey

The annual topographical survey was completed on 04 January 2023 and is presented in Appendix A, drawing reference H074 HENDY 2023-01-04 QU SETTLEMENT_A3L.

6.2 Annual Waste Volume

No waste was accepted in between surveys.

6.3 Settlement Behaviour

Drawing H074 HENDY 2023-01-04 QU SETTLEMENT_A3L shows settlement between August 2021 and January 2023, it appears that settlement is negligible.

6.4 Remaining Void Capacity

The calculated remaining void from the survey undertaken in August 2021 is 1,300,054m³.

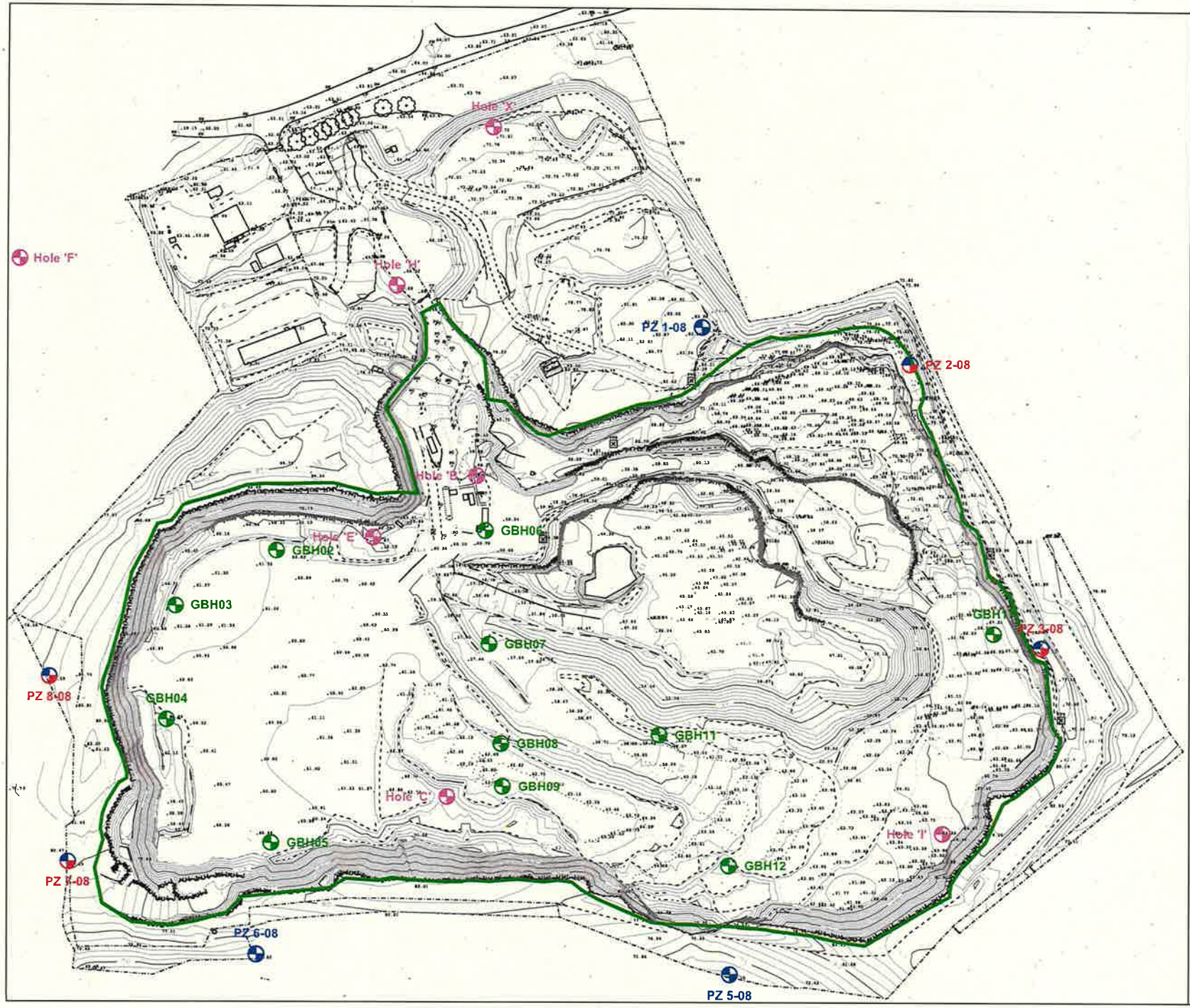
7.0 Compliance Testing

Compliance testing has not been undertaken in the reporting period as no waste was accepted.

Appendix A

Monitoring Plan (CE/HNDY/08)

H074 HENDY 2023-01-04 QU SETTLEMENT_A3L



Legend:

- Environmental Permit area
- Groundwater monitoring boreholes to be included within the Permit
- Internal landfill gas monitoring boreholes
- Landfill gas monitoring boreholes external to the body of waste
- Existing/former boreholes at the site

Final revision	Date	Description
-	-	-
-	-	-

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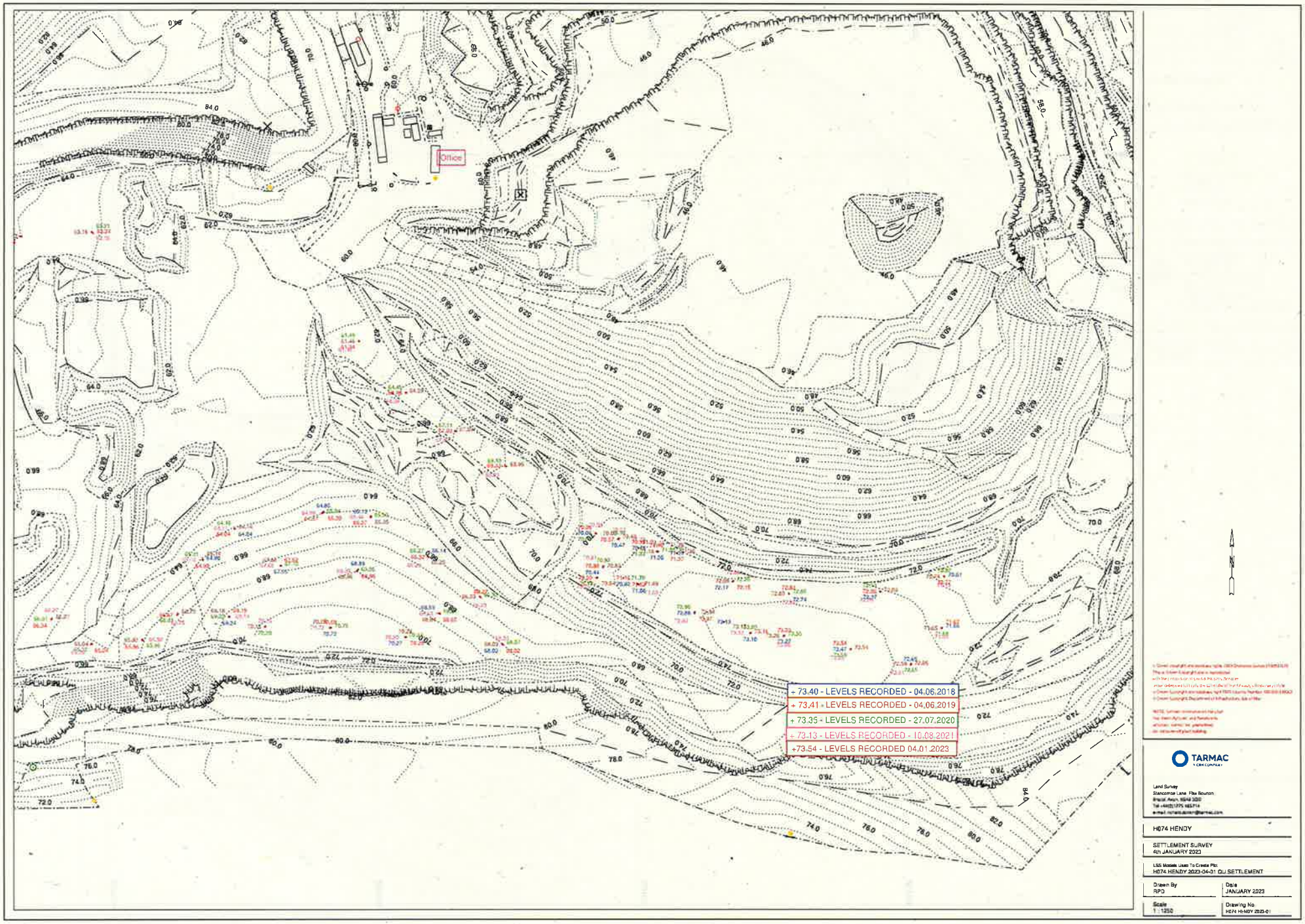
Site: **HENDY QUARRY LANDFILL**

Drawing Title: **MONITORING PLAN**

Drawn By:	Date	Scale:	Page Size:
PSW	4th June '09	1:2,000	A3
Status:	Final Revision:	Drawing No:	
FINAL	-	CE/HNDY/08	



TARMAC
A CRH COMPANY

Land Survey
Stancombe Lane Pilning Bristol

H074 HENDY

SETTLEMENT SURVEY
4th JANUARY 2023

LSS Models Used To Create Plot:
H074 HENDY 2023-04-01 QU SETTLEMENT

Drawn By	Date
RPD	JANUARY 2023
Scale	Drawing No.
1 : 1250	H074 HENDY 2023-01

Appendix B

Landfill Gas Data

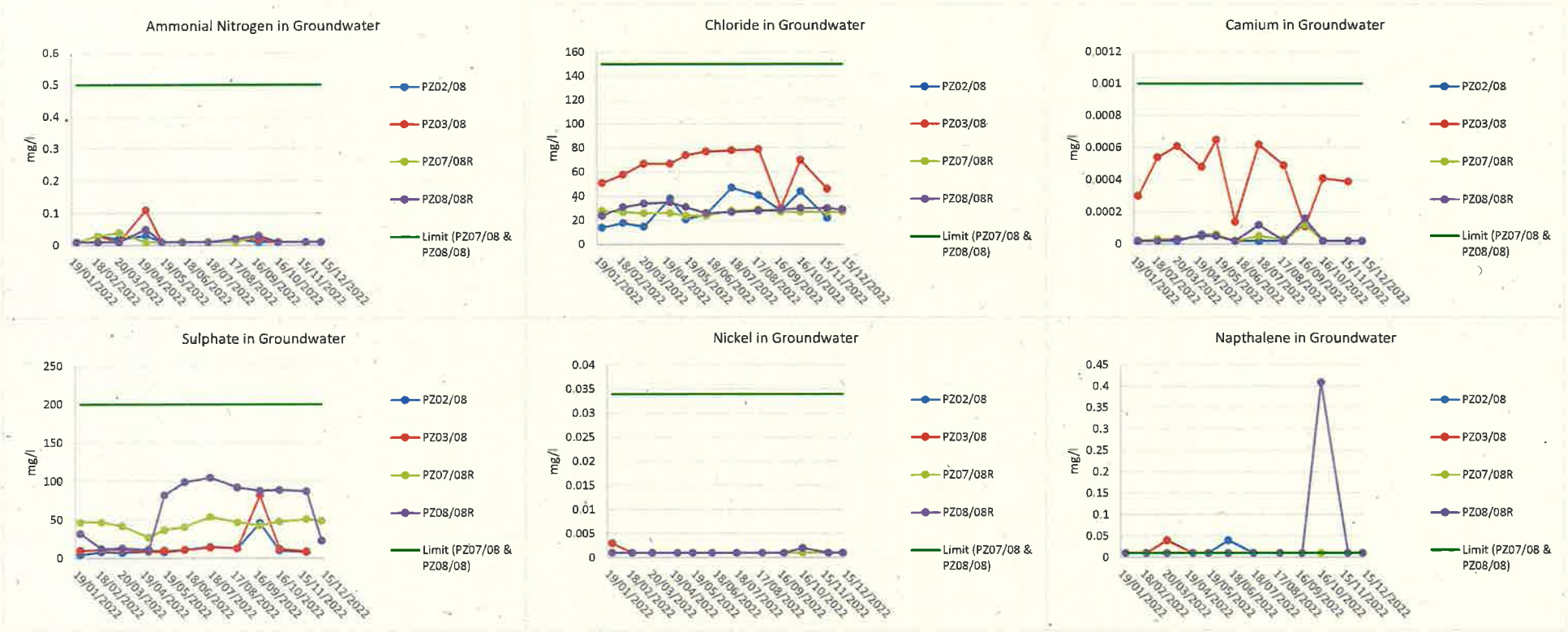
Sample Point	Date	Methane (%Vol)	Carbon Dioxide (%Vol)	Oxygen (%Vol)	Atm pressure (mb)	Relative Pressure (mb)	Flow (lts/hr)	Data Comments
HEN_BH02	23/02/2022	0	0.1	21.1	1014	1.78		
HEN_BH02	27/04/2022	0.1	0.9	18.4	1021	2.49		
HEN_BH02	18/07/2022	0	0	20.9	1015	-0.14	0	
HEN_BH02	18/10/2022							Destroyed
HEN_BH05	23/02/2022	0	2.4	20.7	1014	1.49		
HEN_BH05	27/04/2022	0	0.6	20.8	1021	-0.24		
HEN_BH05	18/07/2022	0	0.1	20.9	1013	-0.02	0	
HEN_BH05	18/10/2022	0	0.4	19.8	1021	-0.98	0.1	
HEN_BH07	23/02/2022							Inaccessible, no safe access
HEN_BH07	27/04/2022							Inaccessible, no safe access
HEN_BH07	18/07/2022							Inaccessible, no safe access
HEN_BH07	18/10/2022							Inaccessible, no safe access
HEN_BH08	23/02/2022	0	0.1	21.2	1013	1.88		
HEN_BH08	27/04/2022	0	0.1	20.8	1021	-2.17		
HEN_BH08	18/07/2022	0	0	20.9	1013	0.16	-0.1	
HEN_BH08	18/10/2022	0	0.1	20.9	1021	0	0.4	
HEN_BH09	23/02/2022	0	0.1	21.2	1013	1.3		
HEN_BH09	27/04/2022	0.1	0.6	20.8	1021	1.21		
HEN_BH09	18/07/2022	0	0	20.9	1014	-0.03	0	
HEN_BH09	18/10/2022	0	0.1	20.8	1021	-0.17	0.1	
HEN_BH0B	23/02/2022							Borehole lost
HEN_BH0B	27/04/2022							Borehole lost
HEN_BH0B	18/07/2022							Borehole lost
HEN_BH0B	18/10/2022							Borehole lost
HEN_BH0H	23/02/2022	0	0.1	17.4	999	-24.74		
HEN_BH0H	27/04/2022	0.1	0.9	15.5	1021	-0.01		
HEN_BH0H	18/07/2022	0	0	21.3	1011	-0.03	0.4	
HEN_BH0H	18/10/2022	0	0.1	20.7	1021	0	0.2	
HEN_PZ01/08	23/02/2022	0	0.2	21	1012	1.76		
HEN_PZ01/08	27/04/2022	0.1	0.6	20.7	1021	0.11		
HEN_PZ01/08	18/07/2022	0	0	20.9		0.07	0.4	
HEN_PZ01/08	18/10/2022	0	0.1	21	1019	-0.12	-0.3	
HEN_PZ02/08	23/02/2022	0	0.1	21.1	1011	1.8		
HEN_PZ02/08	27/04/2022	0	0.7	20.8	1021	0.23		
HEN_PZ02/08	18/07/2022	0	0.2	21.1	1012	0.57	0.4	
HEN_PZ02/08	18/10/2022	0	0.1	20.9	1020	0.02	-0.3	
HEN_PZ03/08	23/02/2022	0	0.1	21.1	1010	2.04		
HEN_PZ03/08	27/04/2022	0	3.2	19.7	1021	0.02		
HEN_PZ03/08	18/07/2022	0	0	21.3	1012	-0.07	0.3	
HEN_PZ03/08	18/10/2022	0	0.2	21	1019	-0.16	-0.3	
HEN_PZ05/08	23/02/2022	0	0.4	20.6	1011	1.74		
HEN_PZ05/08	27/04/2022	0.1	0.4	20.1	1020	2.12		
HEN_PZ05/08	18/07/2022	0	0	21.3	1014	0.07	0.3	
HEN_PZ05/08	18/10/2022	0	0.8	20.6	1019		-0.2	
HEN_PZ06/08	23/02/2022	0	0.6	21	1012	-3.11		
HEN_PZ06/08	27/04/2022	0	0.5	20.6	1020	0.02		
HEN_PZ06/08	18/07/2022	0	0.8	20.5	1012	0.03	0.4	
HEN_PZ06/08	18/10/2022	0	0.8	20.9	1021	-0.03	-0.3	
HEN_PZ07/08R	23/02/2022	0	0	18.3	1010	1.23		
HEN_PZ07/08R	27/04/2022	0	1.3	16	1020	3.41		
HEN_PZ07/08R	18/07/2022	0	0	21.3	1012	0.02	0.4	
HEN_PZ07/08R	18/10/2022	0	2.6	16.8	1019	-0.07	-0.3	
HEN_PZ08/08R	23/02/2022	0	0	5.5	1012	1.62		

Sample Point	Date	Methane (%Vol)	Carbon Dioxide (%Vol)	Oxygen (%Vol)	Atm pressure (mb)	Relative Pressure (mb)	Flow (lts/hr)	Data Comments
HEN_PZ08/08R	27/04/2022	0	0.3	20.8	1020	-0.91		
HEN_PZ08/08R	18/07/2022	0	0	21.3	1012	-0.03	0.4	
HEN_PZ08/08R	18/10/2022	0	0.1	21.1	1020	0.07	-0.2	
	Max	0.1	3.2	21.3	1021	3.41	0.4	
	Min	0	0	5.5	999	-24.74	-0.3	

Appendix C

Groundwater Data

Sample Point	Date	Ammoniacal Nitrogen (mg/l)	Chloride (mg/l)	Cadmium (mg/l)	Nickel (mg/l)	Sulphate (mg/l)	Naphthalene (UG/L)	Alkalinity (mg/l)	Calcium (mg/l)	Chromium (mg/l)	Copper (mg/l)	DO (mg O2/l)	Iron (mg/l)	Potassium (mg/l)	Magnesium (mg/l)	Manganese (mg/l)	Sodium (mg/l)	Lead (mg/l)	TOC (mg/l)	TON (mg/l)	Zinc (mg/l)	EC (us/cm)	pH	Total PAH's (UG/L)	Total TPH (mg/l)
PZ02/08	26/01/2022	<0.01	14	<0.00002	<0.001	4	<0.01	180	74	<0.001	<0.001	10.2	<0.01	<1	8	<0.002	9	<0.001	0.38	<0.2	0.003	358	8	<0.16	0.01
PZ02/08	23/02/2022	0.03	18	<0.00002	<0.001	8	<0.01	146	62	<0.001	<0.001	10.4	<0.01	<1	6	0.005	9	<0.001	0.3	0.4	<0.002	844	7.9	<0.16	0.09
PZ02/08	23/03/2022	0.02	15	<0.00002	<0.001	7	<0.04	144	61	<0.001	<0.001	11	<0.01	<1	9	0.004	8	<0.001	0.41	<0.2	0.005	347	7.9	<0.64	0.08
PZ02/08	27/04/2022	0.03	38	0.00006	<0.001	9	<0.01	164	56	<0.001	<0.001	10.2	<0.01	<1	9	0.002	19	<0.001	<0.20	<0.2	0.012	460	7.8	<0.16	0.01
PZ02/08	18/05/2022	<0.01	21	0.00006	<0.001	8	<0.01	157	59	<0.001	<0.001	10.9	0.02	<1	9	<0.002	12	<0.001	<0.20	<0.2	<0.002	345	7.7	<0.16	<0.01
PZ02/08	14/06/2022	<0.01	25	<0.00002	<0.001	11	<0.04	178	57	<0.001	<0.001	10.2	<0.01	<1	9	0.012	13	<0.001	0.31	0.4	0.006	393	7.7	<0.64	0.05
PZ02/08	18/07/2022	0.01	47	<0.00002	<0.001	15	<0.01	173	76	<0.001	<0.001	9.6	<0.01	<1	13	<0.002	29	<0.001	3.46	0.5	0.004	504	7.7	<0.16	0.01
PZ02/08	23/08/2022	0.02	41	<0.00002	<0.001	13	<0.01	153	66	0.002	<0.001	10.8	0.01	<1	12	<0.002	22	<0.001	1.5	0.8	0.002	459	7.7	0.18	<0.01
PZ02/08	22/09/2022	<0.01	28	0.00013	<0.001	46	<0.01	320	110	<0.001	<0.001	10.5	<0.01	4	34	0.004	17	<0.001	1.88	0.4	0.008	718	7.3	<0.16	0.02
PZ02/08	18/10/2022	<0.01	44	<0.00002	<0.001	10	<0.01	216	77	<0.001	<0.001	11	<0.01	1	12	0.016	29	<0.001	3.04	0.3	<0.002	495	7.7	<0.16	0.01
PZ02/08	23/11/2022	<0.01	22	<0.00002	<0.001	8	<0.01	185	70	<0.001	<0.001	11.3	<0.01	<1	9	<0.002	13	<0.001	1.99	0.3	0.009	425	7.3	0.16	0.01
PZ03/08	26/01/2022	<0.01	51	0.0003	0.003	10	<0.01	322	101	<0.001	0.002	10	<0.01	2	32	<0.002	31	0.005	0.55	0.8	0.102	689	7.9	<0.16	<0.01
PZ03/08	23/02/2022	0.03	58	0.00054	<0.001	11	<0.01	320	88	<0.001	<0.001	9.5	<0.01	2	29	<0.002	31	0.004	0.52	0.8	0.029	648	7.3	<0.16	0.08
PZ03/08	23/03/2022	<0.01	67	0.00061	<0.001	11	<0.04	326	107	<0.001	0.001	10.4	<0.01	2	32	0.003	37	0.006	0.57	0.8	0.119	817	7.5	<0.64	0.15
PZ03/08	27/04/2022	0.11	67	0.00048	<0.001	10	<0.01	339	90	<0.001	0.001	10.7	<0.01	2	28	<0.002	34	0.005	0.49	0.7	0.111	824	7.6	<0.16	0.03
PZ03/08	18/05/2022	<0.01	74	0.00065	<0.001	10	<0.01	354	101	<0.001	0.002	10.2	0.01	2	30	<0.002	42	0.006	0.28	0.7	0.119	753	7.4	<0.16	0.01
PZ03/08	14/06/2022	<0.01	77	0.00014	<0.001	11	<0.01	335	96	<0.001	<0.001	9.3	<0.01	2	30	<0.002	45	<0.001	0.8	1.3	0.054	854	7.4	<0.16	0.02
PZ03/08	18/07/2022	0.01	78	0.00062	<0.001	14	<0.01	298	116	<0.001	0.003	9.7	<0.01	3	35	<0.002	49	0.006	2.86	1.2	0.112	863	7.4	<0.16	<0.01
PZ03/08	23/08/2022	0.02	79	0.00049	<0.001	13	<0.01	309	108	0.002	0.002	10.5	<0.01	3	33	<0.002	47	0.004	0.82	1.8	0.118	825	7.5	0.16	0.01
PZ03/08	22/09/2022	0.02	30	0.00011	<0.001	82	<0.01	340	128	<0.001	<0.001	10.2	<0.01	5	40	0.047	23	<0.001	3.81	2.6	0.008	840	7.2	<0.16	0.04
PZ03/08	18/10/2022	<0.01	70	0.00041	<0.001	12	<0.01	345	107	<0.001	0.002	9.9	<0.01	3	33	0.002	45	0.007	2.31	1.2	0.112	770	7.4	<0.16	0.03
PZ03/08	23/11/2022	<0.01	46	0.00039	<0.001	9	<0.01	297	93	<0.001	<0.001	11.1	<0.01	2	28	<0.002	27	0.005	2.32	0.9	0.099	722	7.2	0.16	0.02
PZ07/08R	26/01/2022	<0.01	28	<0.00002	<0.001	47	<0.01	331	113	<0.001	<0.001	10.6	<0.01	4	35	<0.002	18	<0.001	2.4	<0.2	0.008	694	7.7	0.18	0.02
PZ07/08R	23/02/2022	0.03	27	0.00003	<0.001	47	<0.01	342	102	<0.001	<0.001	12	<0.01	4	33	<0.002	17	0.001	1.7	<0.2	<0.002	616	7.2	<0.16	0.08
PZ07/08R	23/03/2022	0.04	26	0.00003	<0.001	42	<0.01	314	104	<0.001	<0.001	9.6	<0.01	4	36	0.205	16	0.005	2.1	<0.2	0.01	721	7.5	0.18	0.1
PZ07/08R	27/04/2022	<0.01	26	0.00005	<0.001	27	<0.01	333	90	<0.001	<0.001	9.4	0.05	3	31	0.003	22	0.003	2.1	<0.2	0.01	724	7.5	0.19	0.02
PZ07/08R	18/05/2022	<0.01	24	0.00006	<0.001	37	<0.01	321	94	<0.001	<0.001	9.7	0.02	4	33	<0.002	15	<0.001	2.2	<0.2	0.003	678	7.3	0.25	0.04
PZ07/08R	14/06/2022	<0.01	24	<0.00002	<0.001	41	<0.01	302	95	<0.001	<0.001	8.8	<0.01	3	33	0.003	15	<0.001	2.2	0.5	0.005	716	7.4	0.16	0.02
PZ07/08R	18/07/2022	<0.01	28	0.00005	<0.001	54	<0.01	297	125	<0.001	<0.001	10.5	<0.01	4	37	0.006	20	<0.001	2.19	0.9	0.025	774	7.3	<0.16	0.01
PZ07/08R	23/08/2022	0.01	29	0.00003	<0.001	47	<0.01	360	117	0.002	<0.001	10.1	<0.01	3	35	<0.002	19	<0.001	1.59	1.4	0.007	747	7.3	<0.16	0.02
PZ07/08R	22/09/2022	0.03	27	0.00012	<0.001	43	<0.01	327	110	<0.001	<0.001	10.6	<0.01	4	34	0.007	17	<0.001	1.81	0.6	0.01	734	7.4	<0.16	0.02
PZ07/08R	18/10/2022	<0.01	27	<0.00002	<0.001	48	<0.01	333	116	<0.001	<0.001	9.9	<0.01	4	36	0.004	18	<0.001	2.67	0.5	0.007	703	7.3	0.22	0.05
PZ07/08R	23/11/2022	<0.01	27	<0.00002	<0.001	51	<0.01	329	114	<0.001	<0.001	8.9	<0.01	4	34	0.002	18	<0.001	2.01	0.7	0.007	794	7.1	0.16	0.01
PZ07/08R	13/12/2022	<0.01	27	<0.00002	<0.001	49	<0.01	318	117	<0.001	<0.001	11.3	<0.01	4	36	<0.002	17	<0.001	2.01	0.9	0.049	767	7.4	0.19	0.02
PZ08/08R	26/01/2022	<0.01	24	<0.00002	<0.001	32	<0.01	330	115	<0.001	<0.001	10.6	<0.01	3	33	<0.002	17	<0.001	1.6	1.1	0.006	649	7.7	0.17	0.04
PZ08/08R	23/02/2022	0.01	31	0.00002	<0.001	12	<0.01	310	106	<0.001	<0.001	12.2	<0.01	2	27	0.002	16	<0.001	0.7	1.5	<0.002	541	7.3	0.22	0.19
PZ08/08R	23/03/2022	<0.01	34	0.00003	<0.001	13	<0.01	296	106	<0.001	<0.001	11.1	<0.01	2	29	0.008	18	<0.001	0.7	0.5	0.007	694	7.4	0.17	0.05
PZ08/08R	27/04/2022	0.05	35	0.00005	<0.001	11	<0.01	316	91	<0.001	<0.001	10.3	<0.01	2	26	<0.002	17	<0.001	0.63	0.7	0.017	707	7.5	0.19	0.05
PZ08/08R	18/05/2022	<0.01	31	0.00005	<0.001	82	<0.01	378	129	<0.001	<0.001	10.4	0.02	4	38	<0.002	23	<0.001	3.1	1.4	0.084	854	7.2	<0.16	0.03
PZ08/08R	14/06/2022	<0.01	26	<0.00002	<0.001	99	<0.01	370	127	<0.001	<0.001	9.7	<0.01	4	38	0.003	22	<0.001	3.4	1.5	0.006	917	7.4	0.17	0.04
PZ08/08R	18/07/2022	<0.01	27	0.00012	<0.001	105	<0.01	358	150	<0.001	0.001	9.6	<0.01	6	46	0.04	25	<0.001	8.9	1.3	0.009	926	7.2	<0.16	0.02
PZ08/08R	23/08/2022	0.02	28	<0.00002	<0.001	92	0.01	310	140	0.003	0.002	10.6	<0.01	6	44	0.004	24	<0.001	3.66	1.9	0.012	886	7.3	0.16	0.02
PZ08/08R	22/09/2022	0.03	29	0.00016	<0.001	88	<0.01	376	133	<0.001	<0.001	11.1	<0.01	5	42	<0.002	23	<0.001	3.98	1.2	0.007	863	7.3	<0.16	0.03
PZ08/08R	18/10/2022	<0.01	30	<0.00002	0.002	89	0.41	384	133	<0.001	<0.001	9.8	<0.01	6	41	0.285	24	<0.001	9.22	1	0.007	804	7.3	6.45	0.44
PZ08/08R	23/11/2022	<0.01	30	<0.00002	<0.001	87	<0.01	376	128	<0.001	<0.001	10.6	<0.01	5	39	0.002	23	<0.001	2.99	1.3	0.009	907	7.2	0.16	0.03
PZ08/08R	13/12/2022	<0.01	29	<0.00002	0.001	23	<0.01	325	118	<0.001	<0.001	10.5	<0.01	3	31	0.051	14	<0.001	3.89	2.1	0.159	727	7.3	0.17	0.07
Max		0.11	79	0.00065	0.003	105	0.41	384	150	0.003	0.003	12.2	0.05	6	46	0.285	49	0.007	9.22	2.6	0.159	926	8	6.45	0.44
Min		0.01	14	<0.00002	<0.001	4	<0.01	144	56	0.002	<0.001	8.8	<0.01	1	6	<0.002	8	<0.001	0.28	<0.2	<0.002	345	7.1	<0.16	<0.01
Limit (PZ07/08 & PZ08/08)		0.5	150	0.001	0.034	200	0.01																		


Ammonial Nitrogen in Groundwater
mg/l
0.6
0.5
0.4
0.3
0.2
0.1
0
19/01/2022
18/02/2022
20/03/2022
19/04/2022
19/05/2022
18/06/2022
18/07/2022
17/08/2022
16/09/2022
16/10/2022
15/11/2022
15/12/2022
PZ02/08
PZ03/08
PZ07/08R
PZ08/08R
Limit (PZ07/08 & PZ08/08)
Chloride in Groundwater
mg/l
160
140
120
100
80
60
40
20
0
PZ02/08
PZ03/08
PZ07/08R
PZ08/08R
Limit (PZ07/08 & PZ08/08)
Camium in Groundwater
mg/l
0.0012
0.001
0.0008
0.0006
0.0004
0.0002
0
PZ02/08
PZ03/08
PZ07/08R
PZ08/08R
Limit (PZ07/08 & PZ08/08)
Sulphate in Groundwater
mg/l
250
200
150
100
50
0
PZ02/08
PZ03/08
PZ07/08R
PZ08/08R
Limit (PZ07/08 & PZ08/08)
Nickel in Groundwater
mg/l
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
PZ02/08
PZ03/08
PZ07/08R
PZ08/08R
Limit (PZ07/08 & PZ08/08)
Napthalene in Groundwater
mg/l
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
PZ02/08
PZ03/08
PZ07/08R
PZ08/08R
Limit (PZ07/08 & PZ08/08)