



Church Village Bypass Ty Garreg Groundwater Monitoring 2016

July 2016

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Client: Rhondda Cynon Taf County Borough Council

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Church Village Bypass

Ty Garreg Groundwater Monitoring 2016

	Name	Signature	Date
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Issue Record

Rev	Date	Description/Comments	Author/Prepared by:	Approved for Issue by:

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1. Introduction

In January 2015 a surrender application (EPR/CP3599FB (2/9017)) was made by Capita on behalf of Rhondda Cynon Taf County Borough Council (RCTCBC) to Natural Resource Wales (NRW) for surrender of the waste license on Ty Garreg Landfill (EAWML/30031), located 6km northwest of Cardiff and 500m south of the town of Llantwit Farde. An assessment by the NRW in the second half of 2015 showed that a further round of sampling, together with an interpretation, was required in order to progress the application. In December 2015 with RCTCBC consent, Capita agreed to progress with another round of monitoring using a sub-contractor to obtain the factual data.

This report provides details of the sampling that was carried out by Environmental Scientifics Group (ESG) on the site, between the 16th and 23st March 2016, on behalf of Capita, together with the results from laboratory chemical testing and review by Capita.

2. Groundwater Locations

The landfill site has been subject to intensive investigations prior to and during the development of the Church Village Bypass between 2005 and 2010. The work included the installation of a number of boreholes for monitoring groundwater within the site, in compliance with statutory requirements. During construction of the Bypass through the actual landfill, a number of the boreholes were lost or damaged and the groundwater monitoring between 2010 and 2012 was limited to four locations. The number of the remaining monitoring positions were described in a previous report submitted to NRW in January 2015, with the surrender application and reproduced in Table 1 below.

Table 1: Boreholes Monitoring Groundwater up to July 2012

Boreholes Monitored up to July 2012	BH5/5, BH5/11, BH5/12, BHA(1225)
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Prior to carrying out the present monitoring, all boreholes on site were investigated by Capita technicians to determine whether or not that they remain in operation and were safe to be sampled. The number of boreholes that were found to be adequate are shown in Table 2.

Table 2: Boreholes Operational in March 2016

Boreholes Operational in March 2016	BH5/5, BH5/10, BH5/11, BH1327A, BH1a/17
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The present operational boreholes have been sub-divided into two groups, those that are located up gradient of the landfill area, and those that remain inside the landfill site to assist in determining the influence on the groundwater from the landfill. The number and location of the boreholes are shown in Drawing SW01 and in Table 3 below.

Table 3: Groundwater Boreholes March 2016

Boreholes Located on the Up Gradient of the Site	Boreholes Located within Landfill
BH5/5	BH5/10, BH5/11, BH/1327A, BH1a/17

3. Methodology

Samples of groundwater were obtained by ESG operatives between 16th and 23rd March 2016, initially using low flow techniques and thereafter using alternative techniques. The samples were delivered to their Brebty Laboratory, Burton on Trent on 23rd March 2016 and were analysed in accordance with the agreed schedule (Refer to Appendix B, ESG Report H1609-16).

Concentrations of individual determinants have been screened using Environmental quality standard values for groundwater in line with the Water Framework Directive 2010.

4. Results

A review of the results show that a number of contaminants were detected at concentrations that exceed EQS values, in particular Manganese and Iron. Manganese exceedance was detected in a sample collected up gradient of the site, as well as in samples collected from within the landfill site boundary. It must be noted that historical concentration of these contaminants have been regularly detected above EQS values.

A full data set of results are presented in Appendix A, with exceedances highlighted.

Table 4: Summary of Exceedances of EQS values

Determinant	EQS µg/l	Max recorded Concentration µg/l	Present Concentration µg/l	Monitoring Location	
Manganese	400	11000	2109	BH5/5	up gradient
			650	BH5/10	within landfill
			1289	BH5/11	
			1180	BH/1327A	
			1174	BH1a/17	
Iron	1000	16500	1100	BH5/10	

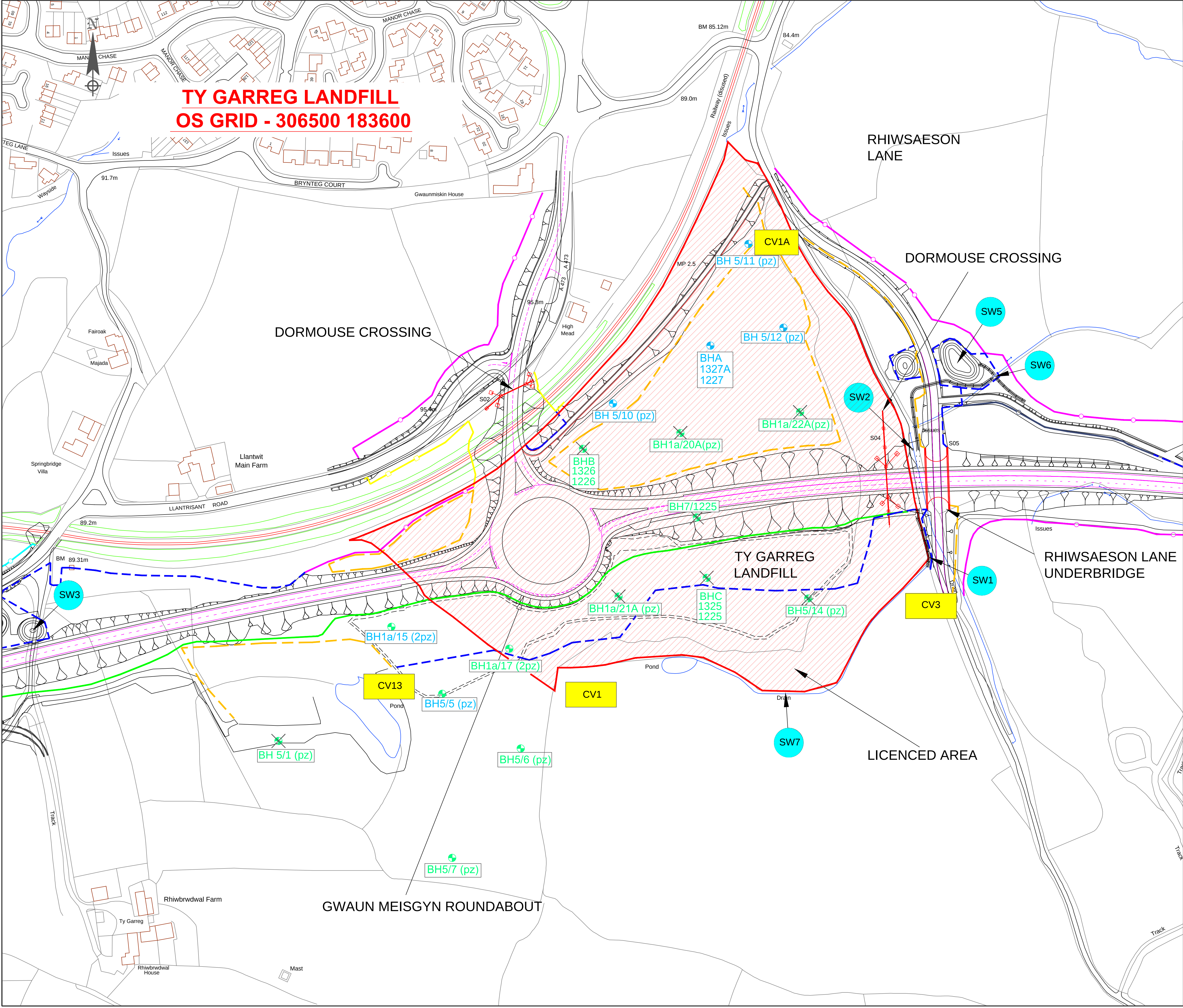
5. Conclusions

High concentration levels of Manganese up gradient of the site supports the previous conclusions that the regional shallow groundwater in the superficial deposits is affected by acid mine drainage contamination. Another possible cause is the waste material deposited in the neighbouring historic landfill to the south and west of the site. However, lower concentrations of this contaminant were found inside the landfill area which indicate that the site is not adding to the overall contamination levels.

There is exceedance of Iron concentrations within the landfill but this is marginal compared to previous monitoring, with no exceedance discovered in the up gradient section of the site. This evidence would suggest that there is a gradual improvement and the risk is decreasing.

No other EQS exceedances were found, suggesting there is no significant risk to the surrounding environmental receptors.

Drawings



AMENDMENTS

Rev.	Ref.	DETAILS	Date	Made By	Chkd By
A		Boreholes amended	10/15	PG	MSR

Key

Boreholes currently monitored

Boreholes not currently monitored

Abandoned Boreholes

Licence Boundary

Close Boarded Fence HCD Detail H14

Newt Fence

Post and 4 Rail Fence

Stock Proof Post and 4 Rail Fence

Stock Proof Post and Wire Fence

Stock Proof Post and 4 Rail Fence with Barbed Wire

Surface Water Sampling Location

Previous Surface Water Sampling Location

Notes

SW2 is in reference to sampling chamber.

SW7 access permitting

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Project:

Church Village Bypass

Title:

Ty Garreg Landfill
Monitoring Locations

Drawn	SID	Approved	WP
Checked	MS	Date	Feb '12
Job No.	GC/000041	Dwg No.	SW01

Rev.

A

Appendix A

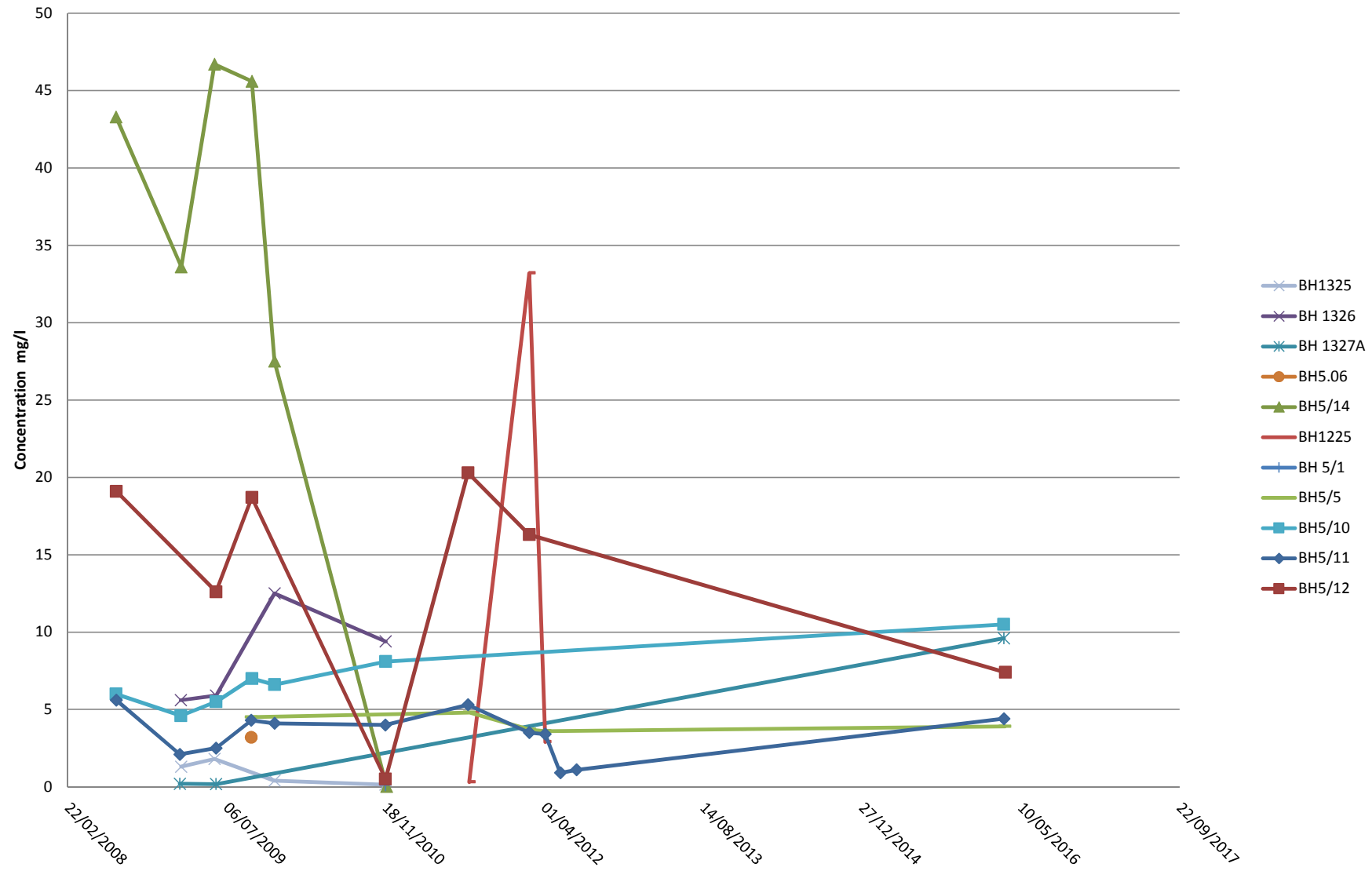
Groundwater Results

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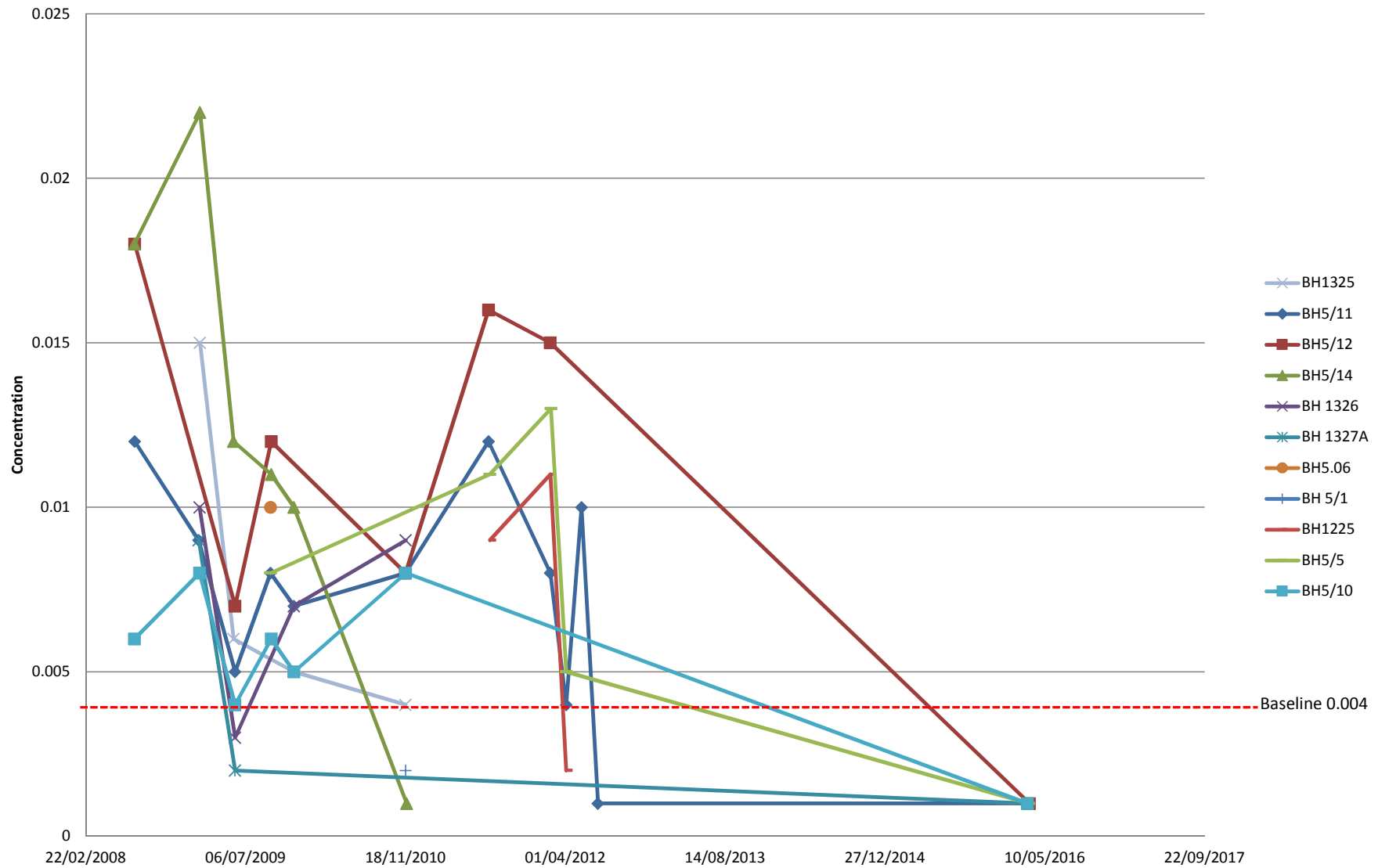
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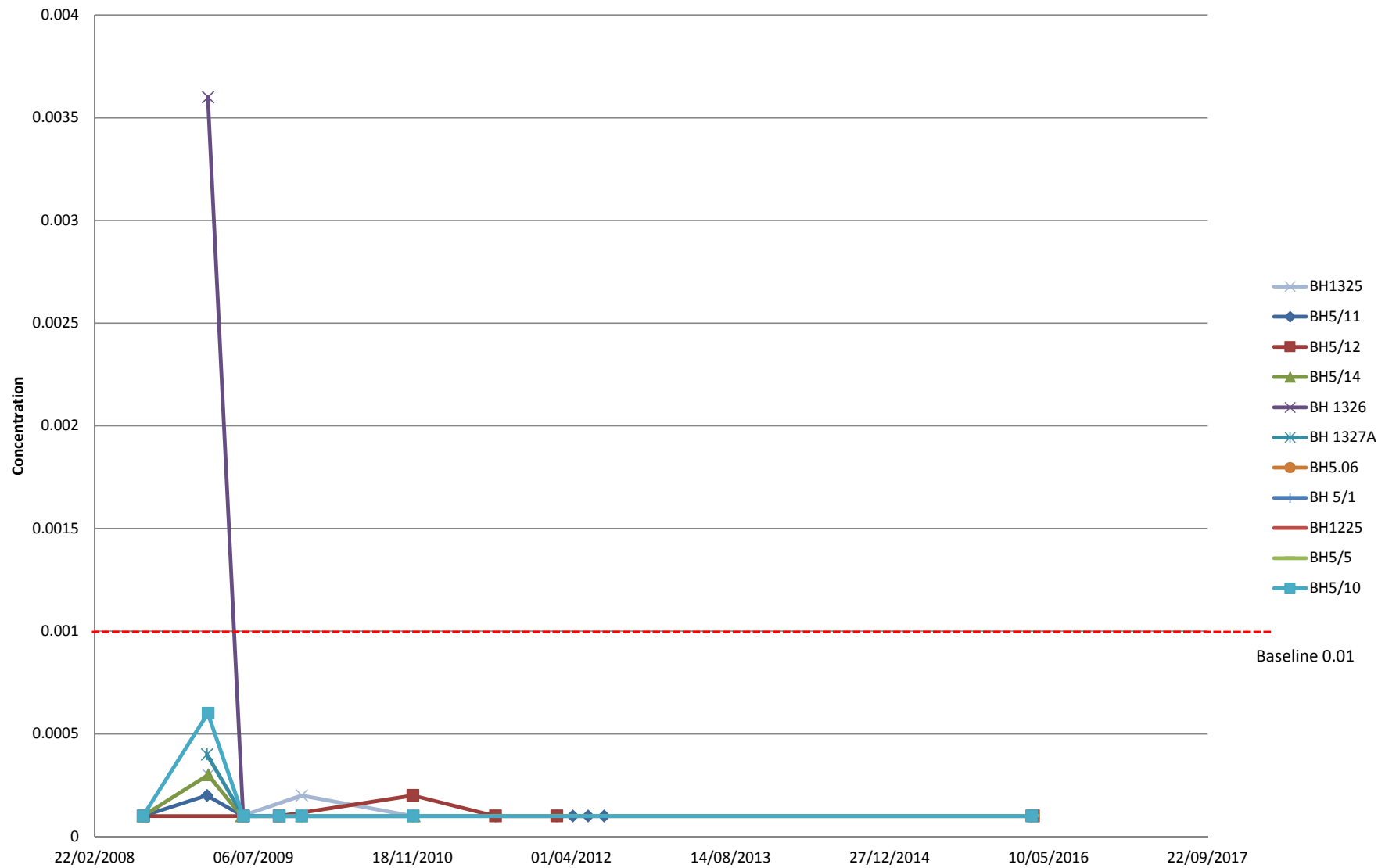
Ammonical Nitrogen



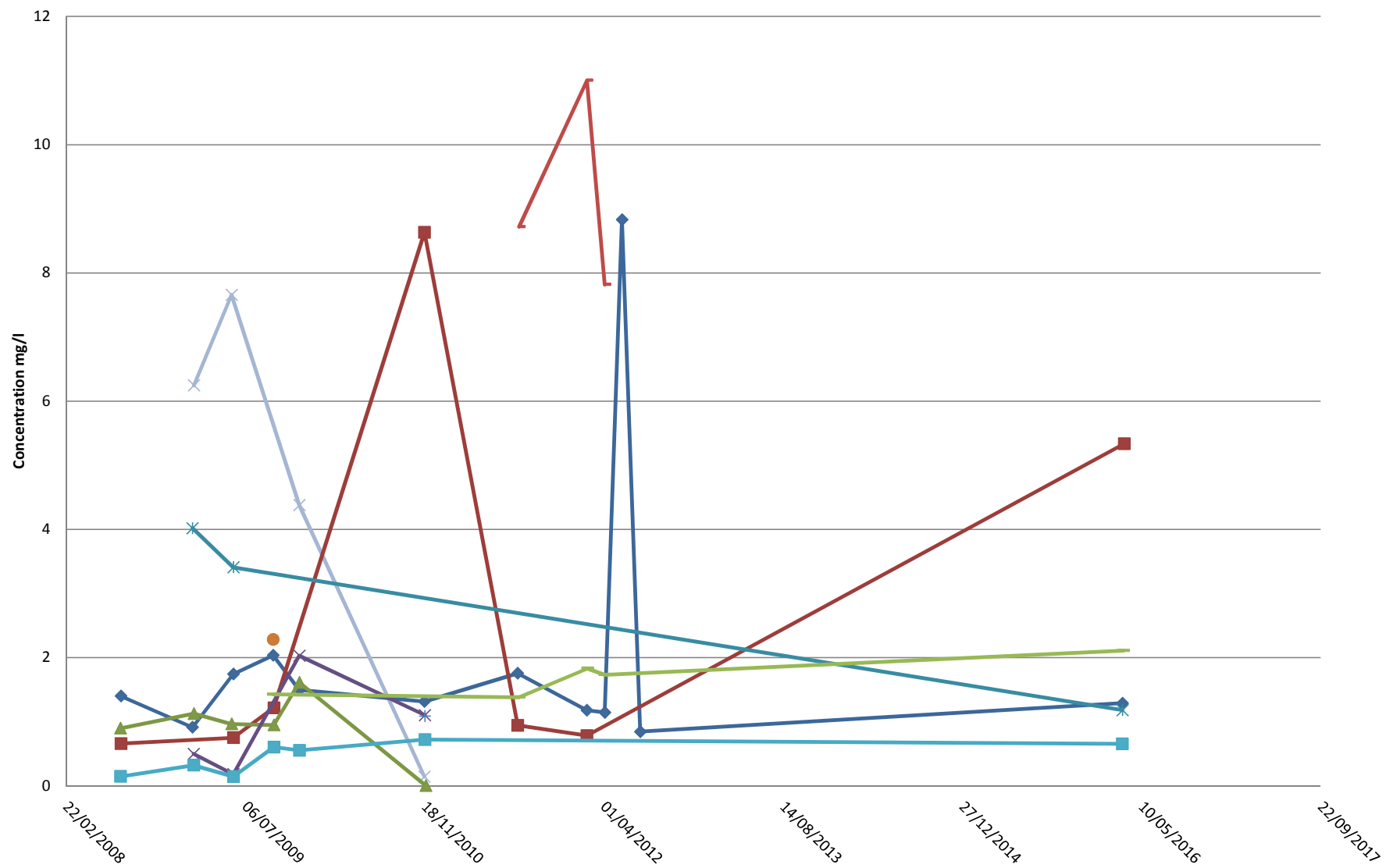
Chromium as Cr (dissolved)



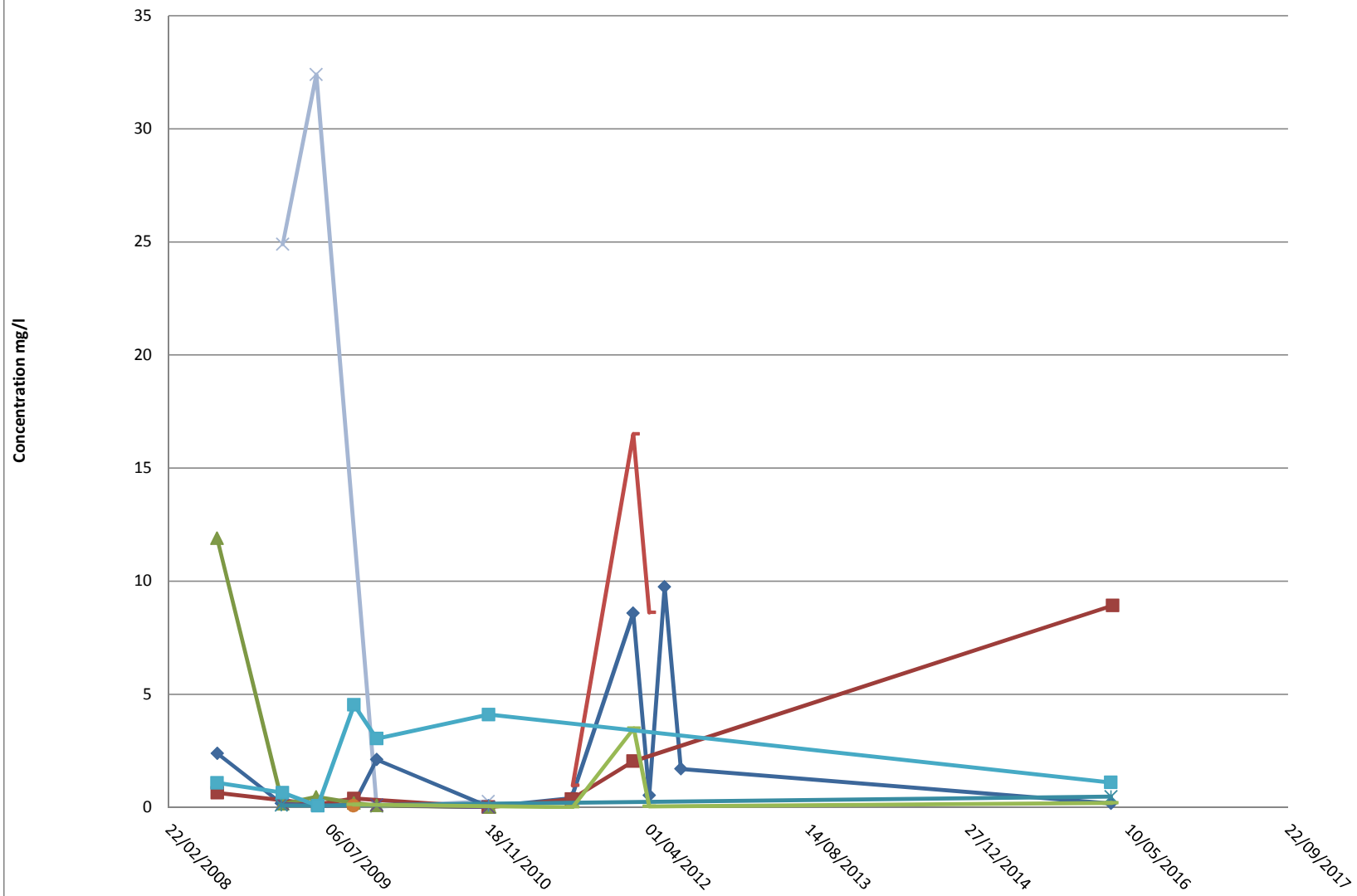
Cadmium

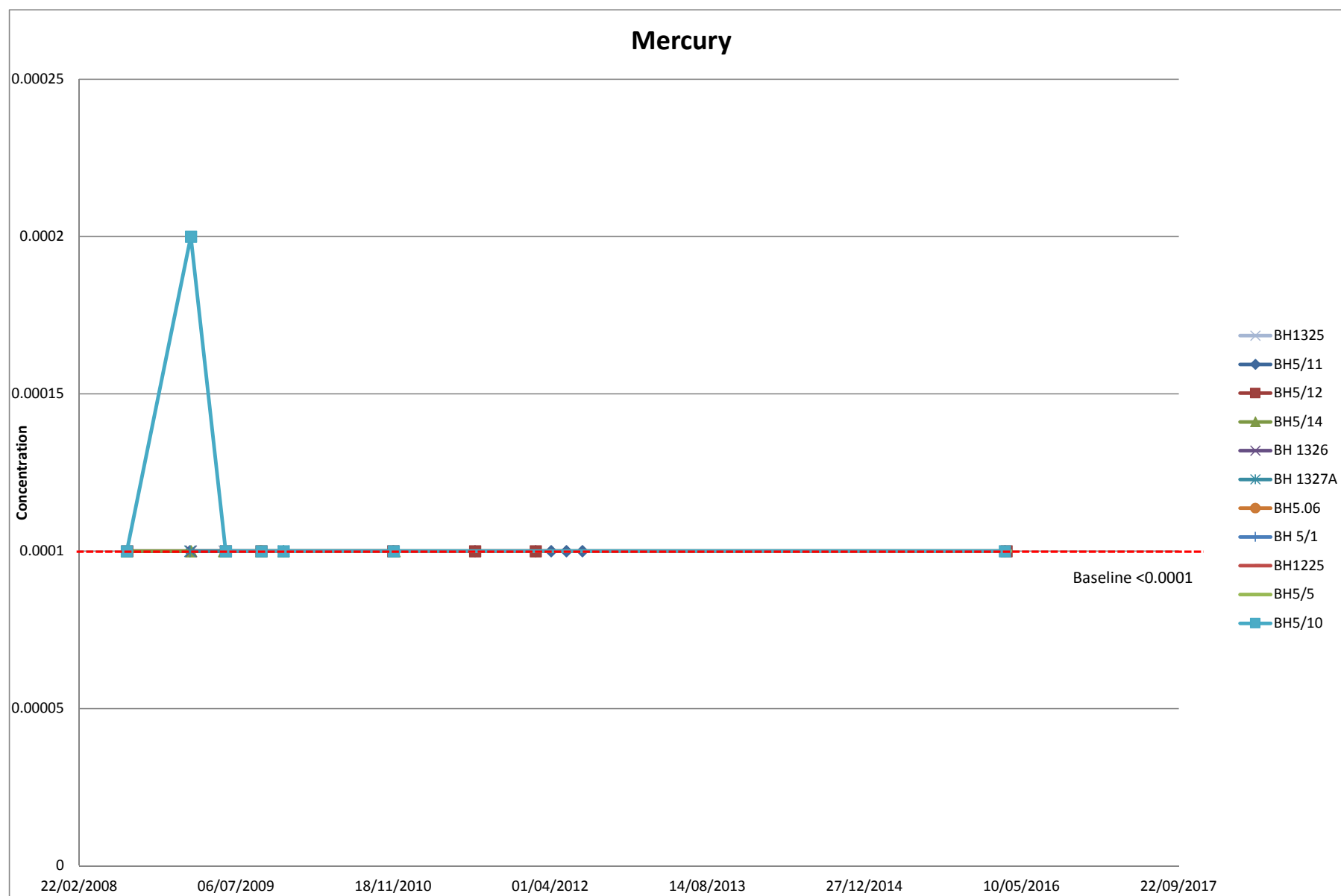


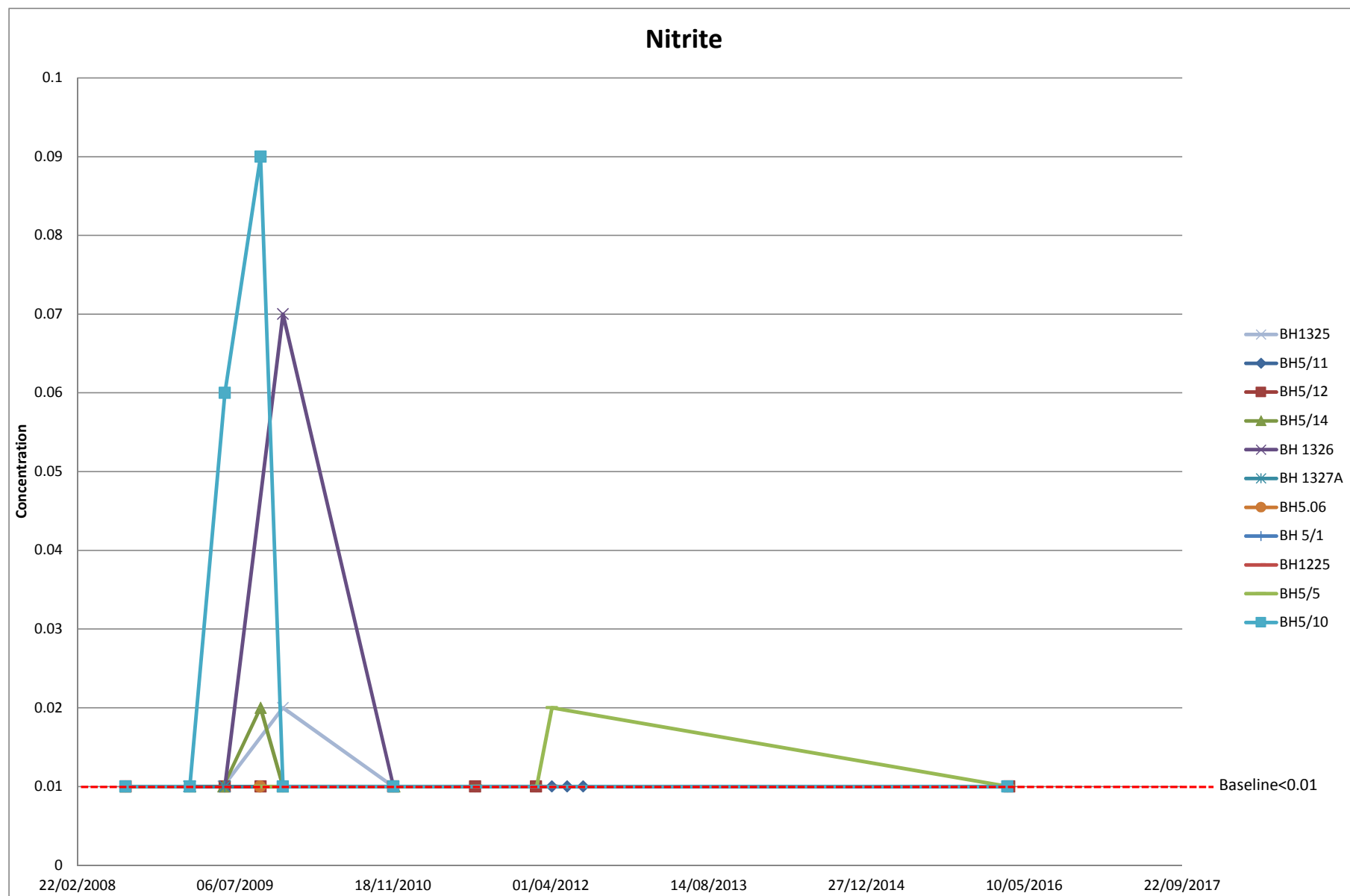
Manganese

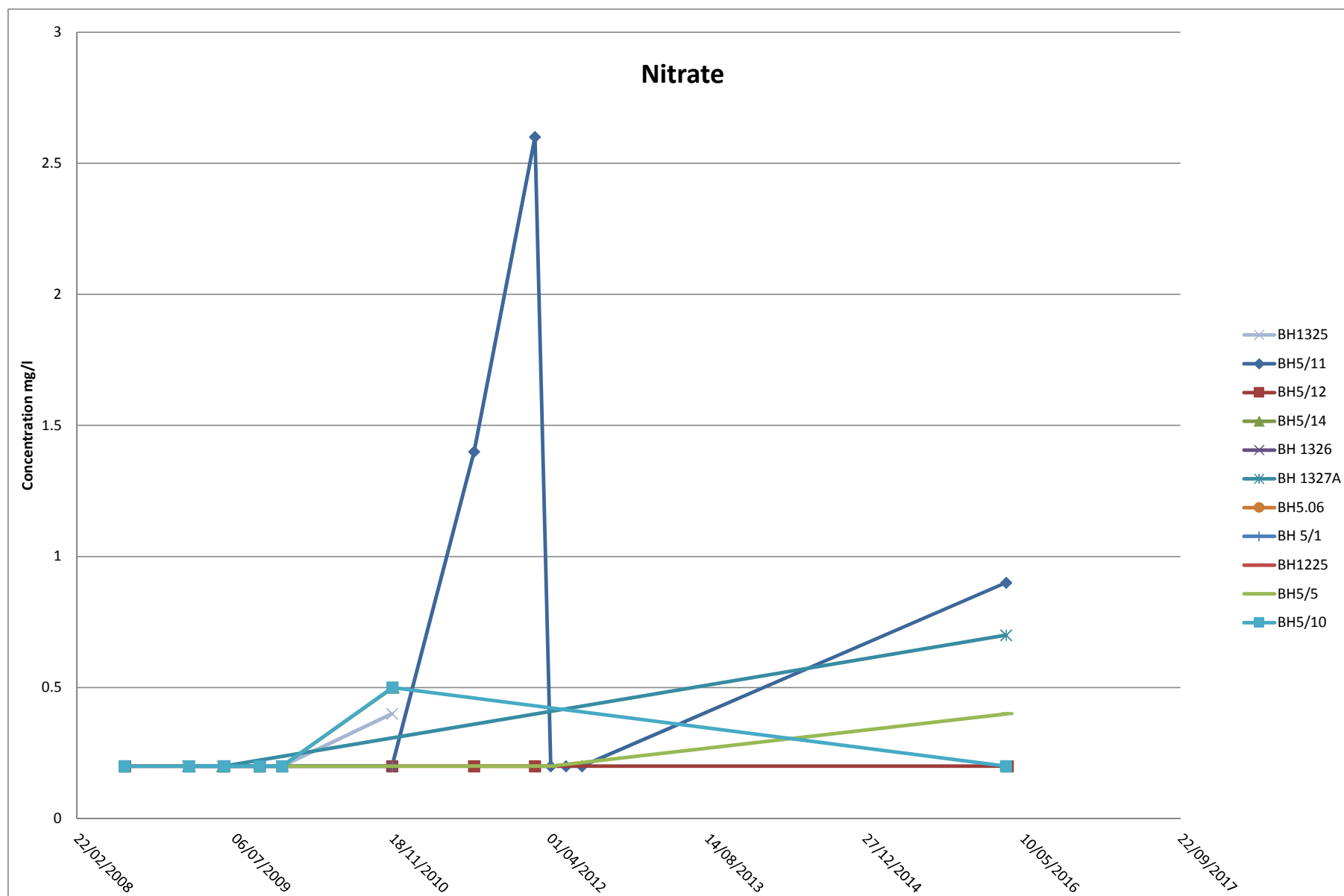


Iron

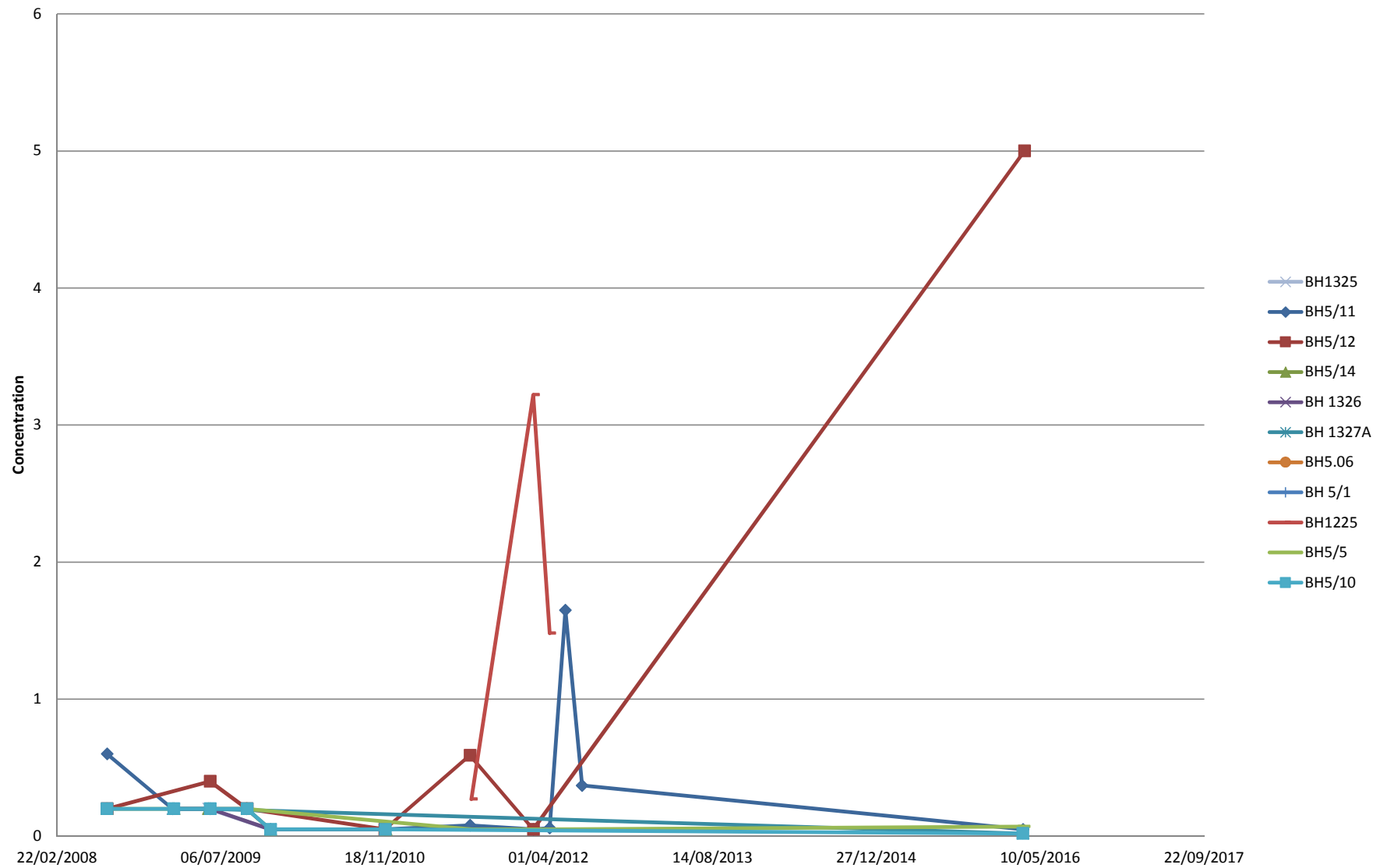




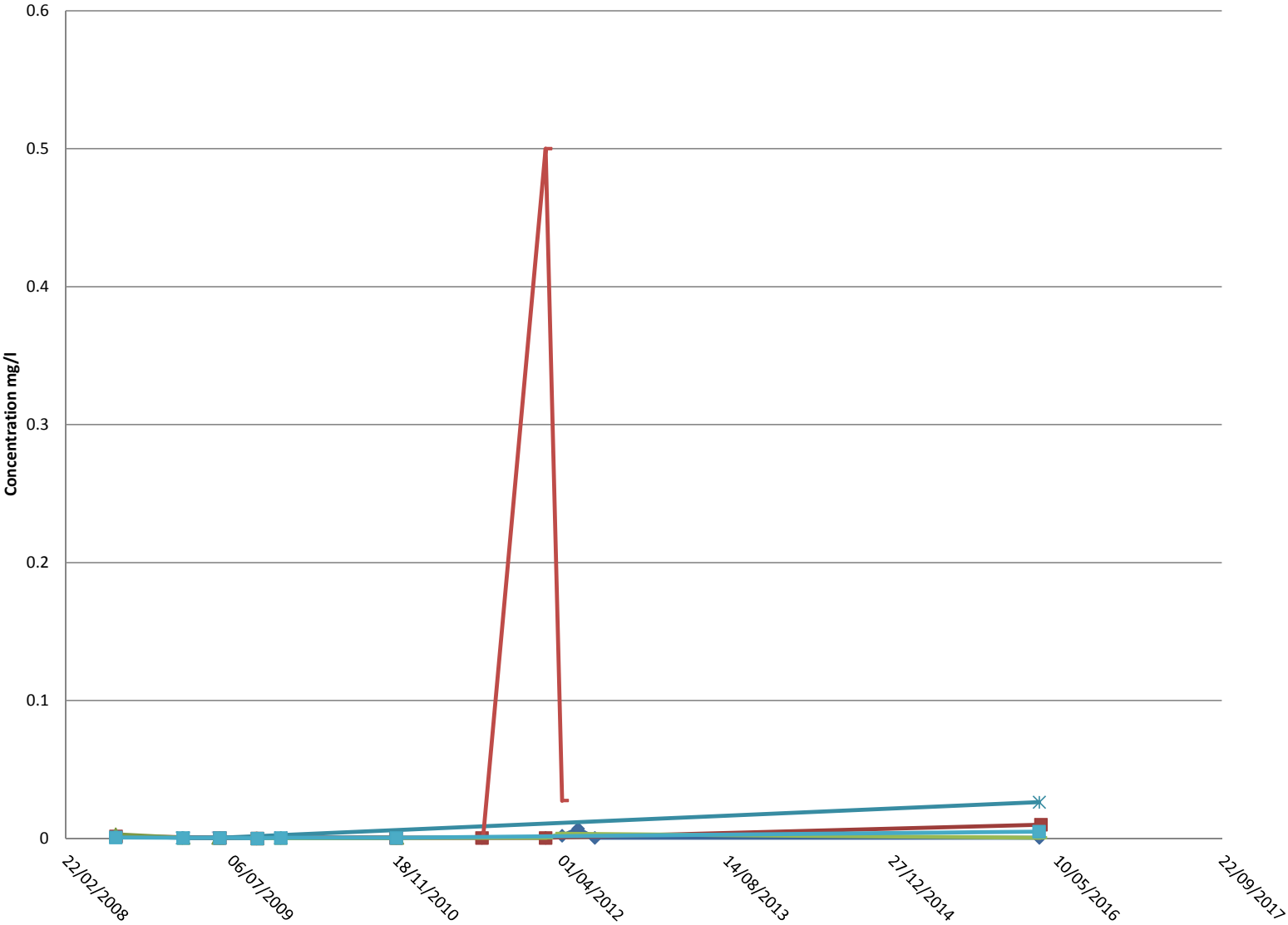


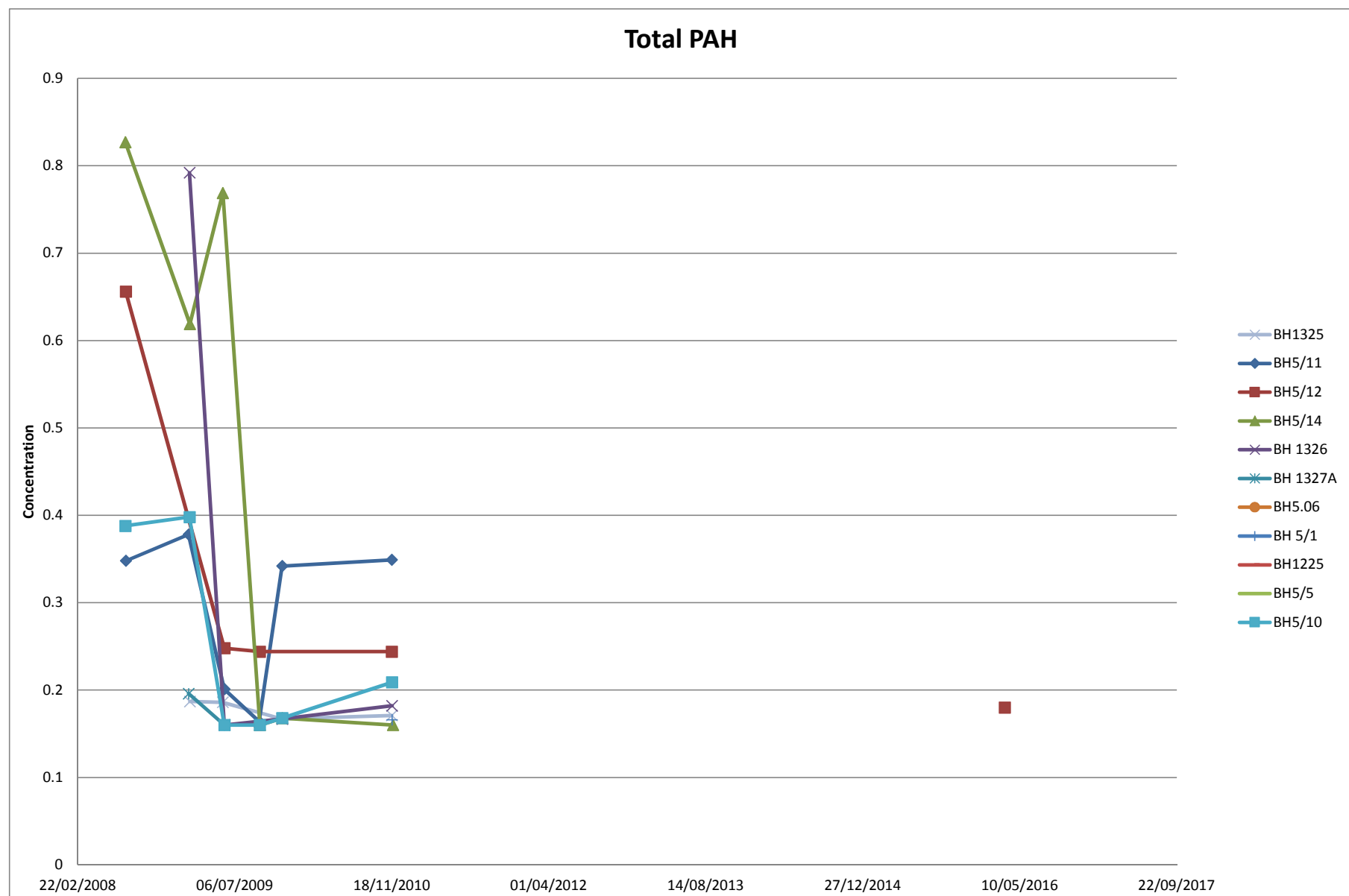


Sulphide



Phenol





Appendix B

ESG Report, H6019-16

Myrddin Rees
Capita

Letter ref: LO/H6019-16/AGJ/001

5th April 2016

Dear Sirs

TY GARREG LANDFILL WATER SAMPLING, CHURCH VILLAGE

1 INTRODUCTION

In February 2016 ESG was commissioned by Capita to carry out water quality monitoring and sampling at the site of Ty Garreg Landfill, Church Village. The investigation was required to obtain geoenvironmental information to provide further data regarding water quality to supplement existing data which will be utilised to discharge a landfill license.

The scope of the investigation, which was specified by Capita, comprised a single round of water quality monitoring and sampling. The investigation was carried out in accordance with the supplied specification and BS EN ISO 22475-1. The fieldwork was carried out over a four day period between 17 and 23 March 2016.

This letter report presents the factual records of the water sampling and laboratory testing.

2 THE SITE

2.1 Site Location and Description

The site is located approximately 1.75 km east of Llantrisant and 2.12 km south west of Llantwit Fardre, at National Grid Reference (NGR) ST 065838. The site comprises an area of grassland and shrubbery interspersed with a number of young trees.

The site is approximately rectangular in shape orientated north east to south west and measures approximately 480 m by 150 m. The site is bisected by the A473 (Church Village Bypass) including the Gwaun Meisgyn Roundabout at the centre of the site. As part of the bypass development, the site has been landscaped with tall grasses, shrubbery and numerous young trees.

The site is bound to the north by an area of woodland, to the east by an unnamed lane beyond which lies an area of public grassland, and to the south and west by agricultural grassland. A body of water exists within a nature reserve environment at the south west boundary of the site at a lower elevation.

2.2 Previous Investigations

A previous investigation had been undertaken by Soil Mechanics (Report Number: H5141, November 2005). The findings of this investigation were made available to ESG at the outset of the investigation.

The previous investigation confirmed Made Ground to a maximum depth of 13.40 m underlain by superficial deposits comprising Glacial Deposits.

3 FIELDWORK

Seven exploratory holes containing a mixture of single and dual installations were monitored and sampled using a combination of low flow techniques and Waterra tubing and valves. The exploratory hole locations are shown on the Site Plan in the appendix.

Water sampling utilising low flow techniques was attempted at every exploratory hole location. However this methodology proved unsuccessful in instances where the head of water was deeper than 8.00 m. As an alternative, Waterra tubing and valves were used to retrieve water samples from installations where the head of water exceeded 8.00 m with water quality measurements taken at regular intervals.

The sampling schedule and techniques used are summarised below.

Table 1: SUMMARY OF WATER SAMPLING

BH Ref	Install Ref	Diameter (mm)	Instrument Depth (mBGL)	Depth to Water (mBGL)	Sampling technique
5/5A	1	50	11.9	7.88	Low flow method
	2	19	12.7	8.65	Waterra tube - insufficient recharge to sample
1a/15	1	50	11.7	8.4	Waterra tube
1a/17	1	50	10.5	7.47	Low flow method
	2	50	12.44	7.45	Low flow method
5/10/A	1	19	4.67	1.98	Low flow method
	2	50	1.9	Dry	
1227/1327A	1	50	17.6	10.9	Waterra tube
	2	50	7.06	6.41	Low flow method
05/12	1	50	10.27	9.3	Waterra tube
	2	19	10.25	9.14	Waterra tube
05/11	1	50	5.26	4.88	Low flow method
	2	19	4.98	3.92	Low flow method

Water quality monitoring included measurement of the following at regular intervals:

- Φ Water level (mBGL)
- Φ Temperature (°C)
- Φ pH
- Φ Dissolved oxygen (mg/l)
- Φ Conductivity (µS)
- Φ Redox potential (mV)

Daily records of the water quality monitoring and sampling are presented in the appendix.

4 GEOENVIRONMENTAL TESTING

Geoenvironmental laboratory testing was scheduled by ESG on the water samples recovered during the fieldwork. The testing was carried out by the laboratory at ESG Bretby. The results are presented in the appendix.

Yours faithfully
from **ESG**

Amelia Gyngell-Jones
Graduate Engineer

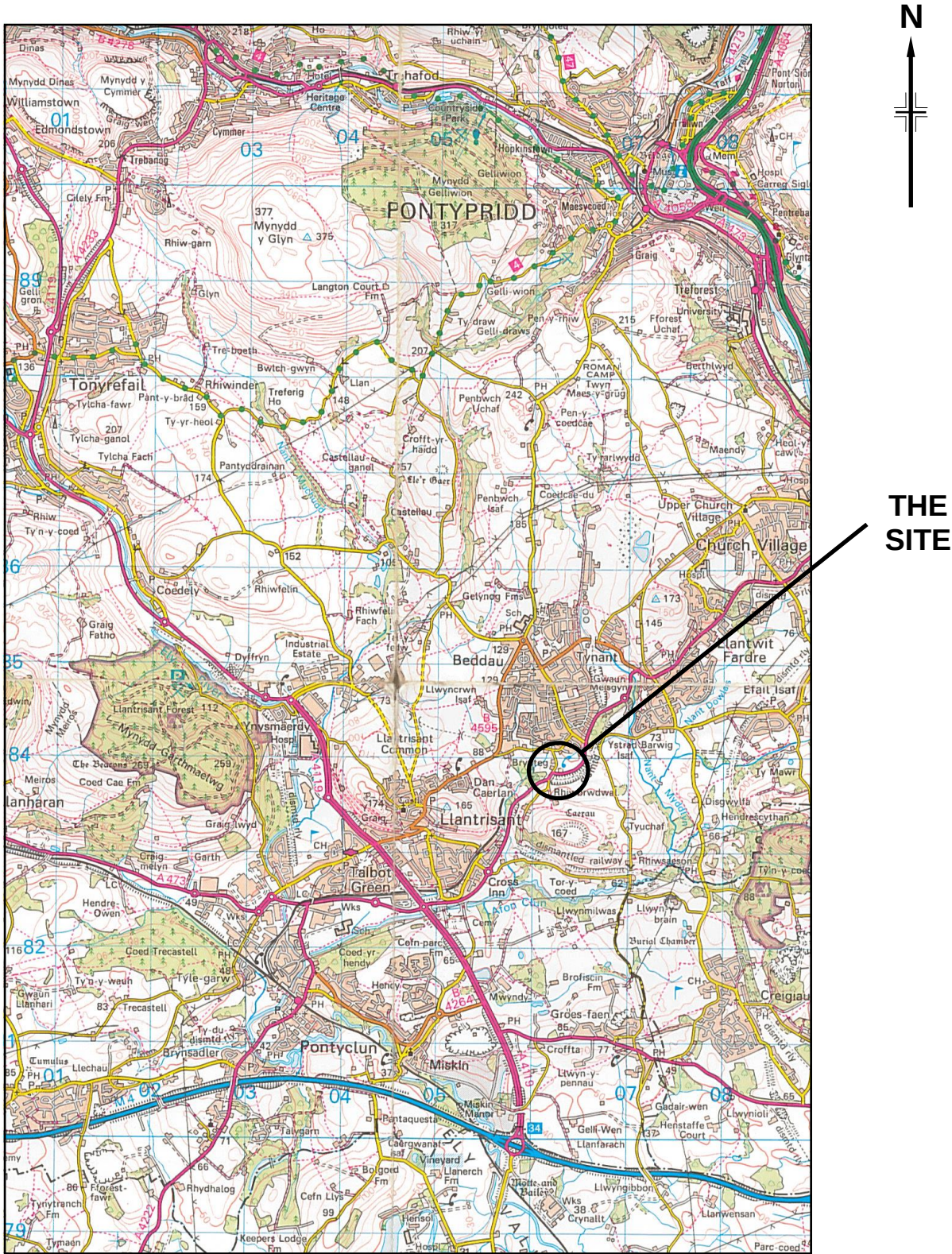
APPENDICES

Site Location Plan
Water Sampling Records
ESG Test Report EXR/216941 and EXR/217133

REFERENCES

BS EN ISO 22475-1 : 2006 : Geotechnical investigation and testing – Sampling methods and groundwater measurements - Part 1
Technical principles for execution. British Standards Institution.

EA: 2005 Sampling and testing of wastes to meet landfill waste acceptance procedures. Environment Agency.



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Notes: Scale 1:50 000	Project Ty Garreg Landfill Water Sampling Project No. H6019-16 Carried out for Capita	Figure A1
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Project No H6019-16

Project Ty Garreg

Client Capita

Borehole No BH5/5 Site Area 50mm

Date 21/03/2016

Purging Data

Initial Water Level, mBGL (a) 7.88

Base of Installation, m BGL (b) 11.9

Saturated Depth, m (c) (b-a) 4.02

Diameter of Installation, mm (d) 50

Base of Borehole, m (e) 11.9

Guideline Water Volumes

Borehole Diameter (mm) Volume (litres/m)

17 0.23

50 2.0

95 7.1

100 8

150 18

200 32

380 113

Well Volume, litres (f) $(\pi d^2 c/4) \times 10^{-3}$ 7.893252

Readings taken during purging

Number of Well Volumes (g) 3 Water Level, mBGL 7.88 7.89 7.91 7.89 7.89 7.88

Purging Device Low Flow Temperature, degC 12.9 12.9 13.1 12.8 12.8 12.8

Flow Rate, l/min (h) pH 7.8 7.3 6.9 6.8 6.9 6.9

Time to purge, min (gf/h) Dissolved O2, mg/l 13.7 7.1 0.81 0.8 0.81 0.81

Volume Purged, litres Conductivity, uS/m 920 860 840 860 840 820

Redox Potential, mV -44 -117 -159 -150 -151 -150

Sampling Data

Sample Collection Depth, mBGL 7.88 Oil Little on surface

Sample No (use ddmmyy) EWM W1 Appearance and Colour Clear but grey

Time Collected (hh:mm:ss) 170000 Odour Faint hydrocarbon

Time since purge (minutes) Low flow Sediment Minimal

Containers: Number 6 Type 1L Plastic, 3 Organic 200ml, 1 Phenol/cyanide

Remarks

Weather Sunny

Notes and Comments

Name

Signature

Project No	H6019-16		
Project	Ty Garreg		
Client	Capita		
Borehole No	BH5/5	Site Area	19mm
Date	21/03/2016		

Purging Data

Initial Water Level, mBGL (a)	8.8	Guideline Water Volumes	
Base of Installation, m BGL (b)	12.7	Borehole Diameter (mm)	Volume (litres/m)
Saturated Depth, m (c) (b-a)	3.9	17	0.23
Diameter of Installation, mm (d)	19	50	2.0
Base of Borehole, m (e)	12.7	95	7.1
		100	8
		150	18
		200	32
		380	113

Well Volume, litres (f) ($\pi d^2 c/4$)x10 ⁻³	1.105762	Readings taken during purging	
Number of Well Volumes (g)	3	Water Level, mBGL	
Purging Device	Low Flow	Temperature, degC	
Flow Rate, l/min (h)		pH	
Time to purge, min (gf/h)		Dissolved O2, mg/l	
Volume Purged, litres		Conductivity, uS/m	
		Redox Potential, mV	

Sampling Data

Sample Collection Depth, mBGL		Oil	
Sample No (use ddmmyy) EWM		Appearance and Colour	
Time Collected (hh:mm:ss)		Odour	
Time since purge (minutes)		Sediment	
Containers: Number		Type	

Remarks

Weather	Sunny
Notes and Comments	Unable to retrieve sufficient water to purge and sample hole via pumping. Alternate methodologies advised.

Name	Signature
------	-----------

Project No H6019-16

Project Ty Garreg

Client Capita

Borehole No BH5/5

Site Area 19mm W2

Date 23/03/2016

Purging Data

Initial Water Level, mBGL (a) 8.65

Base of Installation, m BGL (b) 12.7

Saturated Depth, m (c) (b-a) 4.05

Diameter of Installation, mm (d) 19

Base of Borehole, m (e) 12.7

Guideline Water Volumes

Borehole Diameter (mm)

Volume (litres/m)

17

0.23

50

2.0

95

7.1

100

8

150

18

200

32

380

113

Well Volume, litres (f) $(\pi d^2 c/4) \times 10^{-3}$ 1.148291

Readings taken during purging

Number of Well Volumes (g) 3

Water Level, mBGL 12.5

Purging Device Waterra Tube

Temperature, degC 12

Flow Rate, l/min (h) 1.15/2

pH 6.1

Time to purge, min (gf/h) 2

Dissolved O2, mg/l 0.93

Volume Purged, litres 1

Conductivity, uS/m 1460

Redox Potential, mV -82

Sampling Data

Sample Collection Depth, mBGL

Oil

Sample No (use ddmmyy) EWM

Appearance and Colour

Time Collected (hh:mm:ss)

Odour

Time since purge (minutes)

Sediment

Containers: Number

Type

Remarks

Weather Overcast

Notes and Comments Purged 1 well volume (1 litre) until dry. Returned 1 hour later. Insufficient recharge to sample.

Name

Signature

Project No	H6019-16
Project	Ty Garreg
Client	Capita
Borehole No	BH1a/15
Site Area	50mm SP
Date	23/03/2016

Purging Data

Initial Water Level, mBGL (a)	8.4	Guideline Water Volumes	
Base of Installation, m BGL (b)	11.7	Borehole Diameter (mm)	Volume (litres/m)
Saturated Depth, m (c) (b-a)	3.3	17	0.23
Diameter of Installation, mm (d)	50	50	2.0
Base of Borehole, m (e)	11.7	95	7.1
		100	8
		150	18
		200	32
		380	113

Well Volume, litres (f) ($\pi d^2 c/4$)x10 ⁻³	6.479535	Readings taken during purging	
Number of Well Volumes (g)	3	Water Level, mBGL	11.5 11.62
Purging Device	Waterra Tube	Temperature, degC	12 12
Flow Rate, l/min (h)	1	pH	5.9 60
Time to purge, min (gf/h)	15	Dissolved O2, mg/l	0.57 0.92
Volume Purged, litres	8	Conductivity, uS/m	1550 1560
		Redox Potential, mV	-75 -102

Sampling Data

Sample Collection Depth, mBGL	11.62	Oil	On surface
Sample No (use ddmmyy) EWM	W1	Appearance and Colour	Murky
Time Collected (hh:mm:ss)	120000	Odour	None
Time since purge (minutes)	45	Sediment	Occasional
Containers: Number	6	Type	1l plastic, 3 organic 200ml, 1 phenol/cyanid

Remarks

Weather	Overcast
Notes and Comments	Sampled after borehole was purged dry. Very slow recharge.

Name	Signature
------	-----------

Project No H6019-16

Project Ty Garreg

Client Capita

Borehole No BH1A/17 Site Area 50mm

Date 21/03/2016

Purging Data

Initial Water Level, mBGL (a) 7.47

Base of Installation, m BGL (b) 10.5

Saturated Depth, m (c) (b-a) 3.03

Diameter of Installation, mm (d) 50

Base of Borehole, m (e) 10.5

Guideline Water Volumes

Borehole Diameter (mm) Volume (litres/m)

17 0.23

50 2.0

95 7.1

100 8

150 18

200 32

380 113

Well Volume, litres (f) $(\pi d^2 c/4) \times 10^{-3}$ 5.949391

Readings taken during purging

Number of Well Volumes (g) 3 Water Level, mBGL 7.47 7.51 7.5 7.48 7.47

Purging Device Pump Temperature, degC 12.9 13.1 13 13.1 13.1

Flow Rate, l/min (h) pH 7.4 7.5 7.2 7.4 7.4

Time to purge, min (gf/h) 60 Dissolved O2, mg/l 1.54 0.89 0.68 0.47

Volume Purged, litres 20 Conductivity, uS/m 120 80 100 0.1 0

Redox Potential, mV -90 -120 -143 -157 -192

Sampling Data

Sample Collection Depth, mBGL 7.47 Oil None

Sample No (use ddmmyy) EWM W1 Appearance and Colour Clear

Time Collected (hh:mm:ss) 140000 Odour None

Time since purge (minutes) Low flow Sediment Initially frequent, then rare

Containers: Number 6 Type 1L Plastic, 3 Organic 300ml, 1 Phenol/cyan

Remarks

Weather Sunny

Notes and Comments

Name

Signature

Project No H6019-16

Project Ty Garreg

Client Capita

Borehole No BH1A/17 Site Area 50mm

Date 21/03/2016

Purging Data

Initial Water Level, mBGL (a)	7.45	Guideline Water Volumes	
Base of Installation, m BGL (b)	12.44		
Saturated Depth, m (c) (b-a)	4.99	Borehole Diameter (mm)	Volume (litres/m)
Diameter of Installation, mm (d)	50	17	0.23
Base of Borehole, m (e)	12.44	50	2.0
		95	7.1
		100	8
		150	18
		200	32
		380	113

Well Volume, litres (f) $(\pi d^2 c/4) \times 10^{-3}$ 9.797842

Readings taken during purging

Number of Well Volumes (g) 3 Water Level, mBGL 7.45 7.47 7.46 7.48 7.46 7.45 7.45

Purging Device Pump Temperature, degC 12 12.4 12.9 13.7 13.2 13.3 13.3

Flow Rate, l/min (h) pH 7.5 6.9 6.7 6.9 6.9 7 6.9

Time to purge, min (gf/h) 120 Dissolved O2, mg/l 1.68 1.37 0.63 0.67 0.43 0.45 0.44

Volume Purged, litres 30 Conductivity, uS/m 340 430 640 670 640 640 640

Redox Potential, mV -79 -118 -153 -171 -173 -179 -179

Sampling Data

Sample Collection Depth, mBGL 7.45 Oil None

Sample No (use ddmmyy) EWM W2 Appearance and Colour Clear

Time Collected (hh:mm:ss) 120000 Odour None

Time since purge (minutes) Low flow Sediment Minimal

Containers: Number 6 Type 1L Plastic, 3 Organic 200ml, 1 Phenol/cyan

Remarks

Weather Sunny

Notes and Comments

Name

Signature

Project No	H6019-16
Project	Ty Garreg
Client	Capita
Borehole No	BH5/10
Site Area	19mm
Date	16/03/2016

Purging Data

Initial Water Level, mBGL (a)	1.98	Guideline Water Volumes	
Base of Installation, m BGL (b)	4.67	Borehole Diameter (mm)	Volume (litres/m)
Saturated Depth, m (c) (b-a)	2.69	17	0.23
Diameter of Installation, mm (d)	19	50	2.0
Base of Borehole, m (e)	4.67	95	7.1
		100	8
		150	18
		200	32
		380	113

Well Volume, litres (f) $(\pi d^2 c/4) \times 10^{-3}$	0.762692	Readings taken during purging							
Number of Well Volumes (g)	3	Water Level, mBGL	1.98	1.99	1.98	2.99			
Purging Device	Pump	Temperature, degC	10.4	10.4	10.4	10.4			
Flow Rate, l/min (h)	0.3	pH	6.3	6.3	6.4	6.4			
Time to purge, min (gf/h)	30	Dissolved O2, mg/l	1.07	0.71	0.56	0.56			
Volume Purged, litres	5	Conductivity, uS/m	330	750	700	690			
		Redox Potential, mV	-123	-134	-158	-160			

Sampling Data

Sample Collection Depth, mBGL	2	Oil	None
Sample No (use ddmmyy) EWM	W1	Appearance and Colour	Yellow (light)
Time Collected (hh:mm:ss)	170000	Odour	None
Time since purge (minutes)	Low flow	Sediment	None
Containers: Number	6	Type	1L Plastic, 3 Organic 200ml, 1 Sulphide and

Remarks

Weather	Sunny
Notes and Comments	1 1/2 hours to purge 0L of water - later sampling.

Name	Signature
------	-----------

Project No	H6019-16		
Project	Ty Garreg		
Client	Capita		
Borehole No	BH5/10	Site Area	50mm
Date	16/03/2016		

Purging Data

Initial Water Level, mBGL (a)		Guideline Water Volumes	
Base of Installation, m BGL (b)	1.9	Borehole Diameter (mm)	Volume (litres/m)
Saturated Depth, m (c) (b-a)		17	0.23
Diameter of Installation, mm (d)	50	50	2.0
Base of Borehole, m (e)	1.9	95	7.1
		100	8
		150	18
		200	32
		380	113

Well Volume, litres (f) $(\pi d^2 c/4) \times 10^{-3}$		Readings taken during purging	
Number of Well Volumes (g)	3	Water Level, mBGL	
Purging Device	Pump	Temperature, degC	
Flow Rate, l/min (h)		pH	
Time to purge, min (gf/h)		Dissolved O2, mg/l	
Volume Purged, litres		Conductivity, uS/m	
		Redox Potential, mV	

Sampling Data

Sample Collection Depth, mBGL		Oil	
Sample No (use ddmmyy) EWM		Appearance and Colour	
Time Collected (hh:mm:ss)		Odour	
Time since purge (minutes)		Sediment	
Containers: Number		Type	

Remarks

Weather	Sunny
Notes and Comments	Hole dry

Name	Signature
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Project No	H6019-16
Project	Ty Garreg
Client	Capita
Borehole No	BH1337/1227A
Site Area	50mm (Facing post - left)
Date	18/03/2016

Purging Data

Initial Water Level, mBGL (a)	10.52	Guideline Water Volumes	
Base of Installation, m BGL (b)	17.63	Borehole Diameter (mm)	Volume (litres/m)
Saturated Depth, m (c) (b-a)	7.11	17	0.23
Diameter of Installation, mm (d)	50	50	2.0
Base of Borehole, m (e)	17.63	95	7.1
		100	8
		150	18
		200	32
		380	113

Well Volume, litres (f) $(\pi d^2 c/4) \times 10^{-3}$	13.96045	Readings taken during purging	
Number of Well Volumes (g)	3	Water Level, mBGL	10.52
Purging Device	Pump	Temperature, degC	15.4
Flow Rate, l/min (h)		pH	6.9
Time to purge, min (gf/h)		Dissolved O2, mg/l	0.9
Volume Purged, litres		Conductivity, uS/m	520
		Redox Potential, mV	-187

Sampling Data

Sample Collection Depth, mBGL		Oil	
Sample No (use ddmmyy) EWM		Appearance and Colour	
Time Collected (hh:mm:ss)		Odour	
Time since purge (minutes)		Sediment	
Containers: Number		Type	

Remarks

Weather	Sunny
Notes and Comments	Unable to extract sufficient water to purge/sample. Head of water too deep. Other methodologies advised.

Name	Signature
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Project No H6019-16

Project Ty Garreg

Client Capita

Borehole No BH1337/1227A Site Area 50mm SP 1

Date 23/03/2016

Purging Data

Initial Water Level, mBGL (a) 10.9

Base of Installation, m BGL (b) 17.63

Saturated Depth, m (c) (b-a) 6.73

Diameter of Installation, mm (d) 50

Base of Borehole, m (e) 17.63

Guideline Water Volumes

Borehole Diameter (mm)

Volume (litres/m)

17

0.23

50

2.0

95

7.1

100

8

150

18

200

32

380

113

Well Volume, litres (f) $(\pi d^2 c/4) \times 10^{-3}$ 13.21432

Readings taken during purging

Number of Well Volumes (g) 3

Water Level, mBGL 11.1 11 11.7 12.4 12.4

Purging Device Waterra Tube

Temperature, degC 11 10.9 11.1 11 11

Flow Rate, l/min (h) 3

pH 7 6.9 6.9 7 7

Time to purge, min (gf/h) 90

Dissolved O2, mg/l 0.93 1.12 1.21 1.25 1.34

Volume Purged, litres 40

Conductivity, uS/m 1460 1420 1210 1150 1150

Redox Potential, mV -58 -79 -128 -158 -161

Sampling Data

Sample Collection Depth, mBGL 12.4

Oil None

Sample No (use ddmmyy) EWM W1

Appearance and Colour Cloudy

Time Collected (hh:mm:ss) 163000

Odour None

Time since purge (minutes) 0

Sediment Occasional

Containers: Number 6

Type 1l plastic, 3 organic 200ml, 1 phenol/cyanid

Remarks

Weather Overcast

Notes and Comments

Name

Signature

Project No H6019-16

Project Ty Garreg

Client Capita

Borehole No BH1337/1227A Site Area 50mm (Facing post right)

Date 18/03/2016

Purging Data

Initial Water Level, mBGL (a) 6.41

Base of Installation, m BGL (b) 7.06

Saturated Depth, m (c) (b-a) 0.65

Diameter of Installation, mm (d) 50

Base of Borehole, m (e) 7.06

Guideline Water Volumes

Borehole Diameter (mm)

Volume (litres/m)

17

0.23

50

2.0

95

7.1

100

8

150

18

200

32

380

113

Well Volume, litres (f) $(\pi d^2 c/4) \times 10^{-3}$ 1.276272

Readings taken during purging

Number of Well Volumes (g) 3

Water Level, mBGL 6.52 6.8 6.84 6.85

Purging Device Perastaltic Pump

Temperature, degC 17.4 11.8 11.8 12.6

Flow Rate, l/min (h) 0.03

pH 7.3 7.2 7.1 7

Time to purge, min (gf/h) 120

Dissolved O2, mg/l 0.4 0.31 1.01 0.68

Volume Purged, litres 4

Conductivity, uS/m 1010 1020 1060 990

Redox Potential, mV -85 -165 -119 -164

Sampling Data

Sample Collection Depth, mBGL 6.85

Oil Slight on surface

Sample No (use ddmmyy) EWM W2

Appearance and Colour Black murky

Time Collected (hh:mm:ss) 143000

Odour None

Time since purge (minutes) Low flow

Sediment Frequent

Containers: Number 6

Type 1l plastic. 3 organic 200ml, 1 phenol/cyanid

Remarks

Weather Sunny

Notes and Comments

Name

Signature

Project No H6019-16

Project Ty Garreg

Client Capita

Borehole No BH5/12

Site Area 50mm

Date 18/03/2016

Purging Data

Initial Water Level, mBGL (a) 9.15

Base of Installation, m BGL (b) 10.27

Saturated Depth, m (c) (b-a) 1.12

Diameter of Installation, mm (d) 50

Base of Borehole, m (e) 10.27

Guideline Water Volumes

Borehole Diameter (mm) Volume (litres/m)

17 0.23

50 2.0

95 7.1

100 8

150 18

200 32

380 113

Well Volume, litres (f) $(\pi d^2 c/4) \times 10^{-3}$ 2.199115

Readings taken during purging

Number of Well Volumes (g) 3

Water Level, mBGL 9.15

Purging Device Pump

Temperature, degC 21.6

Flow Rate, l/min (h)

pH 6.6

Time to purge, min (gf/h)

Dissolved O2, mg/l 0.87

Volume Purged, litres

Conductivity, uS/m 720

Redox Potential, mV -163

Sampling Data

Sample Collection Depth, mBGL Oil

Sample No (use ddmmyy) EWM Appearance and Colour

Time Collected (hh:mm:ss) Odour

Time since purge (minutes) Sediment

Containers: Number Type

Remarks

Weather Sunny

Notes and Comments Unable to extract sufficient water to purge and sample. Other methodologies advised.

Name

Signature

Project No H6019-16

Project Ty Garreg

Client Capita

Borehole No BH5/12

Site Area 50mm SP 1

Date 23/03/2016

Purging Data

Initial Water Level, mBGL (a) 9.3

Base of Installation, m BGL (b) 10.27

Saturated Depth, m (c) (b-a) 0.97

Diameter of Installation, mm (d) 50

Base of Borehole, m (e) 10.27

Guideline Water Volumes

Borehole Diameter (mm)

Volume (litres/m)

17

0.23

50

2.0

95

7.1

100

8

150

18

200

32

380

113

Well Volume, litres (f) $(\pi d^2 c/4) \times 10^{-3}$ 1.904591

Readings taken during purging

Number of Well Volumes (g) 3

Water Level, mBGL 10.19 10.2

Purging Device Waterra Tube

Temperature, degC 11.9 11.9

Flow Rate, l/min (h) 0.5

pH 7.1 7

Time to purge, min (gf/h) 30

Dissolved O2, mg/l 0.58 0.42

Volume Purged, litres 4

Conductivity, uS/m 1360 1420

Redox Potential, mV -10 -81

Sampling Data

Sample Collection Depth, mBGL 10.2

Oil None

Sample No (use ddmmyy) EWM W1

Appearance and Colour Dark, murky

Time Collected (hh:mm:ss) 150000

Odour None

Time since purge (minutes) 60

Sediment Frequent

Containers: Number 6

Type 1l plastic, 3 organic 200ml, 1 phenol/cyanid

Remarks

Weather Overcast

Notes and Comments Purged then returned after 1 hour to sample.

Name

Signature

Project No	H6019-16		
Project	Ty Garreg		
Client	Capita		
Borehole No	BH5/12	Site Area	19mm
Date	18/03/2016		

Purging Data

Initial Water Level, mBGL (a)	9.12	Guideline Water Volumes	
Base of Installation, m BGL (b)	10.25	Borehole Diameter (mm)	Volume (litres/m)
Saturated Depth, m (c) (b-a)	1.13	17	0.23
Diameter of Installation, mm (d)	19	50	2.0
Base of Borehole, m (e)	10.25	95	7.1
		100	8
		150	18
		200	32
		380	113

Well Volume, litres (f) $(\pi d^2 c/4) \times 10^{-3}$	0.320387	Readings taken during purging	
Number of Well Volumes (g)	3	Water Level, mBGL	9.12
Purging Device	Pump	Temperature, degC	15.1
Flow Rate, l/min (h)		pH	6.7
Time to purge, min (gf/h)	45	Dissolved O2, mg/l	0.58
Volume Purged, litres	300ml	Conductivity, uS/m	1500
		Redox Potential, mV	-183

Sampling Data

Sample Collection Depth, mBGL		Oil	
Sample No (use ddmmyy) EWM		Appearance and Colour	
Time Collected (hh:mm:ss)		Odour	
Time since purge (minutes)		Sediment	
Containers: Number		Type	

Remarks

Weather	Sunny
Notes and Comments	Unable to extract sufficient water to purge or sample. Head of water too deep for pump. Alternate methodologies advised.

Name	Signature
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Project No H6019-16

Project Ty Garreg

Client Capita

Borehole No BH5/12

Site Area 19mm SP 2

Date 23/03/2016

Purging Data

Initial Water Level, mBGL (a) 9.14

Base of Installation, m BGL (b) 10.25

Saturated Depth, m (c) (b-a) 1.11

Diameter of Installation, mm (d) 19

Base of Borehole, m (e) 10.27

Guideline Water Volumes

Borehole Diameter (mm)

Volume (litres/m)

17

0.23

50

2.0

95

7.1

100

8

150

18

200

32

380

113

Well Volume, litres (f) $(\pi d^2 c/4) \times 10^{-3}$ 0.314717

Readings taken during purging

Number of Well Volumes (g) 3

Water Level, mBGL 10.1

Purging Device Waterra Tube

Temperature, degC 11.9

Flow Rate, l/min (h) 0.5

pH 7.1

Time to purge, min (gf/h) 30

Dissolved O2, mg/l 0.42

Volume Purged, litres 1

Conductivity, uS/m 1440

Redox Potential, mV -92

Sampling Data

Sample Collection Depth, mBGL 10.1

Oil None

Sample No (use ddmmyy) EWM W2

Appearance and Colour Dark murky

Time Collected (hh:mm:ss) 150000

Odour None

Time since purge (minutes) 60

Sediment Frequent

Containers: Number 6

Type 1l plastic, 3 organic 200ml, 1 sulphide, 1 ph

Remarks

Weather Overcast

Notes and Comments Purged then returned 1 hour later to sample.

Name

Signature

Project No	H6019-16		
Project	Ty Garreg		
Client	Capita		
Borehole No	BH5/11	Site Area	50mm
Date	17/03/2016		

Purging Data

Initial Water Level, mBGL (a)	4.88	Guideline Water Volumes	
Base of Installation, m BGL (b)	5.26	Borehole Diameter (mm)	Volume (litres/m)
Saturated Depth, m (c) (b-a)	0.38	17	0.23
Diameter of Installation, mm (d)	50	50	2.0
Base of Borehole, m (e)	5.26	95	7.1
		100	8
		150	18
		200	32
		380	113
Well Volume, litres (f) ($\pi d^2 c/4$) $\times 10^{-3}$	0.746128	Readings taken during purging	
Number of Well Volumes (g)	3	Water Level, mBGL	4.9 4.88 4.88
Purging Device	Pump	Temperature, degC	9.7 9.7 9.7
Flow Rate, l/min (h)		pH	6.4 6.4 6.4
Time to purge, min (gf/h)	30	Dissolved O2, mg/l	0.6 0.49 0.5
Volume Purged, litres	1.5	Conductivity, uS/m	590 560 560
		Redox Potential, mV	-118 -125 -120

Sampling Data

Sample Collection Depth, mBGL	4.9	Oil	On surface
Sample No (use ddmmyy) EWM	W1	Appearance and Colour	Clear - virtually black
Time Collected (hh:mm:ss)	091500	Odour	None
Time since purge (minutes)	Low flow	Sediment	Sparadically frequent
Containers: Number	6	Type	1L Plastic, 3 Organic 200ml, 1 Cyanide/phe

Remarks

Weather	Sunny
Notes and Comments	

Name	Signature
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Project No	H6019-16		
Project	Ty Garreg		
Client	Capita		
Borehole No	BH5/11	Site Area	19mm
Date	17/03/2016		

Purging Data

Initial Water Level, mBGL (a)	3.92	Guideline Water Volumes					
Base of Installation, m BGL (b)	4.98	Borehole Diameter (mm)			Volume (litres/m)		
Saturated Depth, m (c) (b-a)	1.06	17			0.23		
Diameter of Installation, mm (d)	19	50			2.0		
Base of Borehole, m (e)	4.98	95			7.1		
		100			8		
		150			18		
		200			32		
		380			113		
Well Volume, litres (f) ($\pi d^2 c/4$)x10 ⁻³	0.30054	Readings taken during purging					
Number of Well Volumes (g)	3	Water Level, mBGL	3.95	3.94	3.94	3.92	
Purging Device	Pump	Temperature, degC	10	10	10	10	
Flow Rate, l/min (h)		pH	6.5	6.5	6.5	6.5	
Time to purge, min (gf/h)	15	Dissolved O2, mg/l	0.63	0.58	0.45	0.34	
Volume Purged, litres	1.2	Conductivity, uS/m	570	580	540	570	
		Redox Potential, mV	127	-133	-144	-152	

Sampling Data

Sample Collection Depth, mBGL	3.92	Oil	None
Sample No (use ddmmyy) EWM	W2	Appearance and Colour	Clear
Time Collected (hh:mm:ss)	100000	Odour	None
Time since purge (minutes)	Low flow	Sediment	Minimal
Containers: Number	6	Type	1L Plastic, 3 Organic, 1 Phenol and 1 sulph

Remarks

Weather	Sunny
Notes and Comments	

Name	Signature
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TEST REPORT

Report No. EXR/216941 (Ver. 1)

ESG Limited (Bridgend)
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
Mid Glamorgan
CF31 1JZ

Site: Ty Garreg

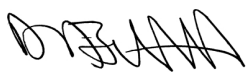
The 7 samples described in this report were registered for analysis by ESG on 23-Mar-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 31-Mar-2016

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (10) Results (Pages 5 to 11)
Analytical and Deviating Sample Overview (Pages 12 to 13)
Table of Additional Report Notes (Page 14)
Table of Method Descriptions (Page 15)
Table of Report Notes (Page 16)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Declan Burns


Managing Director
Multi-Sector Services

Date of Issue: 31-Mar-2016

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.

ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:	ESG Limited (Bridgend): Ty Garreg		
Sample Details:	BH5/10 W 1	Job Number:	W21_6941
LIMS ID Number:	EX1674951	Date Booked in:	23-Mar-16
QC Batch Number:	160197	Date Extracted:	30-Mar-16
Quantitation File:	Initial Calibration	Date Analysed:	30-Mar-16
Directory:	016PAH.MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.24	0.123	91
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	4.41	0.071	98
Fluorene	86-73-7	4.79	0.033	99
Phenanthrene	85-01-8	5.62	0.039	99
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	6.95	0.022	66
Pyrene	129-00-0	7.23	0.016	99
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	12.23	0.011	75
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.405	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	102
Acenaphthene-d10	104
Phenanthrene-d10	106
Chrysene-d12	101
Perylene-d12	108

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	69
Terphenyl-d14	70

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons GC/MS (SIM)

Customer and Site Details:	ESG Limited (Bridgend): Ty Garreg		
Sample Details:	BH5/11 W 1	Job Number:	W21_6941
LIMS ID Number:	EX1674952	Date Booked in:	23-Mar-16
QC Batch Number:	160197	Date Extracted:	30-Mar-16
Quantitation File:	Initial Calibration	Date Analysed:	30-Mar-16
Directory:	016PAH.MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.24	0.047	90
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	4.41	0.305	99
Fluorene	86-73-7	4.79	0.088	99
Phenanthrene	85-01-8	5.62	0.028	99
Anthracene	120-12-7	5.67	0.011	95
Fluoranthene	206-44-0	6.95	0.021	72
Pyrene	129-00-0	7.23	0.013	78
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.603	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	98
Acenaphthene-d10	100
Phenanthrene-d10	102
Chrysene-d12	94
Perylene-d12	96

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	76
Terphenyl-d14	68

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons

GC/MS (SIM)

Customer and Site Details:	ESG Limited (Bridgend): Ty Garreg		
Sample Details:	BH5/11 W 2	Job Number:	W21_6941
LIMS ID Number:	EX1674953	Date Booked in:	23-Mar-16
QC Batch Number:	160197	Date Extracted:	30-Mar-16
Quantitation File:	Initial Calibration	Date Analysed:	30-Mar-16
Directory:	016PAH.MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	4.41	0.321	99
Fluorene	86-73-7	4.79	0.076	98
Phenanthrene	85-01-8	5.62	0.015	98
Anthracene	120-12-7	5.67	0.010	98
Fluoranthene	206-44-0	6.95	0.020	82
Pyrene	129-00-0	7.23	0.011	83
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.563	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	96
Acenaphthene-d10	98
Phenanthrene-d10	100
Chrysene-d12	91
Perylene-d12	85

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	73
Terphenyl-d14	70

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons

GC/MS (SIM)

Customer and Site Details:	ESG Limited (Bridgend): Ty Garreg		
Sample Details:	BH1327/1227A W 2	Job Number:	W21_6941
LIMS ID Number:	EX1674954	Date Booked in:	23-Mar-16
QC Batch Number:	160197	Date Extracted:	30-Mar-16
Quantitation File:	Initial Calibration	Date Analysed:	30-Mar-16
Directory:	016PAH.MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.24	3.320	98
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	4.41	0.201	95
Fluorene	86-73-7	4.79	0.087	95
Phenanthrene	85-01-8	5.62	0.055	99
Anthracene	120-12-7	5.67	0.010	98
Fluoranthene	206-44-0	6.95	0.014	80
Pyrene	129-00-0	7.23	0.010	82
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 3.787	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	95
Acenaphthene-d10	97
Phenanthrene-d10	96
Chrysene-d12	89
Perylene-d12	88

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	77
Terphenyl-d14	71

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons

GC/MS (SIM)

Customer and Site Details:	ESG Limited (Bridgend): Ty Garreg		
Sample Details:	BH1a/17 W 2	Job Number:	W21_6941
LIMS ID Number:	EX1674955	Date Booked in:	23-Mar-16
QC Batch Number:	160197	Date Extracted:	30-Mar-16
Quantitation File:	Initial Calibration	Date Analysed:	30-Mar-16
Directory:	016PAH.MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.24	0.232	96
Acenaphthylene	208-96-8	4.29	0.018	61
Acenaphthene	83-32-9	4.41	0.909	97
Fluorene	86-73-7	4.79	0.178	99
Phenanthrene	85-01-8	5.62	0.125	99
Anthracene	120-12-7	5.67	0.026	99
Fluoranthene	206-44-0	6.95	0.065	81
Pyrene	129-00-0	7.23	0.037	99
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 1.670	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	96
Acenaphthene-d10	99
Phenanthrene-d10	97
Chrysene-d12	85
Perylene-d12	83

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	75
Terphenyl-d14	70

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons

GC/MS (SIM)

Customer and Site Details:	ESG Limited (Bridgend): Ty Garreg		
Sample Details:	BH1a/17 W 1	Job Number:	W21_6941
LIMS ID Number:	EX1674956	Date Booked in:	23-Mar-16
QC Batch Number:	160197	Date Extracted:	30-Mar-16
Quantitation File:	Initial Calibration	Date Analysed:	30-Mar-16
Directory:	016PAH.MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.24	0.367	95
Acenaphthylene	208-96-8	4.29	0.033	61
Acenaphthene	83-32-9	4.41	1.460	98
Fluorene	86-73-7	4.79	0.241	98
Phenanthrene	85-01-8	5.62	0.310	99
Anthracene	120-12-7	5.67	0.044	96
Fluoranthene	206-44-0	6.95	0.239	79
Pyrene	129-00-0	7.23	0.122	100
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	8.95	0.012	66
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 2.898	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	99
Acenaphthene-d10	103
Phenanthrene-d10	100
Chrysene-d12	92
Perylene-d12	91

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	77
Terphenyl-d14	73

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons

GC/MS (SIM)

Customer and Site Details:	ESG Limited (Bridgend): Ty Garreg		
Sample Details:	BH5/5 W 1	Job Number:	W21_6941
LIMS ID Number:	EX1674957	Date Booked in:	23-Mar-16
QC Batch Number:	160197	Date Extracted:	30-Mar-16
Quantitation File:	Initial Calibration	Date Analysed:	30-Mar-16
Directory:	016PAH.MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.24	0.110	93
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	4.41	0.190	90
Fluorene	86-73-7	4.79	0.029	98
Phenanthrene	85-01-8	5.62	0.027	99
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	6.95	0.023	67
Pyrene	129-00-0	7.23	0.015	99
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.494	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	92
Acenaphthene-d10	92
Phenanthrene-d10	87
Chrysene-d12	77
Perylene-d12	78

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	80
Terphenyl-d14	68

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Report Due 01-Apr-2016

[illegible]

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W216941

Customer ESG Limited (Bridgend)
Site Ty Garreg
Report No W216941

Consignment No W101802
Date Logged 23-Mar-2016

Report Due 01-Apr-2016

ID Number	Description	MethodID		ICPMS/VAR							KONENS				PAHMSW			PHENOLCUL	SFAPI	SFAS	WSLM12	WSLM17
		Matrix Type	Sampled	Potassium as K (Dissolved) VAR	Iron as Fe (Dissolved) VAR	Aluminium as Al (Dissolved) VAR	Boron as B (Dissolved) VAR	Chloride as Cl (Kone)	Ammoniacal Nitrogen (Kone)	Nitrite as N (Kone)	Nitrate as N (Kone calc)	Benzo-a-Pyrene	Naphthalene	PAH GC-MS (16)	Phenols by HPLC (Low Level)	Cyanide (Total) as CN SFA	Sulphide as S SFA	Total Alkalinity as CaCO3	Total Acidity as CaCO3			
EX/1674951	BH5/10	Unclassified	17/03/16																			
EX/1674952	BH5/11	Unclassified	18/03/16																			
EX/1674953	BH5/11	Unclassified	18/03/16																			
EX/1674954	BH1327/1227A	Unclassified	18/03/16																			
EX/1674955	BH1a/17	Unclassified	21/03/16																			
EX/1674956	BH1a/17	Unclassified	21/03/16																			
EX/1674957	BH5/5	Unclassified	21/03/16																			

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - Note: due date may be affected if triggered
	No analysis scheduled
^	Analysis Subcontracted - Note: due date may vary

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.
Where individual results are flagged see report notes for status.

Report Number : W/EXR/216941

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
PHEHPLCVL	EX1674951;EX1674954	This sample was diluted to bring the contamination levels to within the calibration range of the instrument so a value could be reported but in doing so, the detection limit for this test has been elevated. Please take this information into consideration when utilising the data.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	PHEHPLCVL	As Received	Determination of Phenols by HPLC
Water	SFAP1	As Received	Segmented flow analysis with colorimetric detection
Water	SFAS	As Received	Determination of Sulphide by segmented flow analysis with colorimetric detection
Water	WSLM12	As Received	Titration with Sulphuric Acid to required pH
Water	WSLM17	As Received	Titration with Sodium Hydroxide to required pH

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm³@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile

TR Denotes Tremolite

CR Denotes Crocidolite

AC Denotes Actinolite

AM Denotes Amosite

AN Denotes Anthophyllite

NAIIS No Asbestos Identified in Sample

NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.

\$\$ Unable to analyse due to the nature of the sample

¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

¥ Results for guidance only due to possible interference

& Blank corrected result

I.S Insufficient sample to complete requested analysis

I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

N.D Not determined

N.Det Not detected

N.F No Flow

NS Information Not Supplied

Req Analysis requested, see attached sheets for results

▯ Raised detection limit due to nature of the sample

* All accreditation has been removed by the laboratory for this result

‡ MCERTS accreditation has been removed for this result

§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited (Bridgend)

Site : Ty Garreg

Report Number : W21_6941

TEST REPORT

Report No. EXR/217133 (Ver. 1)

ESG Limited (Bridgend)
ESG Bridgend
Unit 15
Crosby Yard
Wildmill
Bridgend
Mid Glamorgan
CF31 1JZ

Site: Ty Garreg

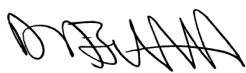
The 4 samples described in this report were registered for analysis by ESG on 25-Mar-2016. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 05-Apr-2016

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 4)
Table of PAH (MS-SIM) (10) Results (Pages 5 to 8)
Analytical and Deviating Sample Overview (Pages 9 to 10)
Table of Additional Report Notes (Page 11)
Table of Method Descriptions (Page 12)
Table of Report Notes (Page 13)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Declan Burns


Managing Director
Multi-Sector Services

Date of Issue: 05-Apr-2016

Tests marked '^' have been subcontracted to another laboratory.

Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.

ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

[illegible]

Bretby Business Park, Ashby Road
Burton-on-Trent, Staffordshire, DE15 0YZ
Tel +44 (0) 1283 554400
Fax +44 (0) 1283 554422

ESG Limited (Bridgend)
Mr A Putt

Ty Garreg

Sample Analysis

Date Printed	05-Apr-2016
Report Number	EXR/217133
Table Number	1

[illegible]

Bretby Business Park, Ashby Road

Client Name

Polycyclic Aromatic Hydrocarbons

GC/MS (SIM)

Customer and Site Details:	ESG Limited (Bridgend): Ty Garreg		
Sample Details:	BH1A/15 W	Job Number:	W21_7133
LIMS ID Number:	EX1676204	Date Booked in:	25-Mar-16
QC Batch Number:	160205	Date Extracted:	01-Apr-16
Quantitation File:	Initial Calibration	Date Analysed:	03-Apr-16
Directory:	316PAH.MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	5.62	0.020	99
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	-	< 0.010	-
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.180	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	88
Acenaphthene-d10	91
Phenanthrene-d10	92
Chrysene-d12	85
Perylene-d12	79

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	72
Terphenyl-d14	67

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons

GC/MS (SIM)

Customer and Site Details:	ESG Limited (Bridgend): Ty Garreg		
Sample Details:	BH5/12 W1 W	Job Number:	W21_7133
LIMS ID Number:	EX1676205	Date Booked in:	25-Mar-16
QC Batch Number:	160205	Date Extracted:	01-Apr-16
Quantitation File:	Initial Calibration	Date Analysed:	03-Apr-16
Directory:	316PAH.MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.24	0.033	81
Acenaphthylene	208-96-8	4.29	0.018	76
Acenaphthene	83-32-9	4.41	0.112	97
Fluorene	86-73-7	4.79	0.103	98
Phenanthrene	85-01-8	5.62	0.167	100
Anthracene	120-12-7	5.67	0.056	95
Fluoranthene	206-44-0	6.95	0.322	96
Pyrene	129-00-0	7.23	0.252	97
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	8.95	0.208	99
Benzo[b]fluoranthene	205-99-2	10.43	0.284	86
Benzo[k]fluoranthene	207-08-9	10.47	0.108	87
Benzo[a]pyrene	50-32-8	10.86	0.185	88
Indeno[1,2,3-cd]pyrene	193-39-5	12.24	0.158	90
Dibenzo[a,h]anthracene	53-70-3	12.27	0.050	91
Benzo[g,h,i]perylene	191-24-2	12.53	0.117	94
Total (USEPA16) PAHs	-	-	< 2.183	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	93
Acenaphthene-d10	96
Phenanthrene-d10	100
Chrysene-d12	103
Perylene-d12	119

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	42
Terphenyl-d14	50

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons

GC/MS (SIM)

Customer and Site Details:	ESG Limited (Bridgend): Ty Garreg		
Sample Details:	BH5/12 W2 W	Job Number:	W21_7133
LIMS ID Number:	EX1676206	Date Booked in:	25-Mar-16
QC Batch Number:	160205	Date Extracted:	01-Apr-16
Quantitation File:	Initial Calibration	Date Analysed:	03-Apr-16
Directory:	316PAH.MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	3.24	0.033	82
Acenaphthylene	208-96-8	4.29	0.012	73
Acenaphthene	83-32-9	4.41	0.103	98
Fluorene	86-73-7	4.78	0.096	99
Phenanthrene	85-01-8	5.62	0.155	100
Anthracene	120-12-7	5.67	0.051	96
Fluoranthene	206-44-0	6.94	0.287	96
Pyrene	129-00-0	7.23	0.220	98
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	8.95	0.164	98
Benzo[b]fluoranthene	205-99-2	10.43	0.208	40
Benzo[k]fluoranthene	207-08-9	10.47	0.080	39
Benzo[a]pyrene	50-32-8	10.86	0.138	96
Indeno[1,2,3-cd]pyrene	193-39-5	12.24	0.115	94
Dibenzo[a,h]anthracene	53-70-3	12.26	0.037	71
Benzo[g,h,i]perylene	191-24-2	12.53	0.084	92
Total (USEPA16) PAHs	-	-	< 1.793	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	97
Acenaphthene-d10	100
Phenanthrene-d10	100
Chrysene-d12	116
Perylene-d12	128

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	36
Terphenyl-d14	45

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons

GC/MS (SIM)

Customer and Site Details:	ESG Limited (Bridgend): Ty Garreg		
Sample Details:	BH1327/1227A W	Job Number:	W21_7133
LIMS ID Number:	EX1676207	Date Booked in:	25-Mar-16
QC Batch Number:	160205	Date Extracted:	01-Apr-16
Quantitation File:	Initial Calibration	Date Analysed:	03-Apr-16
Directory:	316PAH.MS10\	Matrix:	Water
Dilution:	1.0	Ext Method:	Bottle

UKAS accredited?: No

Target Compounds	CAS #	R.T. (min)	Concentration ug/l	% Fit
Naphthalene	91-20-3	-	< 0.020	-
Acenaphthylene	208-96-8	-	< 0.010	-
Acenaphthene	83-32-9	-	< 0.010	-
Fluorene	86-73-7	-	< 0.010	-
Phenanthrene	85-01-8	-	< 0.010	-
Anthracene	120-12-7	-	< 0.010	-
Fluoranthene	206-44-0	-	< 0.010	-
Pyrene	129-00-0	-	< 0.010	-
Benzo[a]anthracene	56-55-3	-	< 0.010	-
Chrysene	218-01-9	-	< 0.010	-
Benzo[b]fluoranthene	205-99-2	-	< 0.010	-
Benzo[k]fluoranthene	207-08-9	-	< 0.010	-
Benzo[a]pyrene	50-32-8	-	< 0.010	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.010	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.010	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.010	-
Total (USEPA16) PAHs	-	-	< 0.170	-

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	93
Acenaphthene-d10	97
Phenanthrene-d10	100
Chrysene-d12	106
Perylene-d12	111

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	77
Terphenyl-d14	72

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W217133

Customer ESG Limited (Bridgend)
Site Ty Garreg
Report No W217133

Consignment No W101946
Date Logged 25-Mar-2016

Report Due 05-Apr-2016

ID Number	Description	Matrix Type	Sampled	Report A	ICPMSW	Nickel as Ni MS (Dissolved)	Chromium as Cr MS (Dissolved)	Cadmium as Cd MS (Dissolved)	Copper as Cu MS (Dissolved)	Lead as Pb MS (Dissolved)	Zinc as Zn MS (Dissolved)	Manganese as Mn MS (Dissolved)	Arsenic as As MS (Dissolved)	Mercury as Hg MS (Dissolved)	Selenium as Se MS (Dissolved)	Molybdenum as Mo MS (Dissolved)	Cobalt as Co MS (Dissolved)	Vanadium as V MS (Total)	ICPMA1VAR			
																			Total Sulphur as SO4 (Diss) VAR	Calcium as Ca (Dissolved) VAR	Magnesium as Mg (Dissolved) VAR	Sodium as Na (Dissolved) VAR
MethodID					ICPMSWT	ICPMSWT																
EX/1676204	BH1A/15	Unclassified	23/03/16																			
EX/1676205	BH5/12 W1	Unclassified	23/03/16																			
EX/1676206	BH5/12 W2	Unclassified	23/03/16																			
EX/1676207	BH1327/1227A	Unclassified	23/03/16																			

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - Note: due date may be affected if triggered
	No analysis scheduled
^	Analysis Subcontracted - Note: due date may vary

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.
Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

W217133

Customer ESG Limited (Bridgend)
Site Ty Garreg
Report No W217133

Consignment No W101946
Date Logged 25-Mar-2016

Report Due 05-Apr-2016

ID Number	Description	MethodID		ICPMAT/VAR	KONENS					PAHMSW	PHBPLC/L	SFAPL	SFAS	WSLM12	WSLM17	
		Matrix Type	Sampled		Boron as B (Dissolved) VAR	Aluminium as Al (Dissolved) VAR	Iron as Fe (Dissolved) VAR	Potassium as K (Dissolved) VAR	Chloride as Cl (Kone)	Ammoniacal Nitrogen (Kone)	Nitrite as N (Kone)	Nitrate as N (Kone calc)	PAH GC-MS (16)	Phenols by HPLC (Low Level)	Cyanide (Total) as CN SFA	Sulphide as S SFA
EX/1676204	BH1A/15	Unclassified	23/03/16					E	E	E	E					
EX/1676205	BH5/12 W1	Unclassified	23/03/16					E	E	E	E					
EX/1676206	BH5/12 W2	Unclassified	23/03/16					E	E	E	E					
EX/1676207	BH1327/1227A	Unclassified	23/03/16					E	E	E	E					

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key	
A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time
Requested Analysis Key	
	Analysis Required
	Analysis dependant upon trigger result - Note: due date may be affected if triggered
	No analysis scheduled
^	Analysis Subcontracted - Note: due date may vary

The integrity of data for samples/analysis that have been categorised as Deviating may be compromised. Data may not be representative of the sample at the time of sampling.
Where individual results are flagged see report notes for status.

Report Number : W/EXR/217133

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
PHEHPLCVL	EX1676204; EX1676205; EX1676206; EX1676207	This sample was diluted to bring the contamination levels to within the calibration range of the instrument so a value could be reported but in doing so, the detection limit for this test has been elevated. Please take this information into consideration when utilising the data.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPMSWT	As Received	Determination of Total Metals in water samples using nitric acid digestion and ICPMS quantitation
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	PAHMSW	As Received	Determination of PolyAromatic Hydrocarbons in water by pentane extraction GCMS quantitation
Water	PHEHPLCVL	As Received	Determination of Phenols by HPLC
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	SFAS	As Received	Determination of Sulphide by segmented flow analysis with colorimetric detection
Water	WSLM12	As Received	Titration with Sulphuric Acid to required pH
Water	WSLM17	As Received	Titration with Sodium Hydroxide to required pH

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm³@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile

TR Denotes Tremolite

CR Denotes Crocidolite

AC Denotes Actinolite

AM Denotes Amosite

AN Denotes Anthophyllite

NAIIS No Asbestos Identified in Sample

NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.

\$\$ Unable to analyse due to the nature of the sample

¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

¥ Results for guidance only due to possible interference

& Blank corrected result

I.S Insufficient sample to complete requested analysis

I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

N.D Not determined

N.Det Not detected

N.F No Flow

NS Information Not Supplied

Req Analysis requested, see attached sheets for results

▯ Raised detection limit due to nature of the sample

* All accreditation has been removed by the laboratory for this result

‡ MCERTS accreditation has been removed for this result

§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : ESG Limited (Bridgend)

Site : Ty Garreg

Report Number : W21_7133

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