AMG RESOURCES LIMITED

Permit number EPR/BM2381IQ

2022 Annual Review

Report Number 2315r1v1d0223

Commissioned by
AMG Resources Limited
Nevill's Dock
Llanelli
Carmarthenshire
SA15 2HD

Prepared by
Geotechnology Ltd
Ty Coed
Cefn-yr-Allt
Aberdulais
SA10 8HE

February 2023

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1 INTRODUCTION

Each year, AMG Resources Limited (AMG) is required to undertake a report on the performance of the activities over the previous year and report to Natural Resources Wales (NRW) by 31 January each year.

Condition 4.2.2. of AMG's Environmental Permit (EPR/BM2381IQ) states:

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

(a) a review of the results of the monitoring and assessment carried out in accordance with the permit including an interpretive review of the data."

This report provides a review of the data gathered during 2022 and has been compiled on behalf of AMG with assistance from Geotechnology Ltd.

2 PERMIT RETURNS

The Permit provides template forms for capturing data required by NRW. These have been completed by AMG and are provided in Appendix 1.

2.1 Energy Usage

As the Installation Permit is no longer active, the site did not consume any energy related to the Installation Permit.

2.2 Raw Material

No raw materials were consumed at the installation in 2022.

2.3 Waste

No waste was removed from the Installation in 2022.

2.4 Air Emissions

There continues to be no emissions to air from emission points A1, A2 and A3 to report due to the boiler being decommissioned on 29 April 2015.

3 GROUNDWATER MONITORING

3.1 Monitoring Network

The monitoring network comprises a series of shallow boreholes that have been monitored for over a decade. Since Geotechnology has been involved with the monitoring programme in 2020 many of the wells have been found to be in poor condition, lost due to inadvertent damage / covering or contain insufficient water to allow sampling.

To address these issues, replacement wells were installed in early 2022 with their positions shown on Figure 1. These wells were located as close as possible to the old wells and are referred to as BH201-BH207. Position BH201 is intended to replace G1, BH202 to replace G2 and so on. The design of the new wells also replicates the old wells i.e. each well is installed to the base of the shallow made ground and intends to intersect perched groundwater passing along the base of the made ground, at the interface with the underlying natural low permeability deposits.

This significant investment in new monitoring infrastructure by AMG has allowed more groundwater samples to be collected during 2022 although some wells are still found, at times, to be dry or to contain such little water that a representative sample cannot be collected. This is particularly the case at G6 / BH206.

3.2 Monitoring Programme

During 2022, the new groundwater wells have been monitored at least 6 monthly as required by the permit. During 2023, quarterly monitoring will continue to inform the ongoing Permit surrender preparations.

All samples collected for testing are placed into cooler boxes and transported via courier to UKAS accredited ALS based in Chester. The original laboratory certificates are provided in Appendix 2.

3.3 Groundwater Levels

Groundwater is typically 2-4m below ground level and typically varies by less than 1m between seasons and years. This data is presented in Appendix 3. Groundwater has been typically highest at positions G4, G5 and G7 (BH204, 205 and 207).

3.4 Groundwater Quality

Temporal variation of selected parameters is presented in Appendix 3. The analysis reveals long-term improvements in groundwater quality, particularly in terms of several trace metals.

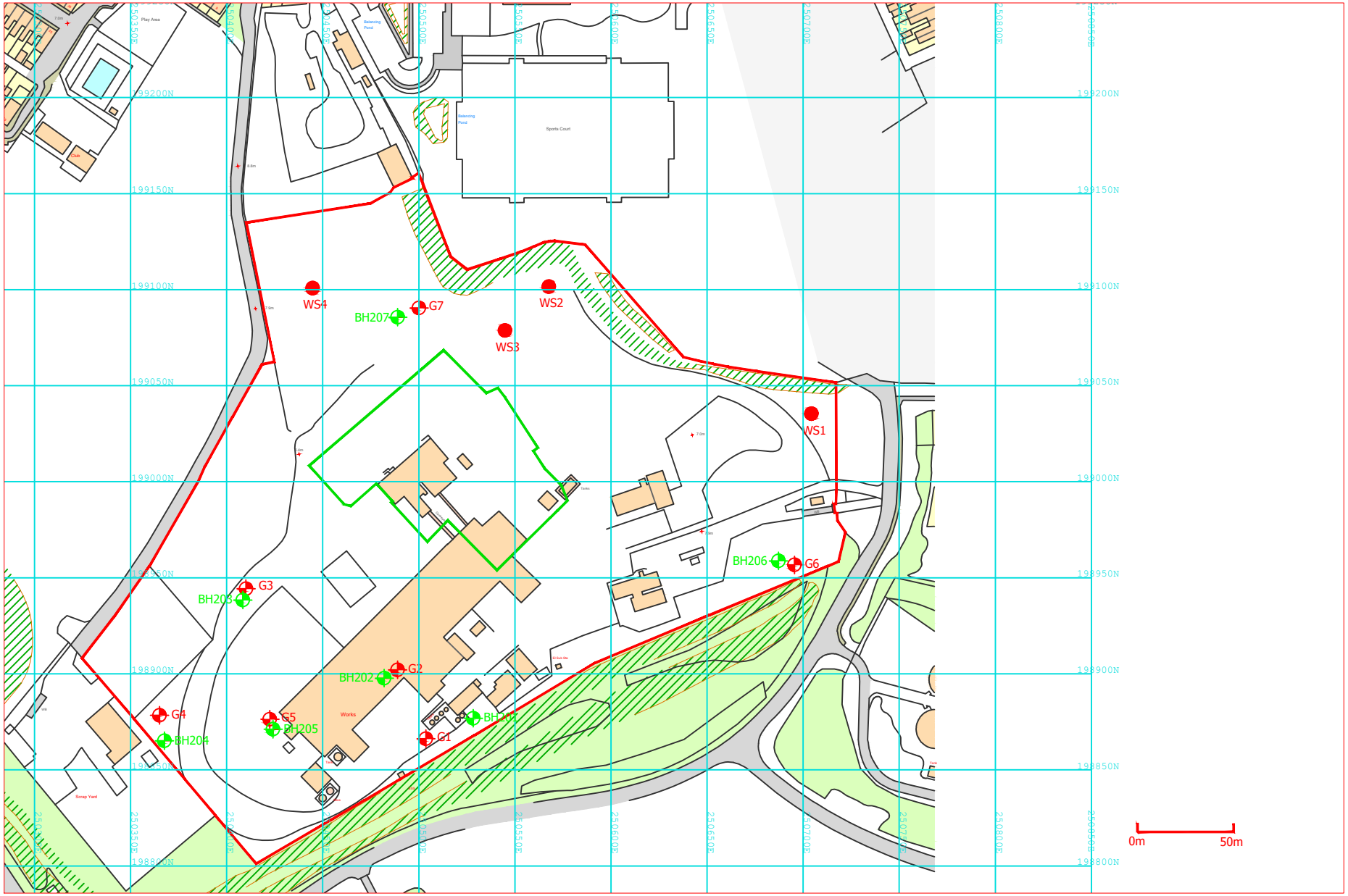
The groundwater at G5 (BH205) and G2 (BH202) is characterised by a strongly alkaline pH (pH 9.5 – 10.5) whilst the other wells contain groundwater with pH between approximately pH 7 and 8. The more alkaline groundwater tends to be more mineralised. Such chemistry may be reflective of the slag based made ground that was historically used to infill the site prior to the AMG operations.

In recent years, most trace metals have been present at declining and low concentrations. Tin continues to be detectable at several positions along with Arsenic, Chromium, Iron, Lead, Mercury, Nickel and Zinc. The levels observed are comparable to levels observed previously with some concentrations still above Environmental Quality Standards. The highest concentrations tend to be found at G2 and G5 although this is not always the case. Hydrocarbons were also found, as noted previously.

4 CONCLUSIONS

The AMG site at Llanelli is currently not used for the activities detailed in the Installation Permit. This is reflected in the annual returns.

An initial appraisal of the groundwater data suggests that groundwater quality has not significantly deteriorated from that detected at the time of Permit issue, but this aspect will be reviewed in more detail as part of the ongoing preparations for surrender.



Drawing Number 2315/1

Legend

- Replacement Well
- Original Well

NOTE

CLIENT: **AMG Resources Limited**

Rev	Date	Status/Ammendments

PROJECT: **2022 Annual Review**

TITLE: **Monitoring Locations**

DRAWING NUMBER: **2315/1**

REVISION: **0**

SCALE	DATE	DRAWN	CHECKED
As Shown	02.23	KP	

Geotechnology
Ty Coed, Cefn-yr-Allt,
Aberdulais, Neath
SA10 8HE
01639 775293
www.geotechnology.net

AMG RESOURCES LIMITED

Permit number EPR/BM2381IQ

2022 Annual Review

Appendix 1
NRW Returns

Report Number 2315r1v1d0223

Permit Number: BM3381IQ Operator: AMG Resources Ltd

Facility: AMG Resources Ltd Form Number: Air1 / 13/06/20

Reporting of emissions to air for the period from 01/01/2022 to 31/12/2022

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result [1]	Test Method [2]	Sample Date and Times [3]	Uncertainty [4]
A2	Particulate Matter	5 mg/m³	Continuous	n/a	BS EN 13284-1		
	Copper, lead, zinc and their compounds taken together (as metal)	2.0 mg/m³		n/a	BS EN 13284-1		
	Cadmium, arsenic, nickel and their compounds taken together (as elements	0.2 mg/m³		n/a	-		
	Tin and its compounds (as Sn)	2.0 mg/m³		n/a	-		
	Dioxins (ITEQ)	0.1 ng/m³		n/a	-		
A3	Particulate matter	5 mg/m³	Continuous	n/a	BS EN 13284-1		
A3	Oxides of Nitrogen	200 mg/m³		n/a	-		

[1] The result given is the maximum value (or the minimum value in the case of a limit that is expressed as a minimum) obtained during the reporting period, expressed in the same terms as the emission limit value. Where the emission limit value is expressed as a range, the result is given as the 'minimum – maximum' measured values.
[2] Where an internationally recognised standard test method is used the reference number is given. Where another method that has been formally agreed with Natural Resources Wales is used, then the appropriate identifier is given. In other cases the principal technique is stated, for example gas chromatography.
[3] For non-continuous measurements the date and time of the sample that produced the result is given. For continuous measurements the percentage of the process operating time covered by the result is given.
[4] The uncertainty associated with the quoted result at the 95% confidence interval, unless otherwise stated.

Signed ..... Date.....
(Authorised to sign as representative of Operator)

Permit Number: BM3381IQ Operator: AMG Resources Limited

Facility: AMG Resources Ltd Form Number: Water1 / 13/06/20

Reporting of emissions to water (other than to sewer) and land for the period from 01/01/2022 to 31/12/2022

Emission Point	Substance / Parameter	Emission Limit Value	Reference Period	Result [1]	Test Method [2]	Sample Date and Times [3]	Uncertainty [4]
W1	Total Oxidised Nitrogen (TON) as N mg l-1	3 mg/l		n/a			

[1] The result given is the maximum value (or the minimum value in the case of a limit that is expressed as a minimum) obtained during the reporting period, expressed in the same terms as the emission limit value. Where the emission limit value is expressed as a range, the result is given as the 'minimum – maximum' measured values.

[2] Where an internationally recognised standard test method is used the reference number is given. Where another method that has been formally agreed with Natural Resources Wales is used, then the appropriate identifier is given. In other cases the principal technique is stated, for example gas chromatography.

[3] For non-continuous measurements the date and time of the sample that produced the result is given. For continuous measurements the percentage of the process operating time covered by the result is given.

[4] The uncertainty associated with the quoted result at the 95% confidence interval, unless otherwise stated.

Signed .....

(Authorised to sign as representative of Operator)

Date.....

Permit Number:	BM3381IQ	Operator:	AMG Resources Ltd]
Facility:	AMG Resources Ltd	Form Number:	Energy1 / 13/06/20

Reporting of Energy Usage for the year 2022

Energy Source	Energy Usage Quantity	Primary Energy (MWh)	Specific Usage (MWh/unit output)
Electricity *	MWh		
Natural Gas	MWh		
Gas Oil	tonnes		
Recovered Fuel Oil	tonnes		
TOTAL	-		

* Conversion factor for delivered electricity to primary energy = 2.4

Operator's comments :

Signed  Date.....

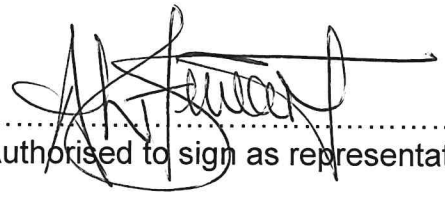
(Authorised to sign as representative of Operator)

Permit Number:	BM3381IQ	Operator:	AMG Resources Ltd
Facility:	AMG Resources Ltd	Form Number:	Performance1 / 13/06/20

Reporting of other performance indicators for the period 01/01/2022 to 31/12/2022

Parameter	Units
Total raw material used	tonnes

Operator's comments :

Signed  .....

(Authorised to sign as representative of Operator)

Date.....

AMG RESOURCES LIMITED

Permit number EPR/BM2381IQ

2022 Annual Review

Appendix 2 Groundwater Monitoring Certificates

Report Number 2315r1v1d0223

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
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CH5 3US
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Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Geotechnology
5 Cefn-yr-Allt
Aberdulais
Neath
West Glamorgan
SA10 8HE

Attention: Alex Stewart

CERTIFICATE OF ANALYSIS

Date of report Generation:	15 March 2022
Customer:	Geotechnology
Sample Delivery Group (SDG):	220305-95
Your Reference:	
Location:	AMG Llanelli
Report No:	637591
Order Number:	L15631

We received 7 samples on Saturday March 05, 2022 and 7 of these samples were scheduled for analysis which was completed on Tuesday March 15, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.
The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager

CERTIFICATE OF ANALYSIS

SDG: 220305-95 **Report Number:** 637591 **Superseded Report:**
Client Ref.: **Location:** AMG Llanelli

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
25925049	BH201			04/03/2022
25925050	BH202			04/03/2022
25925051	BH203			04/03/2022
25925052	BH204			04/03/2022
25925053	BH205			04/03/2022
25925054	BH206			04/03/2022
25925055	BH207			04/03/2022

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

CERTIFICATE OF ANALYSIS

SDG: 220305-95 **Report Number:** 637591 **Superseded Report:**
Client Ref.: **Location:** AMG Llanelli

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

			Lab Sample No(s)	25925049	25925050	25925051	25925052
			Customer Sample Reference	BH201	BH202	BH203	BH204
			AGS Reference				
			Depth (m)				
			Container	1000ml glass bottle (ALE220)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	1000ml glass bottle (ALE220)	500ml Plastic (ALE208)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)	1000ml glass bottle (ALE220)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	1000ml glass bottle (ALE220)	500ml Plastic (ALE208)	H2SO4 (ALE244)
			Sample Type	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 7			X						X					X					X
Anions by Kone (w)	All	NDPs: 0 Tests: 7		X						X					X					X	
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 7		X						X					X					X	
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 7				X				X							X				
EPH (DRO) (C10-C40) Aqueous (W)	All	NDPs: 0 Tests: 7	X						X					X					X		
GRO by GC-FID (W)	All	NDPs: 0 Tests: 7						X					X					X			
Nitrite by Kone (w)	All	NDPs: 0 Tests: 7					X					X					X				
pH Value	All	NDPs: 0 Tests: 7		X						X					X					X	
Total EPH (aq)	All	NDPs: 0 Tests: 7	X						X					X					X		
TPH by IR Oils and Greases	All	NDPs: 0 Tests: 7	X						X					X					X		
VOC MS (W)	All	NDPs: 0 Tests: 7						X					X	X					X		

25925055	BH207			Vial (ALE297)	GW						X					X
				NaOH (ALE245)	GW							X				
				H2SO4 (ALE244)	GW	X										
				500ml Plastic (ALE208)	GW		X	X	X				X			
				1000ml glass bottle (ALE220)	GW					X				X	X	
25925054	BH206			Vial (ALE297)	GW						X					X
				NaOH (ALE245)	GW							X				
				HNO3 Filtered (ALE204)	GW				X							
				H2SO4 (ALE244)	GW	X										
				500ml Plastic (ALE208)	GW		X	X					X			
				1000ml glass bottle (ALE220)	GW					X				X	X	
25925053	BH205			H2SO4 (ALE244)	GW	X										
				500ml Plastic (ALE208)	GW		X	X	X			X	X			
				1000ml glass bottle (ALE220)	GW					X	X			X	X	X
25925052	BH204			NaOH (ALE245)	GW							X				
				HNO3 Filtered (ALE204)	GW				X							

Validated

CERTIFICATE OF ANALYSIS

SDG: 220305-95 **Report Number:** 637591 **Superseded Report:**

Client Ref.: **Location:** AMG Llanelli

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+$@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH201	BH202	BH203	BH204	BH205	BH206
			Depth (m)	.	.	.	.	.	.
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	04/03/2022	04/03/2022	04/03/2022	04/03/2022	04/03/2022	04/03/2022
			Sample Time	.	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
			Date Received	05/03/2022	05/03/2022	05/03/2022	05/03/2022	05/03/2022	05/03/2022
			SDG Ref	220305-95	220305-95	220305-95	220305-95	220305-95	220305-95
			Lab Sample No.(s)	25925049	25925050	25925051	25925052	25925053	25925054
			AGS Reference						
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099		<0.2 #	14.2 #	3.38 #	<0.2 #	10.5 #	<0.2 #
Conductivity @ 20 deg.C	<0.02 mS/cm	TM120		0.944 #	13.2 #	2.59 #	1.98 #	13.4 #	0.686 #
Arsenic (diss.filt)	<0.5 µg/l	TM152		13.5 #	9310 2 #	270 #	87.9 #	1380 2 #	9.12 #
Cadmium (diss.filt)	<0.08 µg/l	TM152		<0.08 #	0.145 2 #	<0.08 #	<0.08 #	0.19 2 #	<0.08 #
Chromium (diss.filt)	<1 µg/l	TM152		<1 #	<1 2 #	2.07 #	8.83 #	<1 2 #	<1 #
Copper (diss.filt)	<0.3 µg/l	TM152		4.28 #	57.4 2 #	16.2 #	13.5 #	126 2 #	2.34 #
Lead (diss.filt)	<0.2 µg/l	TM152		0.684 #	17.5 2 #	4.88 #	1.31 #	16.4 2 #	<0.2 #
Manganese (diss.filt)	<3 µg/l	TM152		94.6 #	5.33 2 #	26.9 #	69.7 #	42.3 2 #	6.02 #
Nickel (diss.filt)	<0.4 µg/l	TM152		1.18 #	48.6 2 #	5.01 #	10.4 #	28.6 2 #	0.914 #
Zinc (diss.filt)	<1 µg/l	TM152		9.74 #	28.5 2 #	7.17 #	3.14 #	20.1 2 #	1.75 #
Tin (Diss.Filt)	<1 µg/l	TM152		2.49 #	10700 2 #	16.2 #	6.94 #	61.3 2 #	<1 #
Sodium (Dis.Filt)	<0.076 mg/l	TM152		69.5 #	3200 2 #	613 #	408 #	3530 2 #	45.7 #
Magnesium (Dis.Filt)	<0.036 mg/l	TM152		11.8 #	0.047 2 #	4.54 #	26.7 #	3.7 2 #	9.27 #
Potassium (Dis.Filt)	<0.2 mg/l	TM152		9.28 #	39.8 2 #	12.1 #	13.5 #	51 2 #	5.1 #
Calcium (Dis.Filt)	<0.2 mg/l	TM152		141 #	1.41 2 #	4.15 #	28.2 #	3.1 2 #	104 #
Iron (Dis.Filt)	<0.019 mg/l	TM152		0.036 #	2.93 2 #	0.206 #	0.102 #	1.39 2 #	<0.019 #
EPH Range >C10 - C40 (aq)	<100 µg/l	TM172		142 #	56100 #	550 #	1780 #	2510 #	102 #
Total EPH (C6-C40) (aq)	<100 µg/l	TM172		142	56100	550	1780	2510	102
Nitrite as NO2	<0.05 mg/l	TM184		<0.05 #	66.4 #	<0.05 #	0.215 #	0.093 2 #	<0.05 #
Sulphate	<2 mg/l	TM184		45 #	231 #	49.6 #	61 #	263 #	32.7 #
Nitrate as NO3	<0.3 mg/l	TM184		11.6	9.8	<0.3	9.35	<1.5	1.24
TPH / Oil & Greases	<1 mg/l	TM235		<10	140	<2	<5	15.4	<2
pH	<1 pH Units	TM256		7.47 #	11.9 #	9.57 #	8.79 #	9.79 #	7.68 #

Validated

CERTIFICATE OF ANALYSIS

SDG: 220305-95 **Report Number:** 637591 **Superseded Report:**

Client Ref.: **Location:** AMG Llanelli

Results Legend	
#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+$@	Sample deviation (see appendix)

Customer Sample Ref.	BH207						
Depth (m)	.						
Sample Type	Ground Water (GW)						
Date Sampled	04/03/2022						
Sample Time	00:00:00						
Date Received	05/03/2022						
SDG Ref	220305-95						
Lab Sample No.(s)	25925055						
AGS Reference							
Component	**LOD/Units**	**Method**					
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2 #				
Conductivity @ 20 deg.C	<0.02 mS/cm	TM120	0.899 #				
Arsenic (diss.filt)	<0.5 µg/l	TM152	118 2 #				
Cadmium (diss.filt)	<0.08 µg/l	TM152	2.93 2 #				
Chromium (diss.filt)	<1 µg/l	TM152	<1 2 #				
Copper (diss.filt)	<0.3 µg/l	TM152	30.9 2 #				
Lead (diss.filt)	<0.2 µg/l	TM152	<0.2 2 #				
Manganese (diss.filt)	<3 µg/l	TM152	52.4 2 #				
Nickel (diss.filt)	<0.4 µg/l	TM152	18.9 2 #				
Zinc (diss.filt)	<1 µg/l	TM152	1600 2 #				
Tin (Diss.Filt)	<1 µg/l	TM152	<1 2 #				
Sodium (Dis.Filt)	<0.076 mg/l	TM152	53.6 2 #				
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	7.54 2 #				
Potassium (Dis.Filt)	<0.2 mg/l	TM152	13.5 2 #				
Calcium (Dis.Filt)	<0.2 mg/l	TM152	140 2 #				
Iron (Dis.Filt)	<0.019 mg/l	TM152	<0.019 2 #				
EPH Range >C10 - C40 (aq)	<100 µg/l	TM172	1170 #				
Total EPH (C6-C40) (aq)	<100 µg/l	TM172	1170				
Nitrite as NO2	<0.05 mg/l	TM184	<0.05 #				
Sulphate	<2 mg/l	TM184	225 #				
Nitrate as NO3	<0.3 mg/l	TM184	11.3				
TPH / Oil & Greases	<1 mg/l	TM235	<10				
pH	<1 pH Units	TM256	7.65 #				

Validated

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Client Ref.: **Location:** AMG Llanelli

GRO by GC-FID (W)

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+$@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH201	BH202	BH203	BH204	BH205	BH206
			Depth (m)	.	.	.	.	.	.
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	04/03/2022	04/03/2022	04/03/2022	04/03/2022	04/03/2022	04/03/2022
			Sample Time	.	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
			Date Received	05/03/2022	05/03/2022	05/03/2022	05/03/2022	05/03/2022	05/03/2022
			SDG Ref	220305-95	220305-95	220305-95	220305-95	220305-95	220305-95
			Lab Sample No.(s)	25925049	25925050	25925051	25925052	25925053	25925054
			AGS Reference						
GRO >C5-C10	<10 µg/l	TM245		<10	10	30 1	<10 1	<10 1	<10
EPH (C6-C10)	<100 µg/l	TM245		<100	<100	<100 1	<100 1	<100 1	<100

CERTIFICATE OF ANALYSIS

SDG: 220305-95 **Report Number:** 637591 **Superseded Report:**
Client Ref.: **Location:** AMG Llanelli

GRO by GC-FID (W)

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+$@	Sample deviation (see appendix)

Customer Sample Ref.	BH207
Depth (m)	.
Sample Type	Ground Water (GW)
Date Sampled	04/03/2022
Sample Time	00:00:00
Date Received	05/03/2022
SDG Ref	220305-95
Lab Sample No.(s)	25925055
AGS Reference	

Component	LOD/Units	Method	
GRO >C5-C10	<10 µg/l	TM245	<10
EPH (C6-C10)	<100 µg/l	TM245	<100

Validated

CERTIFICATE OF ANALYSIS

SDG: 220305-95 **Report Number:** 637591 **Superseded Report:**

Client Ref.: **Location:** AMG Llanelli

VOC MS (W)

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+$@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH201	BH202	BH203	BH204	BH205	BH206
			Depth (m)	.	.	.	.	.	.
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	04/03/2022	04/03/2022	04/03/2022	04/03/2022	04/03/2022	04/03/2022
			Sample Time	.	00:00:00	00:00:00	00:00:00	00:00:00	00:00:00
			Date Received	05/03/2022	05/03/2022	05/03/2022	05/03/2022	05/03/2022	05/03/2022
			SDG Ref	220305-95	220305-95	220305-95	220305-95	220305-95	220305-95
			Lab Sample No.(s)	25925049	25925050	25925051	25925052	25925053	25925054
			AGS Reference						
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208		<1 #	<1 3 #	<1 1 #	<1 1 #	<1 2 #	<1 #
Benzene	<1 µg/l	TM208		<1 #	<1 3 #	<1 1 #	<1 1 #	<1 2 #	<1 #
Toluene	<1 µg/l	TM208		<1 #	<1 3 #	<1 1 #	<1 1 #	<1 2 #	<1 #
Ethylbenzene	<1 µg/l	TM208		<1 #	<1 3 #	<1 1 #	<1 1 #	<1 2 #	<1 #
m,p-Xylene	<1 µg/l	TM208		<1 #	<1 3 #	<1 1 #	<1 1 #	<1 2 #	<1 #
o-Xylene	<1 µg/l	TM208		<1 #	<1 3 #	<1 1 #	<1 1 #	<1 2 #	<1 #
Sum of BTEX	<5 µg/l	TM208		<5	<5 3	<5 1	<5 1	<5 2	<5

CERTIFICATE OF ANALYSIS

SDG: 220305-95 **Report Number:** 637591 **Superseded Report:**
Client Ref.: **Location:** AMG Llanelli

VOC MS (W)

Results Legend	
#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+$@	Sample deviation (see appendix)

Customer Sample Ref.			BH207
Depth (m)			.
Sample Type			Ground Water (GW)
Date Sampled			04/03/2022
Sample Time			00:00:00
Date Received			05/03/2022
SDG Ref			220305-95
Lab Sample No.(s)			25925055
AGS Reference			
Component	**LOD/Units**	**Method**	
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1 #
Benzene	<1 µg/l	TM208	<1 #
Toluene	<1 µg/l	TM208	<1 #
Ethylbenzene	<1 µg/l	TM208	<1 #
m,p-Xylene	<1 µg/l	TM208	<1 #
o-Xylene	<1 µg/l	TM208	<1 #
Sum of BTEX	<5 µg/l	TM208	<5

Table of Results - Appendix

Method No	Reference	Description
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH in Waters
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM235	The Determination of Hydrocarbon Oils in Waters by Solvent Extraction, Infra red Absorption and Gravimetry 1983, HMSO, London	Determination of Total Petroleum Hydrocarbons (TPH) in Waters By Infra-Red Spectroscopy
TM245	By GC-FID	Determination of GRO by Headspace in waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

CERTIFICATE OF ANALYSIS

SDG: 220305-95 **Report Number:** 637591 **Superseded Report:**
Client Ref.: **Location:** AMG Llanelli

Test Completion Dates

Lab Sample No(s)	25925049	25925050	25925051	25925052	25925053	25925054	25925055
Customer Sample Ref.	BH201	BH202	BH203	BH204	BH205	BH206	BH207
AGS Ref.							
Depth							
Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Ammoniacal Nitrogen	14-Mar-2022	09-Mar-2022	14-Mar-2022	14-Mar-2022	09-Mar-2022	14-Mar-2022	14-Mar-2022
Anions by Kone (w)	14-Mar-2022	14-Mar-2022	14-Mar-2022	14-Mar-2022	14-Mar-2022	14-Mar-2022	14-Mar-2022
Conductivity (at 20 deg.C)	09-Mar-2022	09-Mar-2022	09-Mar-2022	09-Mar-2022	09-Mar-2022	09-Mar-2022	09-Mar-2022
Dissolved Metals by ICP-MS	14-Mar-2022	15-Mar-2022	14-Mar-2022	14-Mar-2022	12-Mar-2022	14-Mar-2022	14-Mar-2022
EPH (DRO) (C10-C40) Aqueous (W)	12-Mar-2022	12-Mar-2022	12-Mar-2022	14-Mar-2022	14-Mar-2022	14-Mar-2022	14-Mar-2022
GRO by GC-FID (W)	14-Mar-2022	11-Mar-2022	14-Mar-2022	14-Mar-2022	14-Mar-2022	11-Mar-2022	11-Mar-2022
Nitrite by Kone (w)	12-Mar-2022	12-Mar-2022	12-Mar-2022	12-Mar-2022	12-Mar-2022	12-Mar-2022	12-Mar-2022
pH Value	09-Mar-2022	10-Mar-2022	10-Mar-2022	10-Mar-2022	10-Mar-2022	10-Mar-2022	09-Mar-2022
Total EPH (aq)	14-Mar-2022	12-Mar-2022	14-Mar-2022	14-Mar-2022	14-Mar-2022	14-Mar-2022	14-Mar-2022
TPH by IR Oils and Greases	11-Mar-2022	11-Mar-2022	11-Mar-2022	14-Mar-2022	14-Mar-2022	14-Mar-2022	14-Mar-2022
VOC MS (W)	14-Mar-2022	14-Mar-2022	14-Mar-2022	14-Mar-2022	14-Mar-2022	14-Mar-2022	14-Mar-2022

Appendix General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials andd soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

AMG Resources Ltd
Nevill's Dock
Llanelli
SA15 2HD

Attention: Ben Rees

CERTIFICATE OF ANALYSIS

Date of report Generation:	01 July 2022
Customer:	AMG Resources Ltd
Sample Delivery Group (SDG):	220623-84
Your Reference:	
Location:	AMG Llanelli
Report No:	652835
Order Number:	

We received 7 samples on Thursday June 23, 2022 and 6 of these samples were scheduled for analysis which was completed on Friday July 01, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.

Approved By:

Sonia McWhan

Operations Manager

ALS Life Sciences Limited. Registered Office: Units 7 & 8 Hawarden Business Park, Manor Road, Hawarden, Deeside, CH5 3US. Registered in England and Wales No. 4057291.

Version: 3.3 Version Issued: 01/07/2022

CERTIFICATE OF ANALYSIS

SDG: 220623-84 **Report Number:** 652835 **Superseded Report:**
Client Ref.: **Location:** AMG Llanelli

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
26476608	BH201			21/06/2022
26476610	BH202			21/06/2022
26476611	BH203			21/06/2022
26476612	BH204			21/06/2022
26476613	BH205			21/06/2022
26476614	BH207			21/06/2022
26476615	NO ID			21/06/2022

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

CERTIFICATE OF ANALYSIS

SDG: 220623-84 **Report Number:** 652835 **Superseded Report:**
Client Ref.: **Location:** AMG Llanelli

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

			Lab Sample No(s)	26476608					26476610						26476611						26476612					
			Customer Sample Reference	BH201					BH202						BH203						BH204					
			AGS Reference																							
			Depth (m)																							
			Container	1lplastic (ALE221)	250ml Amber Gl. PTFE/PE (ALE219)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)	1lplastic (ALE221)	250ml Amber Gl. PTFE/PE (ALE219)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)	1lplastic (ALE221)	250ml Amber Gl. PTFE/PE (ALE219)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)	0.5l glass bottle (ALE227)	1lplastic (ALE221)	250ml Amber Gl. PTFE/PE (ALE219)	H2SO4 (ALE244)					
			Sample Type	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW					
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 6				X					X					X							X				
Anions by Kone (w)	All	NDPs: 0 Tests: 6	X						X					X							X						
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 6	X						X					X							X						
EPH (DRO) (C10-C40) Aqueous (W)	All	NDPs: 0 Tests: 6		X						X					X							X					
GRO by GC-FID (W)	All	NDPs: 0 Tests: 6					X						X					X									
Nitrite by Kone (w)	All	NDPs: 0 Tests: 6				X						X					X										
pH Value	All	NDPs: 0 Tests: 6	X						X					X							X						
Total EPH (aq)	All	NDPs: 0 Tests: 6		X						X					X				X								
TPH by IR Oils and Greases	All	NDPs: 0 Tests: 6		X						X					X				X								
VOC MS (W)	All	NDPs: 0 Tests: 6					X						X					X									

26476614	BH207			Vial (ALE297)	GW					X					X
				NaOH (ALE245)	GW						X				
				H2SO4 (ALE244)	GW	X									
				250ml Amber Gl. PTFE/PE (ALE219)	GW				X				X	X	
				1lplastic (ALE221)	GW		X	X				X			
26476613	BH205			Vial (ALE297)	GW					X					X
				NaOH (ALE245)	GW						X				
				H2SO4 (ALE244)	GW	X									
				250ml Amber Gl. PTFE/PE (ALE219)	GW				X				X	X	
				1lplastic (ALE221)	GW		X	X				X			
26476612	BH204			Vial (ALE297)	GW					X					X
				NaOH (ALE245)	GW						X				

Validated

CERTIFICATE OF ANALYSIS

SDG: 220623-84 **Report Number:** 652835 **Superseded Report:**

Client Ref.: **Location:** AMG Llanelli

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH201	BH202	BH203	BH204	BH205	BH207
			Depth (m)	.	.	.	.	.	.
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	21/06/2022	21/06/2022	21/06/2022	21/06/2022	21/06/2022	21/06/2022
			Sample Time	.	.	.	.	.	.
			Date Received	23/06/2022	23/06/2022	23/06/2022	23/06/2022	23/06/2022	23/06/2022
			SDG Ref	220623-84	220623-84	220623-84	220623-84	220623-84	220623-84
			Lab Sample No.(s)	26476608	26476610	26476611	26476612	26476613	26476614
			AGS Reference						
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099		<0.2	4.91	1.2	2.29	5.99	0.347
Arsenic (diss.filt)	<0.5 µg/l	TM152		19 2	750 2	117 2	225 2	983 2	100 2
Cadmium (diss.filt)	<0.08 µg/l	TM152		<0.08 2	0.193 2	<0.08 2	0.161 2	0.2 2	9.37 2
Chromium (diss.filt)	<1 µg/l	TM152		<1 2	<1 2	1.64 2	1.75 2	<1 2	<1 2
Copper (diss.filt)	<0.3 µg/l	TM152		7.41 2	247 2	15.4 2	134 2	252 2	130 2
Lead (diss.filt)	<0.2 µg/l	TM152		0.233 2	40.5 2	4.68 2	4.98 2	11 2	<0.2 2
Manganese (diss.filt)	<3 µg/l	TM152		177 2	23.2 2	27 2	61.8 2	42.8 2	2030 2
Nickel (diss.filt)	<0.4 µg/l	TM152		1.41 2	11.7 2	3.98 2	12.7 2	15.9 2	69.7 2
Zinc (diss.filt)	<1 µg/l	TM152		2.63 2	17.5 2	8.41 2	1.56 2	11.5 2	3530 2
Tin (Diss.Filt)	<1 µg/l	TM152		<1 2	329 2	5.94 2	9.06 2	58.7 2	<1 2
Sodium (Dis.Filt)	<0.076 mg/l	TM152		102 2	1090 2	403 2	563 2	2400 2	258 2
Magnesium (Dis.Filt)	<0.036 mg/l	TM152		18.6 2	0.17 2	10.3 2	11.2 2	4.18 2	33.9 2
Potassium (Dis.Filt)	<0.2 mg/l	TM152		11.9 2	12.8 2	10.3 2	15.8 2	33 2	25.8 2
Calcium (Dis.Filt)	<0.2 mg/l	TM152		111 2	2.36 2	6.3 2	10.3 2	2.04 2	324 2
Iron (Dis.Filt)	<0.019 mg/l	TM152		<0.019 2	0.399 2	0.119 2	0.162 2	1 2	<0.019 2
EPH Range >C10 - C40 (aq)	<100 µg/l	TM172		6580	650000	499	25200	1830	49800
Total EPH (C6-C40) (aq)	<100 µg/l	TM172		6580	650000	499	25200	1830	49800
Nitrite as NO2	<0.05 mg/l	TM184		0.634	2.36	<0.05	<0.05	0.288	<0.05
Sulphate	<2 mg/l	TM184		65.4	134	41.3	40.8	219	705
Nitrate as NO3	<0.3 mg/l	TM184		5.2	<0.3	<0.3	<0.3	<0.3	2.64
TPH / Oil & Greases	<1 mg/l	TM235		1.23	267	1.77	14.2	15.5	45
pH	<1 pH Units	TM256		7.71	9.98	9.49	9.26	9.79	7.5
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256		0.912	4.38	1.7	2.4	9.78	2.42

Validated

CERTIFICATE OF ANALYSIS

SDG: 220623-84 **Report Number:** 652835 **Superseded Report:**

Client Ref.: **Location:** AMG Llanelli

GRO by GC-FID (W)

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH201	BH202	BH203	BH204	BH205	BH207
			Depth (m)	.	.	.	.	.	.
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	21/06/2022	21/06/2022	21/06/2022	21/06/2022	21/06/2022	21/06/2022
			Sample Time	.	.	.	.	.	.
			Date Received	23/06/2022	23/06/2022	23/06/2022	23/06/2022	23/06/2022	23/06/2022
			SDG Ref	220623-84	220623-84	220623-84	220623-84	220623-84	220623-84
			Lab Sample No.(s)	26476608	26476610	26476611	26476612	26476613	26476614
			AGS Reference						
GRO >C5-C10	<10 µg/l	TM245		<10	<10	<10	<10	<10	<10
EPH (C6-C10)	<100 µg/l	TM245		<100	<100	<100	<100	<100	<100

Validated

CERTIFICATE OF ANALYSIS

SDG: 220623-84 **Report Number:** 652835 **Superseded Report:**
Client Ref.: **Location:** AMG Llanelli

VOC MS (W)

Results Legend	
#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH201	BH202	BH203	BH204	BH205	BH207
			Depth (m)	.	.	.	.	.	.
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	21/06/2022	21/06/2022	21/06/2022	21/06/2022	21/06/2022	21/06/2022
			Sample Time	.	.	.	.	.	.
			Date Received	23/06/2022	23/06/2022	23/06/2022	23/06/2022	23/06/2022	23/06/2022
			SDG Ref	220623-84	220623-84	220623-84	220623-84	220623-84	220623-84
			Lab Sample No.(s)	26476608	26476610	26476611	26476612	26476613	26476614
			AGS Reference						
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
Benzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
Toluene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
Ethylbenzene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
m,p-Xylene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
o-Xylene	<1 µg/l	TM208		<1	<1	<1	<1	<1	<1
Sum of BTEX	<5 µg/l	TM208		<5	<5	<5	<5	<5	<5

Table of Results - Appendix

Method No	Reference	Description
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH in Waters
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM235	The Determination of Hydrocarbon Oils in Waters by Solvent Extraction, Infra red Absorption and Gravimetry 1983, HMSO, London	Determination of Total Petroleum Hydrocarbons (TPH) in Waters By Infra-Red Spectroscopy
TM245	By GC-FID	Determination of GRO by Headspace in waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM).

CERTIFICATE OF ANALYSIS

SDG: 220623-84 **Report Number:** 652835 **Superseded Report:**
Client Ref.: **Location:** AMG Llanelli

Test Completion Dates

Lab Sample No(s)	26476608	26476610	26476611	26476612	26476613	26476614
Customer Sample Ref.	BH201	BH202	BH203	BH204	BH205	BH207
AGS Ref.						
Depth						
Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Ammoniacal Nitrogen	28-Jun-2022	28-Jun-2022	28-Jun-2022	28-Jun-2022	28-Jun-2022	28-Jun-2022
Anions by Kone (w)	27-Jun-2022	27-Jun-2022	27-Jun-2022	27-Jun-2022	27-Jun-2022	27-Jun-2022
Dissolved Metals by ICP-MS	28-Jun-2022	28-Jun-2022	28-Jun-2022	28-Jun-2022	28-Jun-2022	28-Jun-2022
EPH (DRO) (C10-C40) Aqueous (W)	01-Jul-2022	01-Jul-2022	01-Jul-2022	01-Jul-2022	29-Jun-2022	01-Jul-2022
GRO by GC-FID (W)	01-Jul-2022	01-Jul-2022	01-Jul-2022	01-Jul-2022	01-Jul-2022	01-Jul-2022
Nitrite by Kone (w)	27-Jun-2022	27-Jun-2022	25-Jun-2022	25-Jun-2022	27-Jun-2022	25-Jun-2022
pH Value	27-Jun-2022	27-Jun-2022	27-Jun-2022	27-Jun-2022	27-Jun-2022	27-Jun-2022
Total EPH (aq)	01-Jul-2022	01-Jul-2022	01-Jul-2022	01-Jul-2022	01-Jul-2022	01-Jul-2022
TPH by IR Oils and Greases	29-Jun-2022	29-Jun-2022	27-Jun-2022	29-Jun-2022	29-Jun-2022	29-Jun-2022
VOC MS (W)	30-Jun-2022	30-Jun-2022	30-Jun-2022	30-Jun-2022	30-Jun-2022	30-Jun-2022

Appendix General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials andd soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

AMG Resources Ltd
Nevill's Dock
Llanelli
SA15 2HD

Attention: Alex Stewart

CERTIFICATE OF ANALYSIS

Date of report Generation:	01 September 2022
Customer:	AMG Resources Ltd
Sample Delivery Group (SDG):	220824-68
Your Reference:	Monitoring Wells
Location:	AMG Llanelli
Report No:	659753
Order Number:	

We received 6 samples on Wednesday August 24, 2022 and 6 of these samples were scheduled for analysis which was completed on Thursday September 01, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.

Approved By:

Sonia McWhan

Operations Manager

1291

CERTIFICATE OF ANALYSIS

SDG: 220824-68 **Report Number:** 659753 **Superseded Report:**
Client Ref.: Monitoring Wells **Location:** AMG Llanelli

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
26778511	BH201			22/08/2022
26778512	BH202			22/08/2022
26778514	BH203			22/08/2022
26778516	BH204			22/08/2022
26778517	BH205			22/08/2022
26778518	BH207			22/08/2022

Only received samples which have had analysis scheduled will be shown on the following pages.

CERTIFICATE OF ANALYSIS

Validated

SDG: 220824-68 **Report Number:** 659753 **Superseded Report:**
Client Ref.: Monitoring Wells **Location:** AMG Llanelli

Results Legend

- X Test
- N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

Lab Sample No(s)			26778511					26778512					26778514					26778516			
Customer Sample Reference			BH201					BH202					BH203					BH204			
AGS Reference																					
Depth (m)																					
Container			0.5l glass bottle (ALE227)	1plastic (ALE221)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)	1plastic (ALE221)	250ml Amber Gl. PTFE/PE (ALE219)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)	1plastic (ALE221)	250ml Amber Gl. PTFE/PE (ALE219)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)	1plastic (ALE221)	250ml Amber Gl. PTFE/PE (ALE219)	H2SO4 (ALE244)	NaOH (ALE245)
Sample Type			GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 6			X					X					X					X	
Anions by Kone (w)	All	NDPs: 0 Tests: 6		X				X					X					X			
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 6		X				X					X					X			
EPH (DRO) (C10-C40) Aqueous (W)	All	NDPs: 0 Tests: 6	X						X					X					X		
GRO by GC-FID (W)	All	NDPs: 0 Tests: 6					X					X					X				
Nitrite by Kone (w)	All	NDPs: 0 Tests: 6				X					X					X					X
pH Value	All	NDPs: 0 Tests: 6		X				X					X					X			
Total EPH (aq)	All	NDPs: 0 Tests: 6	X						X					X					X		
TPH by IR Oils and Greases	All	NDPs: 0 Tests: 6	X					X					X					X			
VOC MS (W)	All	NDPs: 0 Tests: 6					X					X					X				

26778518	BH207			Vial (ALE297)	GW										X										X
				NaOH (ALE245)	GW												X								
				H2SO4 (ALE244)	GW		X																		
				250ml Amber Gl. PTFE/PE (ALE219)	GW								X								X				
				1lplastic (ALE221)	GW				X		X								X				X		
26778517	BH205			Vial (ALE297)	GW										X										X
				NaOH (ALE245)	GW												X								
				H2SO4 (ALE244)	GW		X																		
				250ml Amber Gl. PTFE/PE (ALE219)	GW								X								X				
				1lplastic (ALE221)	GW				X		X								X				X		
26778516	BH204			Vial (ALE297)	GW										X										X

Validated

CERTIFICATE OF ANALYSIS

SDG: 220824-68 **Report Number:** 659753 **Superseded Report:**
Client Ref.: Monitoring Wells **Location:** AMG Llanelli

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH201	BH202	BH203	BH204	BH205	BH207
			Depth (m)	.	.	.	.	.	.
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	22/08/2022	22/08/2022	22/08/2022	22/08/2022	22/08/2022	22/08/2022
			Sample Time	12:04:00	12:23:00	14:08:00	13:37:00	12:42:00	14:28:00
			Date Received	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022
			SDG Ref	220824-68	220824-68	220824-68	220824-68	220824-68	220824-68
			Lab Sample No.(s)	26778511	26778512	26778514	26778516	26778517	26778518
			AGS Reference						
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099		<0.2 #	4.85 #	0.699 #	0.686 #	6.58 #	0.29 #
Arsenic (diss.filt)	<0.5 µg/l	TM152		21.1 2 #	726 2 #	131 2 #	265 2 #	1130 2 #	135 2 #
Cadmium (diss.filt)	<0.08 µg/l	TM152		<0.08 2 #	0.127 2 #	<0.08 2 #	<0.48 2 #	<0.08 2 #	7.75 2 #
Chromium (diss.filt)	<1 µg/l	TM152		<1 2 #	<1 2 #	1.58 2 #	<6 2 #	<1 2 #	<1 2 #
Copper (diss.filt)	<0.3 µg/l	TM152		7.66 2 #	213 2 #	16.4 2 #	53.1 2 #	103 2 #	86.9 2 #
Lead (diss.filt)	<0.2 µg/l	TM152		<0.2 2 #	40.6 2 #	3.99 2 #	6.73 2 #	8.9 2 #	<0.2 2 #
Manganese (diss.filt)	<3 µg/l	TM152		260 2 #	11.3 2 #	44.5 2 #	70 2 #	28.4 2 #	680 2 #
Nickel (diss.filt)	<0.4 µg/l	TM152		1.8 2 #	9.81 2 #	5.18 2 #	15.5 2 #	9.4 2 #	47.2 2 #
Zinc (diss.filt)	<1 µg/l	TM152		3.84 2 #	30.2 2 #	9.42 2 #	<6 2 #	13.9 2 #	3480 2 #
Tin (Diss.Filt)	<1 µg/l	TM152		<1 2 #	407 2 #	6.21 2 #	15 2 #	36 2 #	<1 2 #
Sodium (Dis.Filt)	<0.076 mg/l	TM152		92.3 2 #	1060 2 #	371 2 #	615 2 #	2390 2 #	184 2 #
Magnesium (Dis.Filt)	<0.036 mg/l	TM152		15.2 2 #	0.19 2 #	12.1 2 #	7.24 2 #	2.13 2 #	25.3 2 #
Potassium (Dis.Filt)	<0.2 mg/l	TM152		11.7 2 #	12.3 2 #	9.92 2 #	14.1 2 #	19.2 2 #	21.2 2 #
Calcium (Dis.Filt)	<0.2 mg/l	TM152		107 2 #	2.12 2 #	7.86 2 #	8.85 2 #	1.54 2 #	282 2 #
Iron (Dis.Filt)	<0.019 mg/l	TM152		<0.019 2 #	0.433 2 #	0.101 2 #	0.191 2 #	0.795 2 #	<0.019 2 #
EPH Range >C10 - C40 (aq)	<100 µg/l	TM172		1440 #	322000 #	1400 #	26200 #	2530 #	10900 #
Total EPH (C6-C40) (aq)	<100 µg/l	TM172		1440	322000	1400	26200	2530	10900
Nitrite as NO2	<0.05 mg/l	TM184		0.177 #	1.96 #	0.082 #	<0.05 #	<1 #	<0.05 #
Sulphate	<2 mg/l	TM184		57.8 #	106 #	54.5 #	36 #	185 #	596 #
Nitrate as NO3	<0.3 mg/l	TM184		6.04 #	<6 #	<0.3 #	<0.3 #	<6 #	3.95 #
TPH / Oil & Greases	<1 mg/l	TM235		1.19	149	19	17.8	11.4	10.2
pH	<1 pH Units	TM256		7.5 #	10.1 #	9.34 #	9.29 #	9.7 #	7.3 #
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256		0.872 #	4.17 #	1.67 #	2.44 #	7.91 #	2.07 #

Validated

CERTIFICATE OF ANALYSIS

SDG: 220824-68 **Report Number:** 659753 **Superseded Report:**
Client Ref.: Monitoring Wells **Location:** AMG Llanelli

GRO by GC-FID (W)

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH201	BH202	BH203	BH204	BH205	BH207
			Depth (m)	.	.	.	.	.	.
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	22/08/2022	22/08/2022	22/08/2022	22/08/2022	22/08/2022	22/08/2022
			Sample Time	12:04:00	12:23:00	14:08:00	13:37:00	12:42:00	14:28:00
			Date Received	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022
			SDG Ref	220824-68	220824-68	220824-68	220824-68	220824-68	220824-68
			Lab Sample No.(s)	26778511	26778512	26778514	26778516	26778517	26778518
			AGS Reference						
GRO >C5-C10	<10 µg/l	TM245		<10	<10	<10	<10	<10	<10
EPH (C6-C10)	<100 µg/l	TM245		<100	<100	<100	<100	<100	<100

CERTIFICATE OF ANALYSIS

SDG: 220824-68 **Report Number:** 659753 **Superseded Report:**
Client Ref.: Monitoring Wells **Location:** AMG Llanelli

VOC MS (W)

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH201	BH202	BH203	BH204	BH205	BH207
			Depth (m)	.	.	.	.	.	.
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	22/08/2022	22/08/2022	22/08/2022	22/08/2022	22/08/2022	22/08/2022
			Sample Time	12:04:00	12:23:00	14:08:00	13:37:00	12:42:00	14:28:00
			Date Received	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022	24/08/2022
			SDG Ref	220824-68	220824-68	220824-68	220824-68	220824-68	220824-68
			Lab Sample No.(s)	26778511	26778512	26778514	26778516	26778517	26778518
			AGS Reference						
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208		<1 #	<10 3 #	<1 #	<1 #	<1 3 #	<10 3 #
Benzene	<1 µg/l	TM208		<1 #	<10 3 #	<1 #	<1 #	<1 3 #	<10 3 #
Toluene	<1 µg/l	TM208		<1 #	<10 3 #	<1 #	<1 #	<1 3 #	<10 3 #
Ethylbenzene	<1 µg/l	TM208		<1 #	<10 3 #	<1 #	<1 #	<1 3 #	<10 3 #
m,p-Xylene	<1 µg/l	TM208		<1 #	<10 3 #	<1 #	<1 #	<1 3 #	<10 3 #
o-Xylene	<1 µg/l	TM208		<1 #	<10 3 #	<1 #	<1 #	<1 3 #	<10 3 #
Sum of BTEX	<5 µg/l	TM208		<5	<50 3	<5	<5	<5 3	<50 3

Table of Results - Appendix

Method No	Reference	Description
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH in Waters
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM235	The Determination of Hydrocarbon Oils in Waters by Solvent Extraction, Infra red Absorption and Gravimetry 1983, HMSO, London	Determination of Total Petroleum Hydrocarbons (TPH) in Waters By Infra-Red Spectroscopy
TM245	By GC-FID	Determination of GRO by Headspace in waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM).

CERTIFICATE OF ANALYSIS

SDG: 220824-68 **Report Number:** 659753 **Superseded Report:**
Client Ref.: Monitoring Wells **Location:** AMG Llanelli

Test Completion Dates

Lab Sample No(s)	26778511	26778512	26778514	26778516	26778517	26778518
Customer Sample Ref.	BH201	BH202	BH203	BH204	BH205	BH207
AGS Ref.						
Depth						
Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Ammoniacal Nitrogen	26-Aug-2022	26-Aug-2022	26-Aug-2022	26-Aug-2022	25-Aug-2022	25-Aug-2022
Anions by Kone (w)	30-Aug-2022	30-Aug-2022	30-Aug-2022	30-Aug-2022	30-Aug-2022	30-Aug-2022
Dissolved Metals by ICP-MS	31-Aug-2022	31-Aug-2022	31-Aug-2022	31-Aug-2022	31-Aug-2022	31-Aug-2022
EPH (DRO) (C10-C40) Aqueous (W)	31-Aug-2022	01-Sep-2022	31-Aug-2022	01-Sep-2022	31-Aug-2022	31-Aug-2022
GRO by GC-FID (W)	25-Aug-2022	25-Aug-2022	25-Aug-2022	25-Aug-2022	25-Aug-2022	30-Aug-2022
Nitrite by Kone (w)	26-Aug-2022	26-Aug-2022	26-Aug-2022	26-Aug-2022	26-Aug-2022	24-Aug-2022
pH Value	25-Aug-2022	25-Aug-2022	25-Aug-2022	25-Aug-2022	25-Aug-2022	25-Aug-2022
Total EPH (aq)	31-Aug-2022	01-Sep-2022	31-Aug-2022	01-Sep-2022	31-Aug-2022	31-Aug-2022
TPH by IR Oils and Greases	30-Aug-2022	30-Aug-2022	30-Aug-2022	30-Aug-2022	30-Aug-2022	26-Aug-2022
VOC MS (W)	29-Aug-2022	30-Aug-2022	29-Aug-2022	29-Aug-2022	30-Aug-2022	30-Aug-2022

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials andd soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

AMG Resources Ltd
Nevill's Dock
Llanelli
SA15 2HD

Attention: Alex Stewart

CERTIFICATE OF ANALYSIS

Date of report Generation:	07 November 2022
Customer:	AMG Resources Ltd
Sample Delivery Group (SDG):	221028-39
Your Reference:	AMG Llanelli
Location:	AMG Llanelli
Report No:	667481
Order Number:	

We received 6 samples on Friday October 28, 2022 and 6 of these samples were scheduled for analysis which was completed on Monday November 07, 2022. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.
Incorrect sampling dates and/or sample information will affect the validity of results.

Approved By:

Sonia McWhan

Operations Manager

1291

CERTIFICATE OF ANALYSIS

SDG: 221028-39 **Report Number:** 667481 **Superseded Report:**
Client Ref.: AMG Llanelli **Location:** AMG Llanelli

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
27085378	BH201			27/10/2022
27085379	BH202			27/10/2022
27085380	BH203			27/10/2022
27085381	BH204			27/10/2022
27085382	BH205			27/10/2022
27085383	BH207			27/10/2022

Only received samples which have had analysis scheduled will be shown on the following pages.

Validated

CERTIFICATE OF ANALYSIS

SDG: 221028-39 **Report Number:** 667481 **Superseded Report:**
Client Ref.: AMG Llanelli **Location:** AMG Llanelli

Results Legend

X Test

N No Determination Possible

Sample Types -
S - Soil/Solid
UNS - Unspecified Solid
GW - Ground Water
SW - Surface Water
LE - Land Leachate
PL - Prepared Leachate
PR - Process Water
SA - Saline Water
TE - Trade Effluent
TS - Treated Sewage
US - Untreated Sewage
RE - Recreational Water
DW - Drinking Water Non-regulatory
UNL - Unspecified Liquid
SL - Sludge
G - Gas
OTH - Other

			Lab Sample No(s)	27085378					27085379						27085380						27085381		
			Customer Sample Reference	BH201					BH202						BH203						BH204		
			AGS Reference																				
			Depth (m)																				
			Container	250ml Amber Gl. PTFE/PE (ALE219)	500ml Plastic (ALE208)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)	250ml Amber Gl. PTFE/PE (ALE219)	500ml Plastic (ALE208)	H2SO4 (ALE244)	NaOH (ALE245)	Vial (ALE297)	250ml Amber Gl. PTFE/PE (ALE219)	500ml Plastic (ALE208)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)	250ml Amber Gl. PTFE/PE (ALE219)	500ml Plastic (ALE208)	H2SO4 (ALE244)
			Sample Type	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW	GW
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 6				X					X					X							X
Anions by Kone (w)	All	NDPs: 0 Tests: 6			X					X						X						X	
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 6			X					X							X					X	
EPH (DRO) (C10-C40) Aqueous (W)	All	NDPs: 0 Tests: 6	X					X						X						X			
GRO by GC-FID (W)	All	NDPs: 0 Tests: 6					X						X						X				
Nitrite by Kone (w)	All	NDPs: 0 Tests: 6				X						X						X					
pH Value	All	NDPs: 0 Tests: 6		X					X						X						X		
Total EPH (aq)	All	NDPs: 0 Tests: 6	X					X						X						X			
TPH by IR Oils and Greases	All	NDPs: 0 Tests: 6		X					X						X						X		
VOC MS (W)	All	NDPs: 0 Tests: 6					X						X						X				

27085383	BH207			Vial (ALE297)	GW					X					X
				NaOH (ALE245)	GW						X				
				H2SO4 (ALE244)	GW	X									
				500ml Plastic (ALE208)	GW		X	X				X		X	
				250ml Amber Gl. PTFE/PE (ALE219)	GW				X				X		
27085382	BH205			Vial (ALE297)	GW					X					X
				NaOH (ALE245)	GW						X				
				H2SO4 (ALE244)	GW	X									
				500ml Plastic (ALE208)	GW		X	X				X		X	
				250ml Amber Gl. PTFE/PE (ALE219)	GW				X				X		
27085381	BH204			Vial (ALE297)	GW					X					X
				NaOH (ALE245)	GW						X				

Validated

CERTIFICATE OF ANALYSIS

SDG: 221028-39 **Report Number:** 667481 **Superseded Report:**
Client Ref.: AMG Llanelli **Location:** AMG Llanelli

Results Legend
- # ISO17025 accredited.
- M mCERTS accredited.
- aq Aqueous / settled sample.
- diss.filt Dissolved / filtered sample.
- tot.unfilt Total / unfiltered sample.
- * Subcontracted - refer to subcontractor report for accreditation status.
- ** % recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
- (F) Trigger breach confirmed
- 1-4+§@ Sample deviation (see appendix)

Component	LOD/Units	Method	BH201	BH202	BH203	BH204	BH205	BH207
Customer Sample Ref.								
Depth (m)			.	.	.	.	.	.
Sample Type			Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
Date Sampled			27/10/2022	27/10/2022	27/10/2022	27/10/2022	27/10/2022	27/10/2022
Sample Time			09:45:00	10:04:00	11:02:00	10:44:00	10:30:00	11:17:00
Date Received			28/10/2022	28/10/2022	28/10/2022	28/10/2022	28/10/2022	28/10/2022
SDG Ref			221028-39	221028-39	221028-39	221028-39	221028-39	221028-39
Lab Sample No.(s)			27085378	27085379	27085380	27085381	27085382	27085383
AGS Reference								
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2 #	5.33 #	4.63 #	0.912 #	5.94 #	0.298 #
Arsenic (diss.filt)	<0.5 µg/l	TM152	21.4 2 #	323 2 #	511 #	214 2 #	1310 2 #	112 2 #
Cadmium (diss.filt)	<0.08 µg/l	TM152	0.193 2 #	<0.8 2 #	<0.08 #	0.081 2 #	<0.8 2 #	6.22 2 #
Chromium (diss.filt)	<1 µg/l	TM152	<1 2 #	<10 2 #	1.4 #	2.01 2 #	<10 2 #	<1 2 #
Copper (diss.filt)	<0.3 µg/l	TM152	8.03 2 #	425 2 #	1.98 #	33.2 2 #	268 2 #	58.7 2 #
Lead (diss.filt)	<0.2 µg/l	TM152	<0.2 2 #	37.6 2 #	0.94 #	7.21 2 #	8.8 2 #	0.327 2 #
Manganese (diss.filt)	<3 µg/l	TM152	110 2 #	<30 2 #	18.4 #	122 2 #	<30 2 #	1290 2 #
Nickel (diss.filt)	<0.4 µg/l	TM152	2.72 2 #	9.59 2 #	6.59 #	12.7 2 #	19.8 2 #	44.1 2 #
Zinc (diss.filt)	<1 µg/l	TM152	587 2 #	30.8 2 #	9.21 #	5.73 2 #	32.1 2 #	2900 2 #
Tin (Diss.Filt)	<1 µg/l	TM152	<1 2 #	337 2 #	10.8 #	11.4 2 #	83.8 2 #	<1 2 #
Sodium (Dis.Filt)	<0.076 mg/l	TM152	113 2 #	984 2 #	744 #	608 2 #	2430 2 #	218 2 #
Magnesium (Dis.Filt)	<0.036 mg/l	TM152	14.6 2 #	<0.36 2 #	4.02 #	11 2 #	3.96 2 #	28 2 #
Potassium (Dis.Filt)	<0.2 mg/l	TM152	10.8 2 #	11.7 2 #	16.2 #	14 2 #	26.9 2 #	21.4 2 #
Calcium (Dis.Filt)	<0.2 mg/l	TM152	127 2 #	<2 2 #	3.37 #	13.4 2 #	2.29 2 #	265 2 #
Iron (Dis.Filt)	<0.019 mg/l	TM152	<0.019 2 #	0.514 2 #	0.177 #	0.166 2 #	1.74 2 #	<0.019 2 #
EPH Range >C10 - C40 (aq)	<100 µg/l	TM172	1460 #	45500 #	836 #	11400 #	1670 #	3840 #
Total EPH (C6-C40) (aq)	<100 µg/l	TM172	1460	45500	836	11400	1670	3840
Nitrite as NO2	<0.05 mg/l	TM184	0.05 #	1.48 #	<0.05 #	0.069 #	<1 #	<0.05 #
Sulphate	<2 mg/l	TM184	60.7 #	70.4 #	102 #	50.4 #	208 #	589 #
Nitrate as NO3	<0.3 mg/l	TM184	7.25 #	<6 #	<0.3 #	0.318 #	<6 #	4.99 #
TPH / Oil & Greases	<1 mg/l	TM235	<10	85.5	2.59	<20	11.1	<10
pH	<1 pH Units	TM256	7.49 #	9.73 #	9.51 #	8.94 #	9.78 #	7.42 #
Conductivity @ 20 deg.C	<0.02 mS/cm	TM256	0.978 #	3.52 #	3.13 #	2.39 #	8.86 #	2.17 #

Validated

CERTIFICATE OF ANALYSIS

SDG: 221028-39 **Report Number:** 667481 **Superseded Report:**
Client Ref.: AMG Llanelli **Location:** AMG Llanelli

GRO by GC-FID (W)

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH201	BH202	BH203	BH204	BH205	BH207
			Depth (m)	.	.	.	.	.	.
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/10/2022	27/10/2022	27/10/2022	27/10/2022	27/10/2022	27/10/2022
			Sample Time	09:45:00	10:04:00	11:02:00	10:44:00	10:30:00	11:17:00
			Date Received	28/10/2022	28/10/2022	28/10/2022	28/10/2022	28/10/2022	28/10/2022
			SDG Ref	221028-39	221028-39	221028-39	221028-39	221028-39	221028-39
			Lab Sample No.(s)	27085378	27085379	27085380	27085381	27085382	27085383
			AGS Reference						
GRO >C5-C10	<10 µg/l	TM245		<10	<10	<10	<10	<10	<10
EPH (C6-C10)	<100 µg/l	TM245		<100	<100	<100	<100	<100	<100

CERTIFICATE OF ANALYSIS

SDG: 221028-39 **Report Number:** 667481 **Superseded Report:**
Client Ref.: AMG Llanelli **Location:** AMG Llanelli

VOC MS (W)

Results Legend

#	ISO17025 accredited.
M	mCERTS accredited.
aq	Aqueous / settled sample.
diss.filt	Dissolved / filtered sample.
tot.unfilt	Total / unfiltered sample.
*	Subcontracted - refer to subcontractor report for accreditation status.
**	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery
(F)	Trigger breach confirmed
1-4+§@	Sample deviation (see appendix)

Component	LOD/Units	Method	Customer Sample Ref.	BH201	BH202	BH203	BH204	BH205	BH207
			Depth (m)	.	.	.	.	.	.
			Sample Type	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
			Date Sampled	27/10/2022	27/10/2022	27/10/2022	27/10/2022	27/10/2022	27/10/2022
			Sample Time	09:45:00	10:04:00	11:02:00	10:44:00	10:30:00	11:17:00
			Date Received	28/10/2022	28/10/2022	28/10/2022	28/10/2022	28/10/2022	28/10/2022
			SDG Ref	221028-39	221028-39	221028-39	221028-39	221028-39	221028-39
			Lab Sample No.(s)	27085378	27085379	27085380	27085381	27085382	27085383
			AGS Reference						
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Benzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Toluene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Ethylbenzene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
m,p-Xylene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
o-Xylene	<1 µg/l	TM208		<1 #	<1 #	<1 #	<1 #	<1 #	<1 #
Sum of BTEX	<5 µg/l	TM208		<5	<5	<5	<5	<5	<5

Table of Results - Appendix

Method No	Reference	Description
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM152	ISO 17294-2:2016 Water quality - Application of inductively coupled plasma mass spectrometry (ICP-MS)	Analysis of Aqueous Samples by ICP-MS
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH in Waters
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM235	The Determination of Hydrocarbon Oils in Waters by Solvent Extraction, Infra red Absorption and Gravimetry 1983, HMSO, London	Determination of Total Petroleum Hydrocarbons (TPH) in Waters By Infra-Red Spectroscopy
TM245	By GC-FID	Determination of GRO by Headspace in waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4, Standard Methods for the examination of waters and wastewaters 20th Edition, PHA, Washington DC, USA. ISBN 0-87553-235-7 and The Determination of Alkalinity and Acidity in water HMSO, 1981, ISBN 0 11 751601 5.	Determination of pH, EC, TDS and Alkalinity in Aqueous samples

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).

CERTIFICATE OF ANALYSIS

SDG: 221028-39 **Report Number:** 667481 **Superseded Report:**
Client Ref.: AMG Llanelli **Location:** AMG Llanelli

Test Completion Dates

Lab Sample No(s)	27085378	27085379	27085380	27085381	27085382	27085383
Customer Sample Ref.	BH201	BH202	BH203	BH204	BH205	BH207
AGS Ref.						
Depth						
Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Ammoniacal Nitrogen	03-Nov-2022	03-Nov-2022	03-Nov-2022	03-Nov-2022	03-Nov-2022	03-Nov-2022
Anions by Kone (w)	03-Nov-2022	03-Nov-2022	03-Nov-2022	03-Nov-2022	03-Nov-2022	03-Nov-2022
Dissolved Metals by ICP-MS	04-Nov-2022	04-Nov-2022	04-Nov-2022	07-Nov-2022	04-Nov-2022	04-Nov-2022
EPH (DRO) (C10-C40) Aqueous (W)	02-Nov-2022	02-Nov-2022	02-Nov-2022	02-Nov-2022	02-Nov-2022	02-Nov-2022
GRO by GC-FID (W)	01-Nov-2022	01-Nov-2022	01-Nov-2022	01-Nov-2022	01-Nov-2022	01-Nov-2022
Nitrite by Kone (w)	29-Oct-2022	01-Nov-2022	29-Oct-2022	29-Oct-2022	01-Nov-2022	29-Oct-2022
pH Value	31-Oct-2022	31-Oct-2022	31-Oct-2022	31-Oct-2022	31-Oct-2022	31-Oct-2022
Total EPH (aq)	02-Nov-2022	02-Nov-2022	02-Nov-2022	02-Nov-2022	02-Nov-2022	02-Nov-2022
TPH by IR Oils and Greases	04-Nov-2022	04-Nov-2022	02-Nov-2022	02-Nov-2022	02-Nov-2022	04-Nov-2022
VOC MS (W)	31-Oct-2022	31-Oct-2022	31-Oct-2022	31-Oct-2022	31-Oct-2022	31-Oct-2022

Appendix

General

1. Results are expressed on a dry weight basis (dried at 35ºC) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH4 by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury.

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as “mixed hydrocarbons”. Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. **Sample Deviations**

If a sample is classed as deviated then the associated results may be compromised.

1	**Container with Headspace provided for volatiles analysis**
2	**Incorrect container received**
3	**Deviation from method**
4	**Matrix interference**
♦	**Sample holding time exceeded in laboratory**
@	**Sample holding time exceeded due to late arrival of instructions or samples**
§	**Sampled on date not provided**

20. **Asbestos**

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as “Not detected”. If no asbestos fibre types are found all will be reported as “Not detected” and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials andd soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

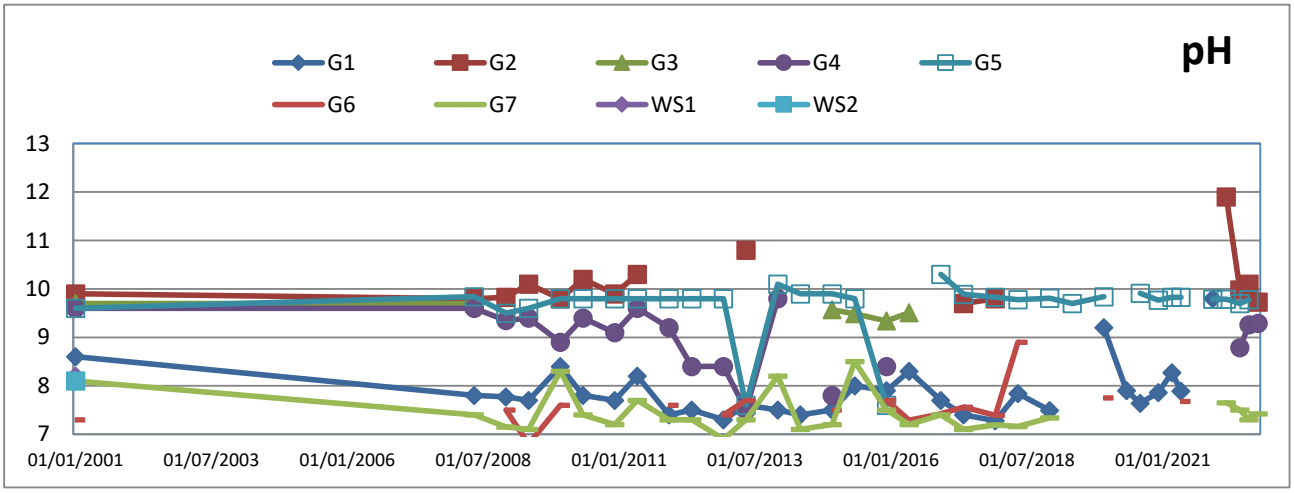
AMG RESOURCES LIMITED

Permit number EPR/BM2381IQ

2022 Annual Review

Appendix 3 Time Series Plots of Groundwater Monitoring Results

Report Number 2315r1v1d0223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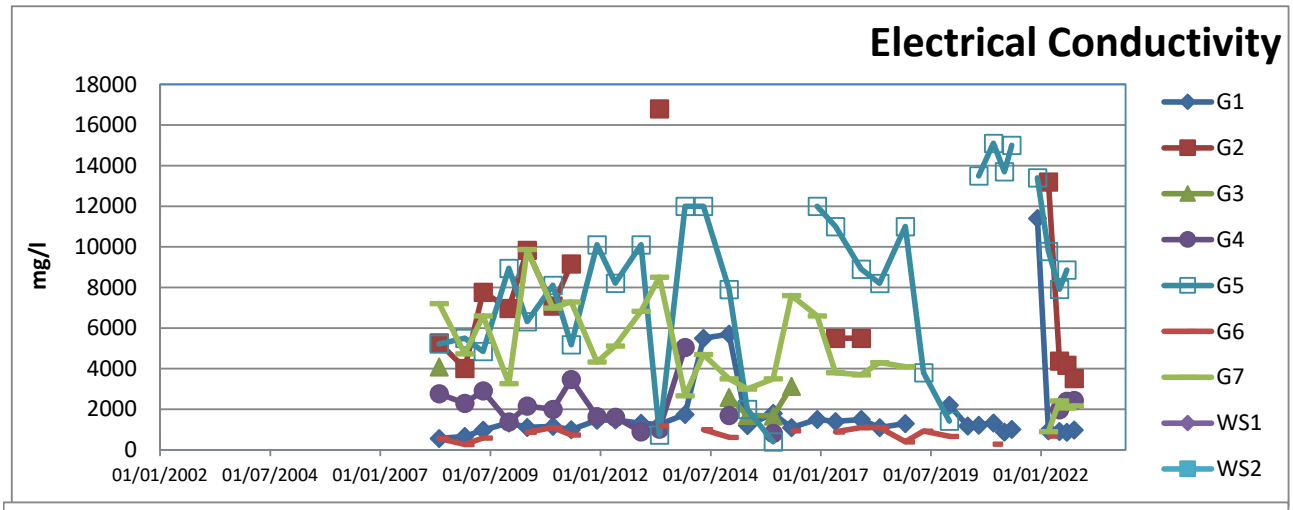
G1
G2
G3
G4
G5
G6
G7
WS1
WS2
13
12
11
10
9
8
7
01/01/2001
01/07/2003
01/01/2006
01/07/2008
01/01/2011
01/07/2013
01/01/2016
01/07/2018
01/01/2021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mg/l
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16000
14000
12000
10000
8000
6000
4000
2000
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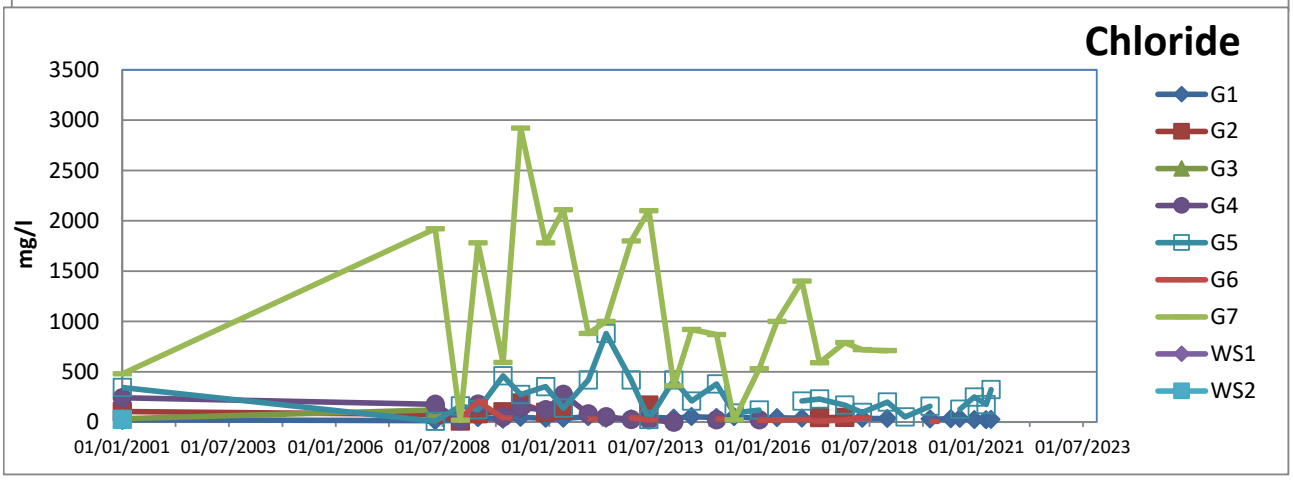
01/01/2002
01/07/2004
01/01/2007
01/07/2009
01/01/2012
01/07/2014
01/01/2017
01/07/2019
01/01/2022
G1
G2
G3
G4
G5
G6
G7
WS1
WS2


Chloride
mg/l
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3000
2500
2000
1500
1000
500
0
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01/07/2003
01/01/2006
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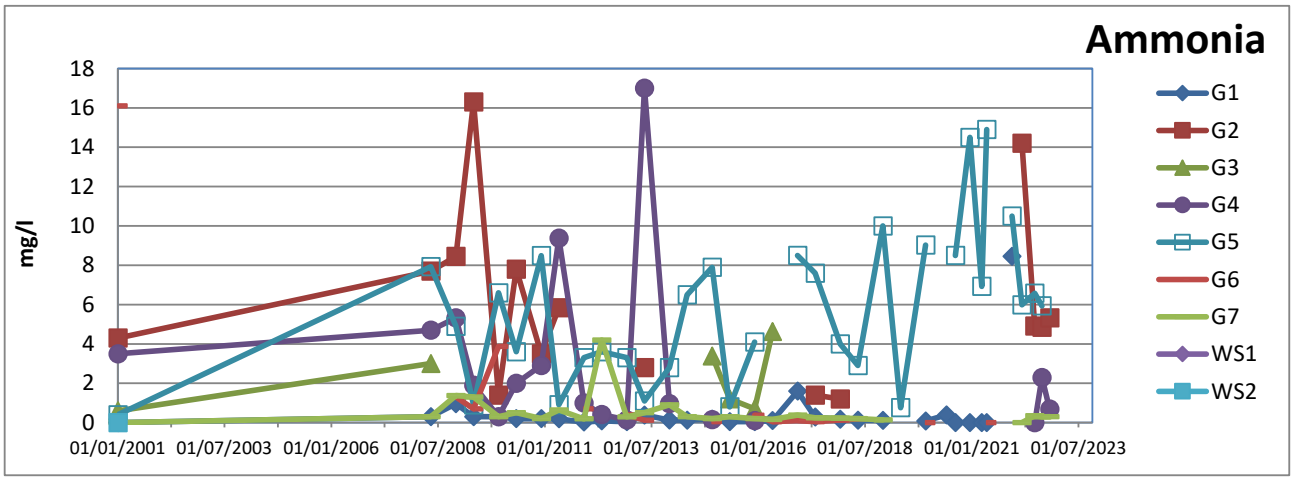
01/01/2011
01/07/2013
01/01/2016
01/07/2018
01/01/2021
01/07/2023
G1
G2
G3
G4
G5
G6
G7
WS1
WS2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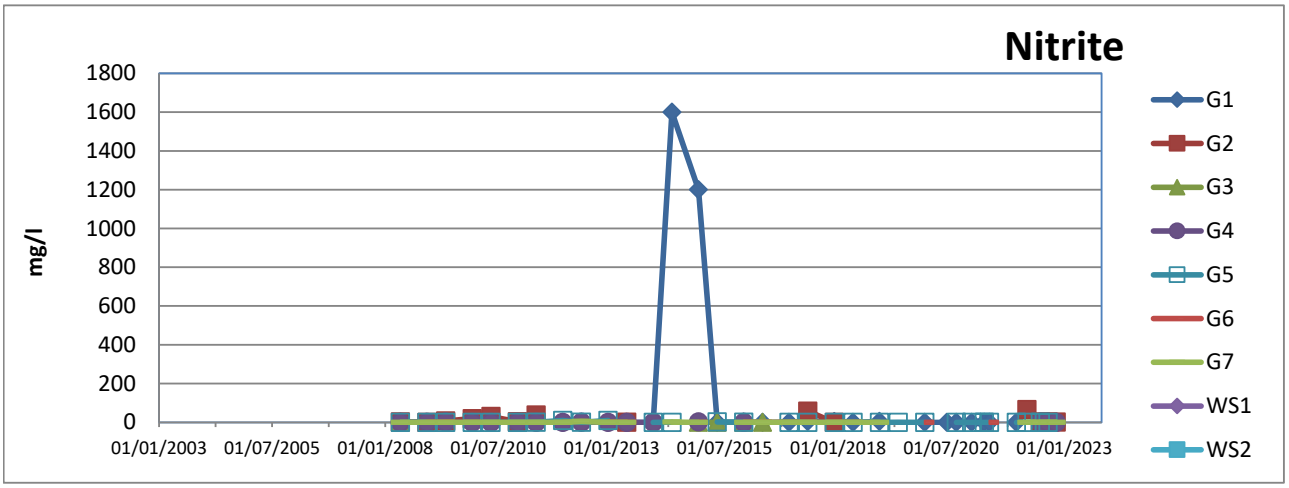
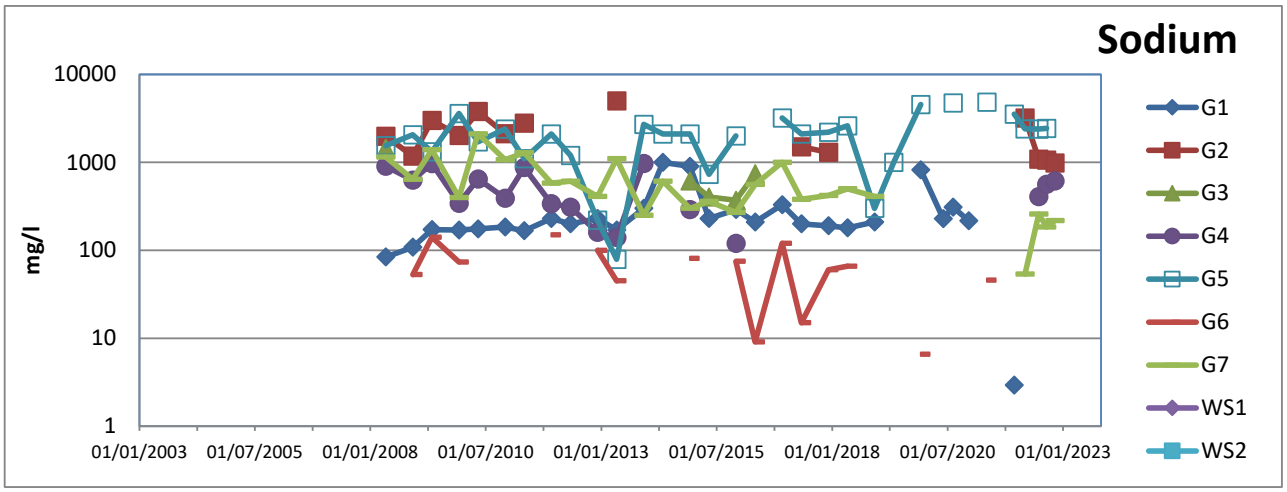
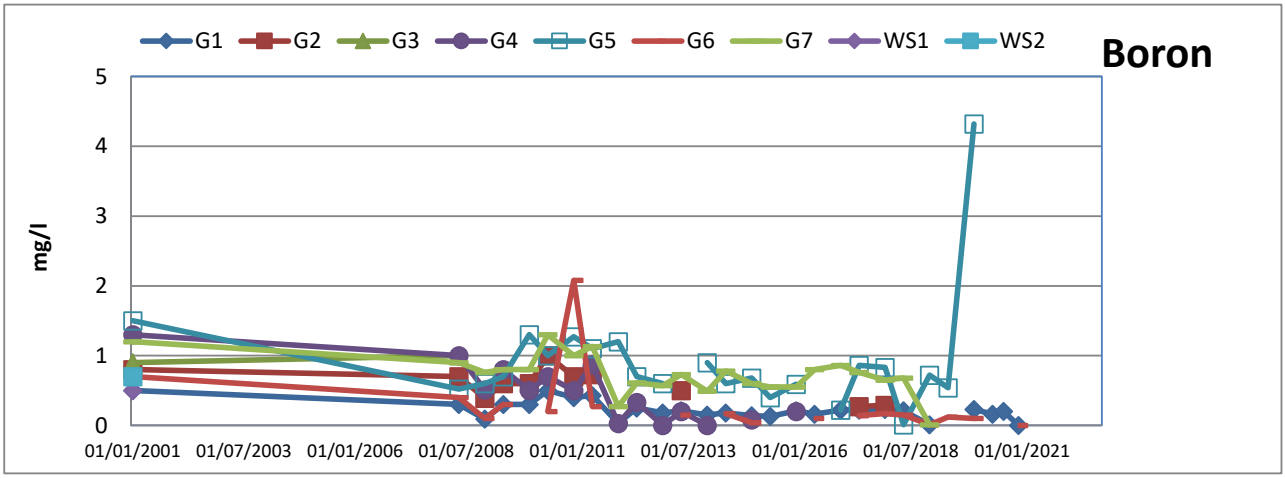
mg/l
18
16
14
12
10
8
6
4
2
0
01/01/2001 01/07/2003 01/01/2006 01/07/2008 01/01/2011 01/07/2013 01/01/2016 01/07/2018 01/01/2021 01/07/2023
G1
G2
G3
G4
G5
G6
G7
WS1
WS2


Nitrite
mg/l
1800
1600
1400
1200
1000
800
600
400
200
0
01/01/2003 01/07/2005 01/01/2008 01/07/2010 01/01/2013 01/07/2015 01/01/2018 01/07/2020 01/01/2023
G1
G2
G3
G4
G5
G6
G7
WS1
WS2


Sodium
mg/l
10000
1000
100
10
1
01/01/2003 01/07/2005 01/01/2008 01/07/2010 01/01/2013 01/07/2015 01/01/2018 01/07/2020 01/01/2023
G1
G2
G3
G4
G5
G6
G7
WS1
WS2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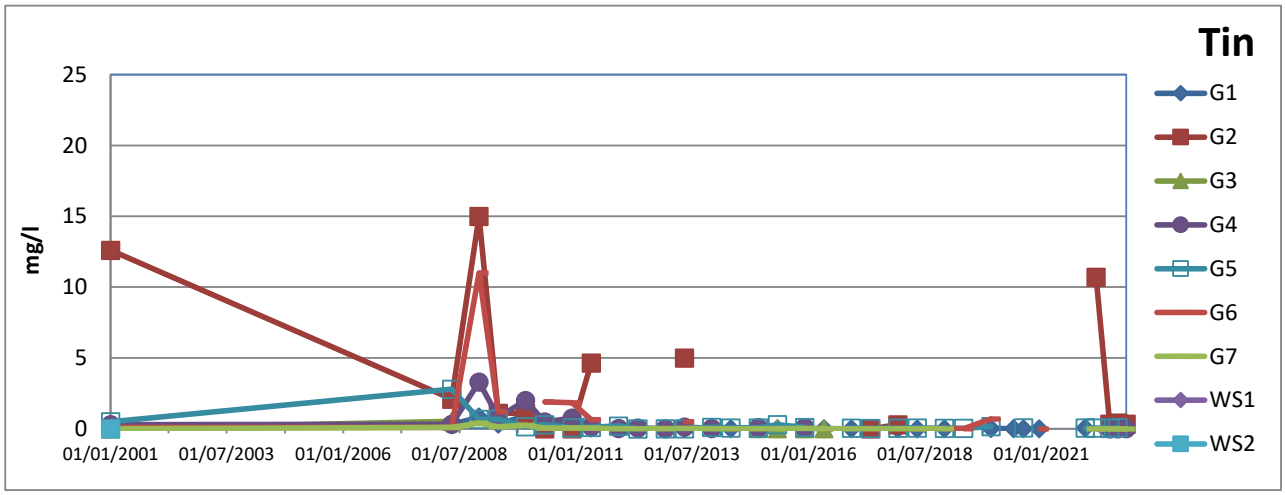
G1 G2 G3 G4 G5 G6 G7 WS1 WS2
mg/l
5
4
3
2
1
0
01/01/2001 01/07/2003 01/01/2006 01/07/2008 01/01/2011 01/07/2013 01/01/2016 01/07/2018 01/01/2021


Tin
mg/l
25
20
15
10
5
0
01/01/2001
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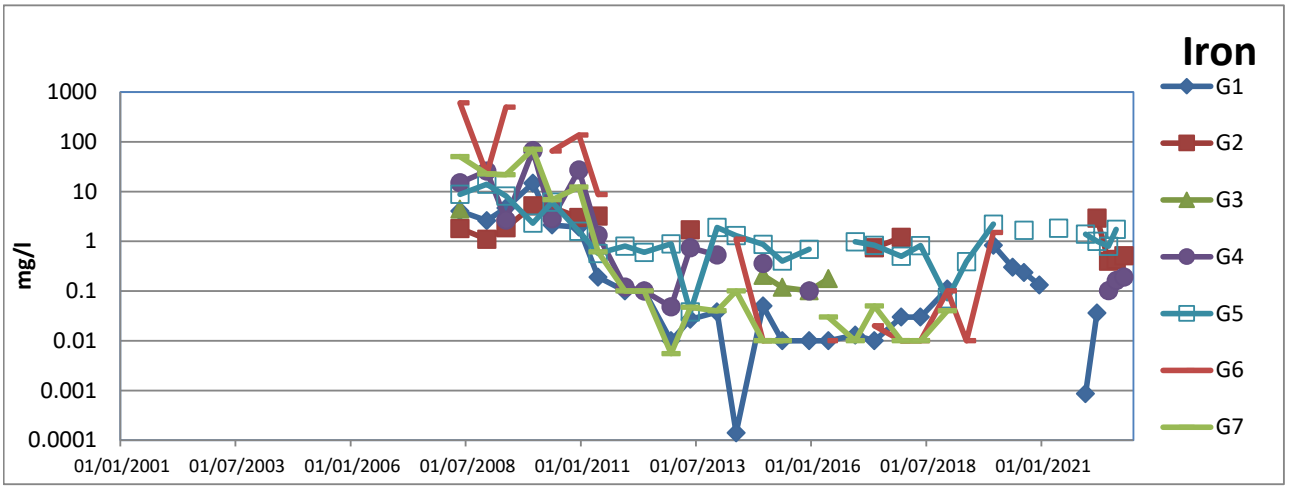
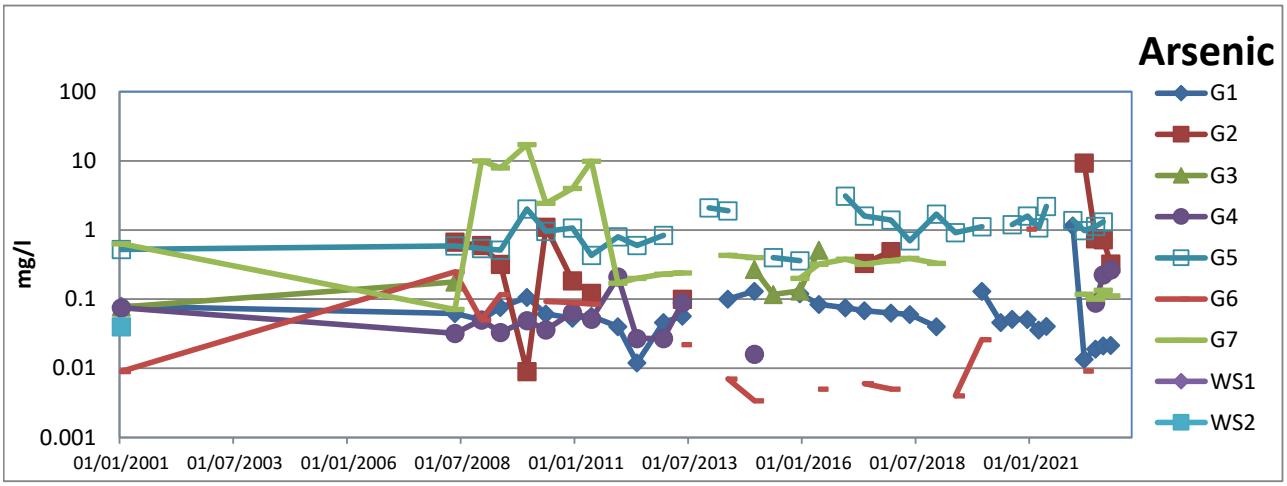
01/07/2013
01/01/2016
01/07/2018
01/01/2021
G1
G2
G3
G4
G5
G6
G7
WS1
WS2


Iron
mg/l
1000
100
10
1
0.1
0.01
0.001
0.0001
01/01/2001
01/07/2003
01/01/2006
01/07/2008
01/01/2011
01/07/2013
01/01/2016
01/07/2018
01/01/2021
G1
G2
G3
G4
G5
G6
G7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mg/l
100
10
1
0.1
0.01
0.001
01/01/2001
01/07/2003
01/01/2006
01/07/2008
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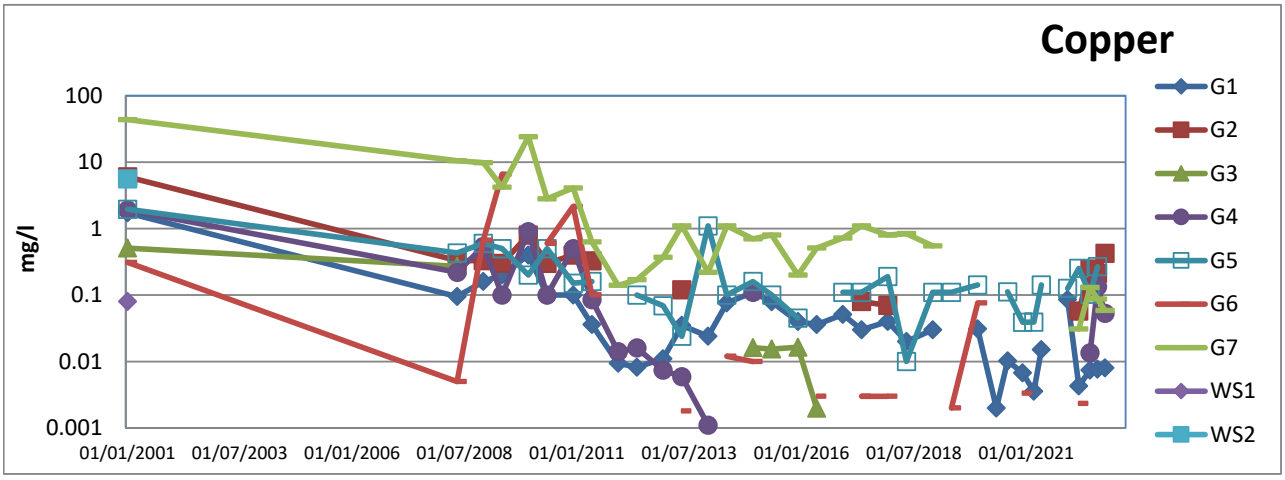
01/07/2013
01/01/2016
01/07/2018
01/01/2021
G1
G2
G3
G4
G5
G6
G7
WS1
WS2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mg/l
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10
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0.001
01/01/2001
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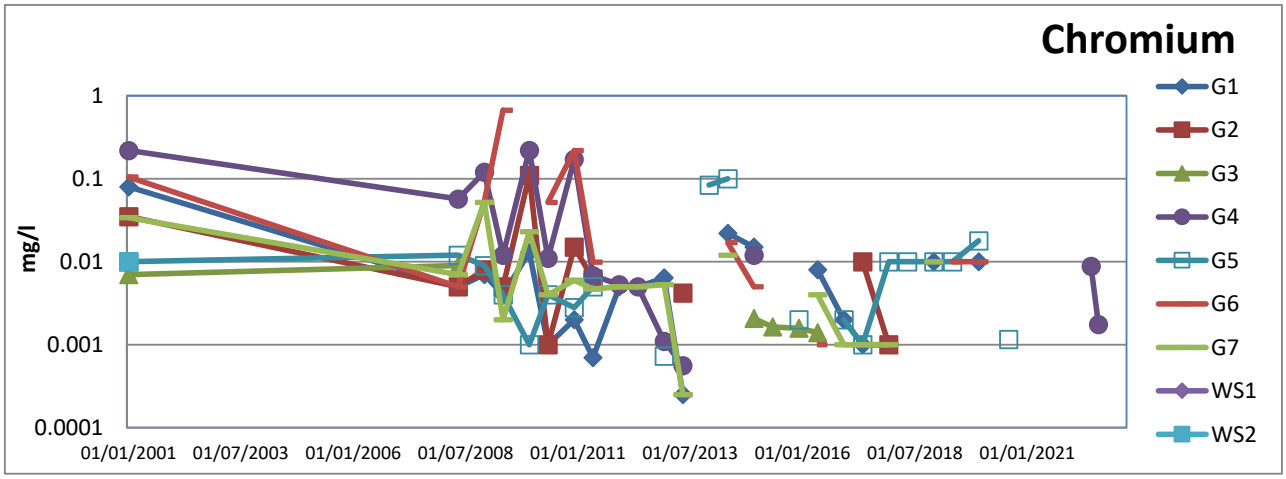
01/07/2013
01/01/2016
01/07/2018
01/01/2021
G1
G2
G3
G4
G5
G6
G7
WS1
WS2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0.001
0.0001
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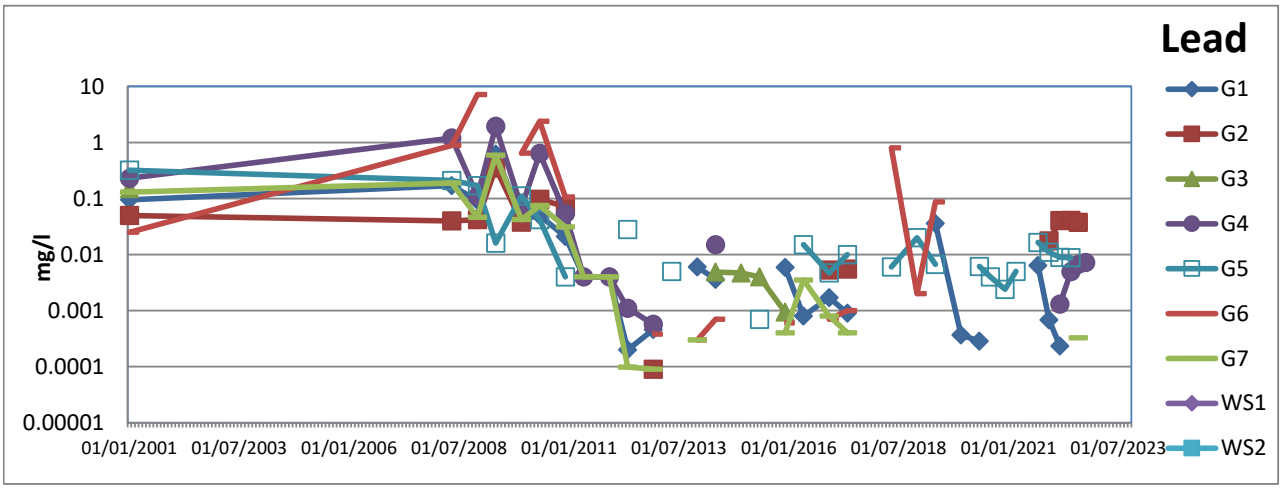
G1
G2
G3
G4
G5
G6
G7
WS1
WS2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mg/l
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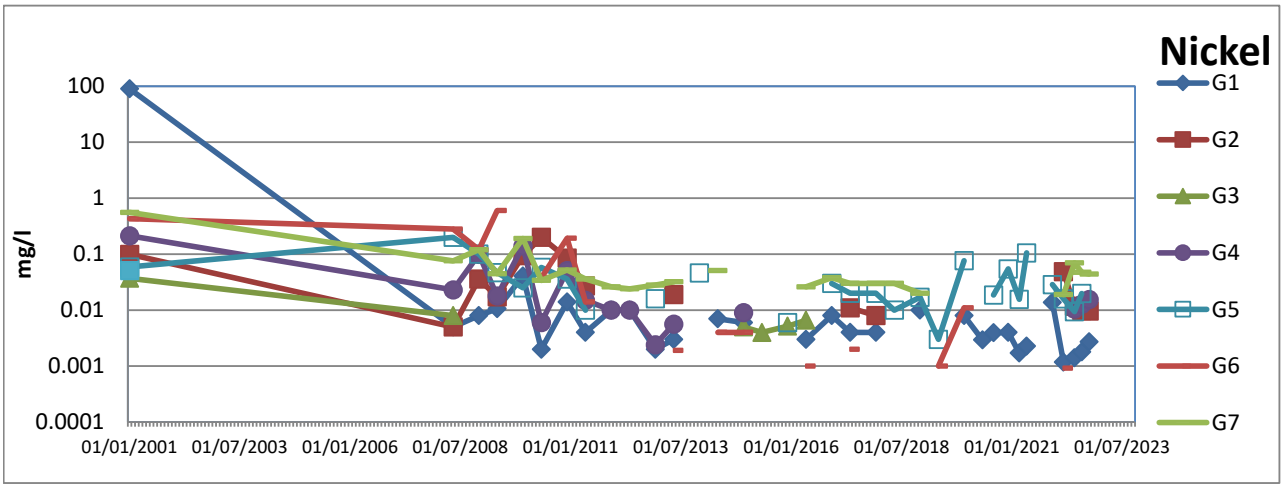
0.001
0.0001
0.00001
01/01/2001 01/07/2003 01/01/2006 01/07/2008 01/01/2011 01/07/2013 01/01/2016 01/07/2018 01/01/2021 01/07/2023
G1
G2
G3
G4
G5
G6
G7
WS1
WS2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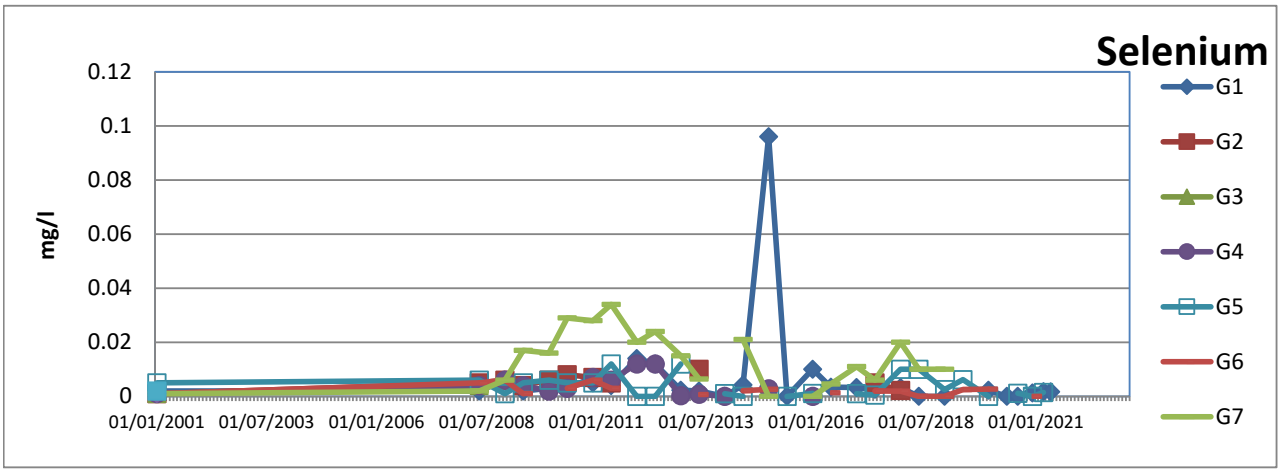
01/01/2001 01/07/2003 01/01/2006 01/07/2008 01/01/2011 01/07/2013 01/01/2016 01/07/2018 01/01/2021 01/07/2023
G1
G2
G3
G4
G5
G6
G7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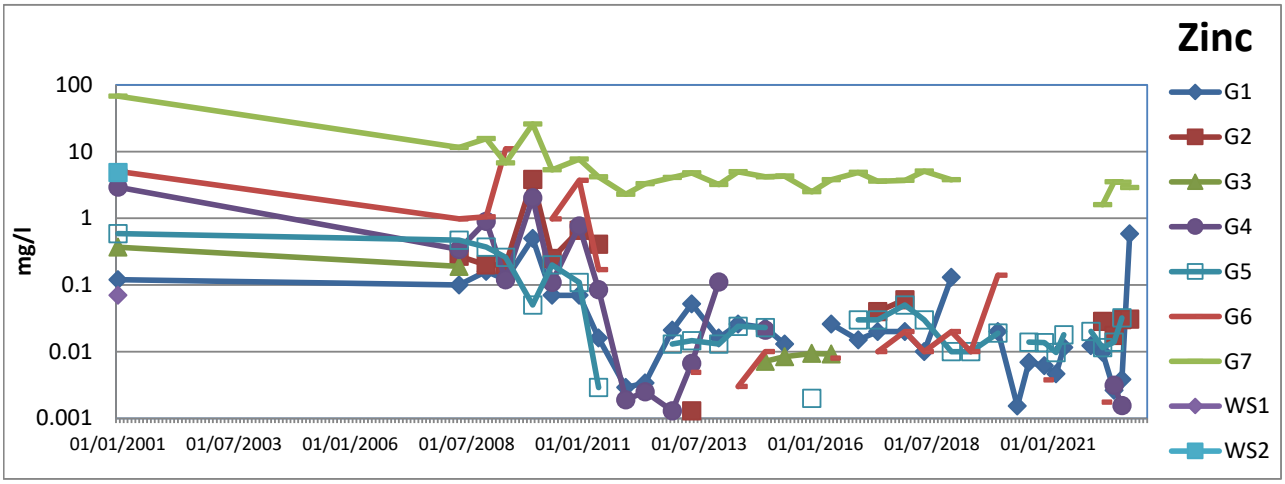
G1
G2
G3
G4
G5
G6
G7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0.001
01/01/2001
01/07/2003
01/01/2006
01/07/2008
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01/07/2013
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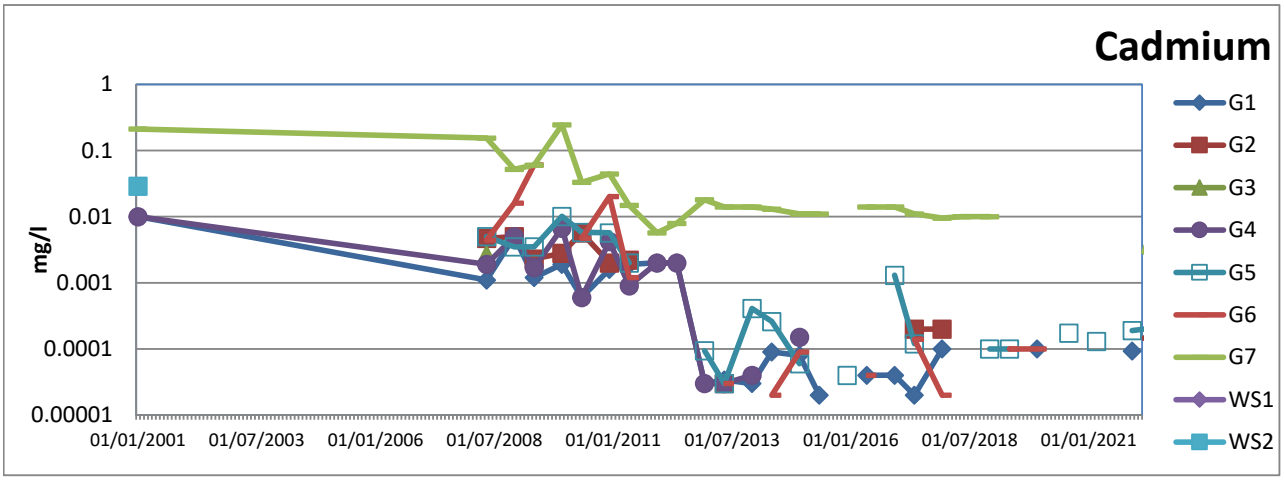
01/01/2021
G1
G2
G3
G4
G5
G6
G7
WS1
WS2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mg/l
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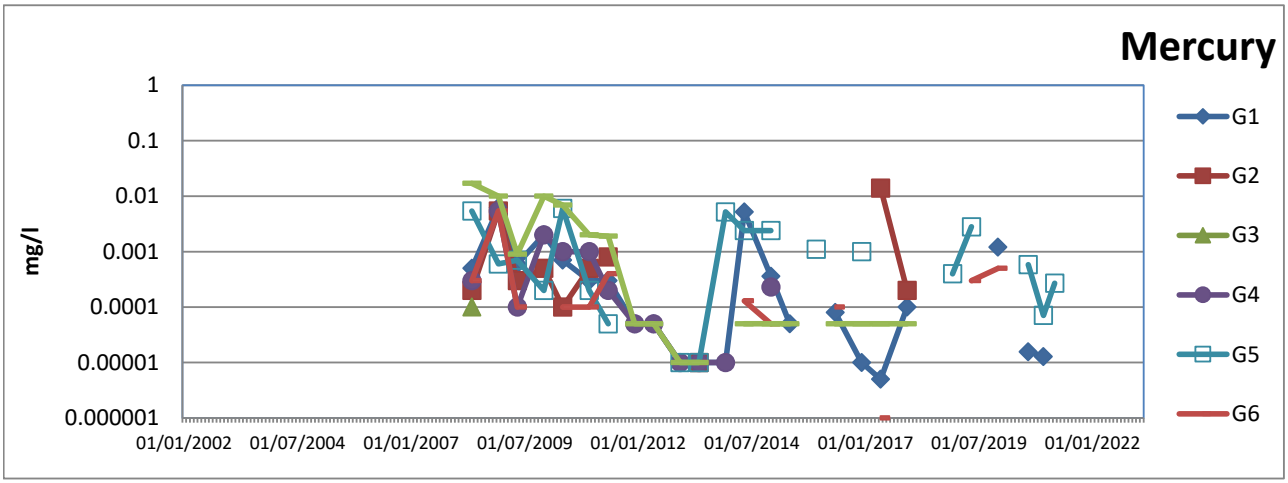
0.01
0.001
0.0001
0.00001
01/01/2001
01/07/2003
01/01/2006
01/07/2008
01/01/2011
01/07/2013
01/01/2016
01/07/2018
01/01/2021
G1
G2
G3
G4
G5
G6
G7
WS1
WS2


Mercury
mg/l
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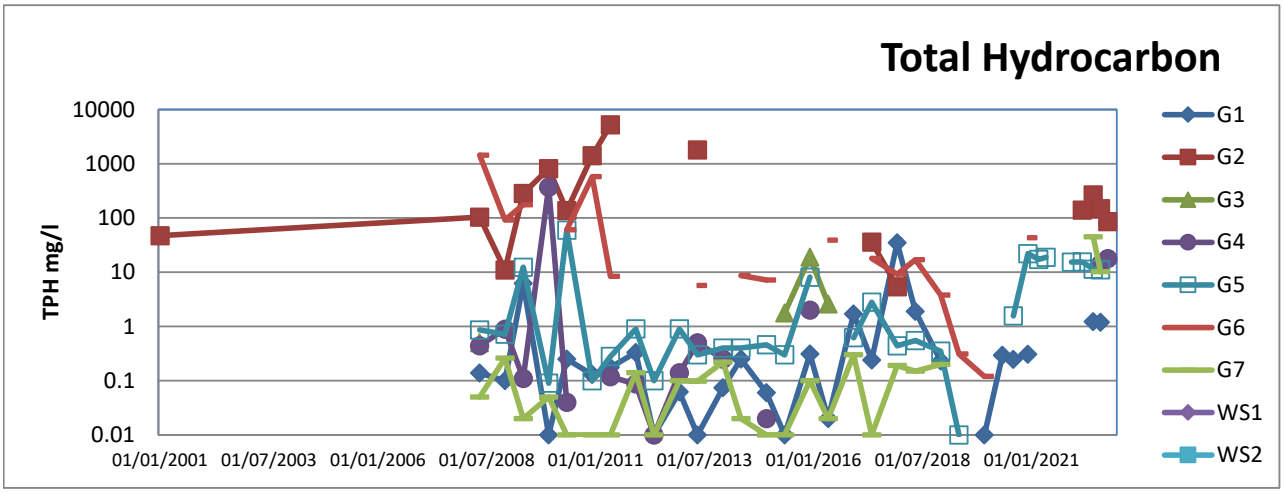
0.01
0.001
0.0001
0.00001
0.000001
01/01/2002
01/07/2004
01/01/2007
01/07/2009
01/01/2012
01/07/2014
01/01/2017
01/07/2019
01/01/2022
G1
G2
G3
G4
G5
G6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TPH mg/l
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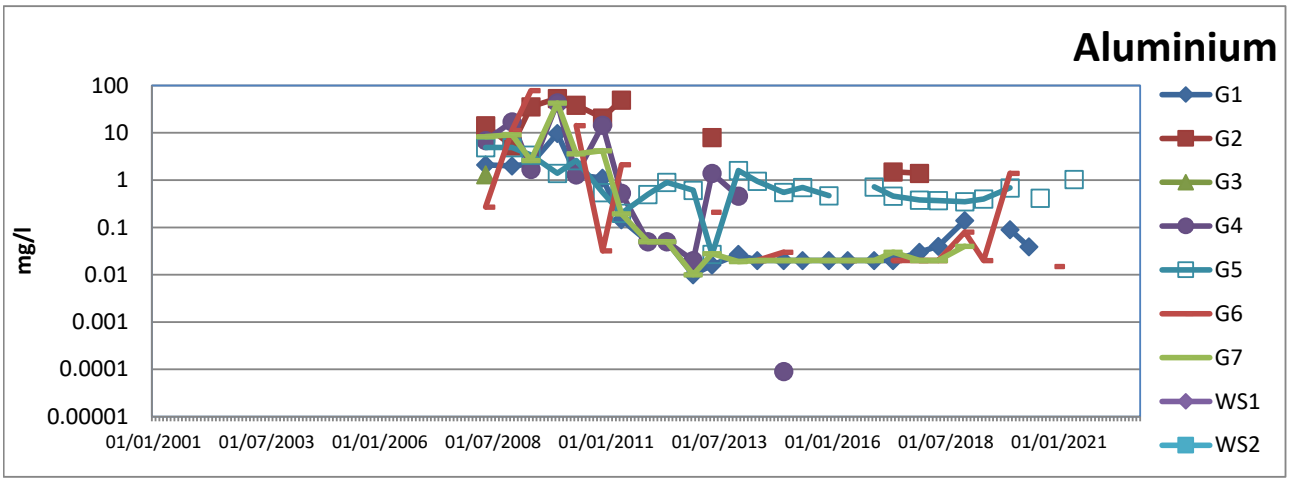
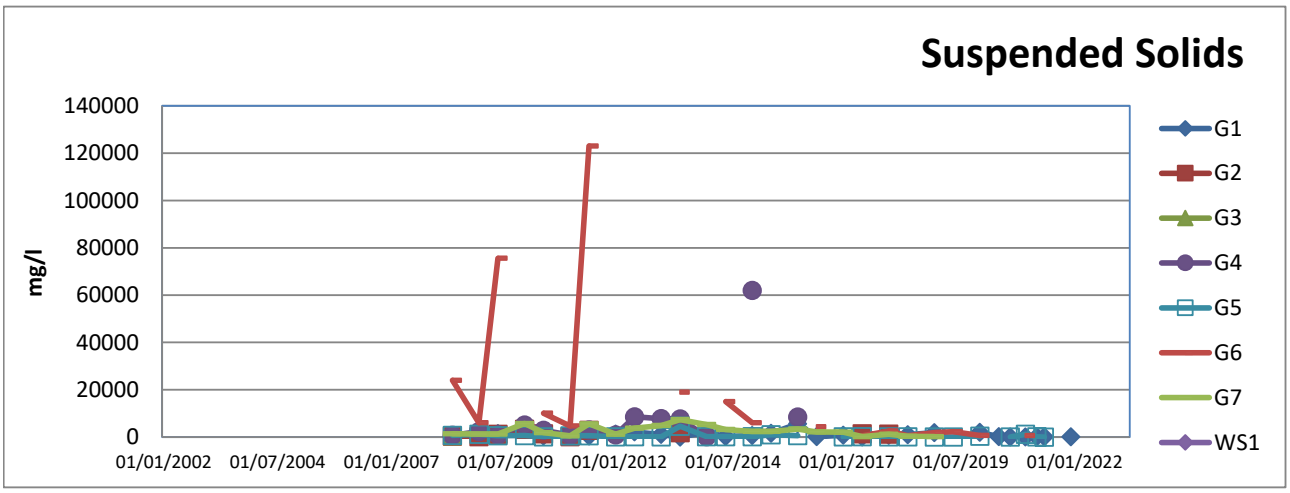
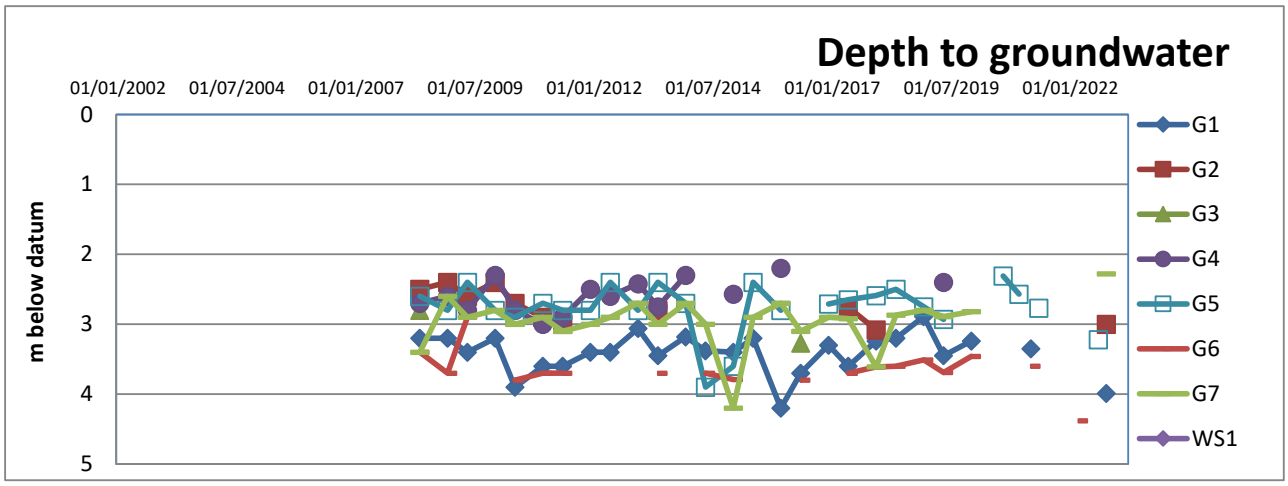
1000
100
10
1
0.1
0.01
01/01/2001
01/07/2003
01/01/2006
01/07/2008
01/01/2011
01/07/2013
01/01/2016
01/07/2018
01/01/2021
G1
G2
G3
G4
G5
G6
G7
WS1
WS2


Aluminium
mg/l
100
10
1
0.1
0.01
0.001
0.0001
0.00001
01/01/2001
01/07/2003
01/01/2006
01/07/2008
01/01/2011
01/07/2013
01/01/2016
01/07/2018
01/01/2021
G1
G2
G3
G4
G5
G6
G7
WS1
WS2


Suspended Solids
mg/l
140000
120000
100000
80000
60000
40000
20000
0
01/01/2002
01/07/2004
01/01/2007
01/07/2009
01/01/2012
01/07/2014
01/01/2017
01/07/2019
01/01/2022
G1
G2
G3
G4
G5
G6
G7
WS1


Depth to groundwater
m below datum
01/01/2002
01/07/2004
01/01/2007
01/07/2009
01/01/2012
01/07/2014
01/01/2017
01/07/2019
01/01/2022
0
1
2
3
4
5
G1
G2
G3
G4
G5
G6
G7
WS1

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