

**NANT Y CAWS
PHASE 1
CLOSED LANDFILL**

**ENVIRONMENTAL
PERMIT EA WML 34183**

**2016 Annual Environmental
Monitoring Report**

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1 INTRODUCTION

Carmarthenshire County Council (CCC) maintains Nant y Caws (NYC) Phase I Landfill which is located east of Carmarthen and west of Cross Hands (see Figure 1). The landfill is in Aftercare and has not accepted waste since March 1997. The landfill has been partially restored, with a full FML (Flexible Membrane Liner) placed over the capped area. The site is regulated by Natural Resources Wales (NRW) through Permit No. EA WML 34183.

The Permit requires routine environmental monitoring to be undertaken. Geotechnology Ltd (Geotechnology) has been commissioned by CCC to undertake the monitoring since April 2013 and to report the results. This annual review of the monitoring data is based on data gathered up to December 2016.

This report includes data provided to Geotechnology by third parties.

2 OVERVIEW OF SITE ACTIVITY

Key dates relating to the operation, closure, capping and regulatory control of the landfill are provided in Table 2-1. A detailed site plan showing surface topography and monitoring infrastructure is provided in Figure 2.

Table 2-1 Summary of Key Dates

Date	Activity
1984	Phase 1 Landfill designed
12 Dec 1985	Waste Disposal Plan (WDP) issued by Carmarthen District Council
1 May 1994	WDP converted to a Waste Management Licence (WML)
1997	Cessation of landfilling operations
1998	Installation of gas and groundwater monitoring infrastructure
Dec 1999	Final FML capping completed
1 January 2002	Modification to WML by Environment Agency
2002/2003	Geotechnology undertakes hydrogeological risk assessment and prepare monitoring action plans based on limited data set
2009	Leachate Breakout on Southern Bund – Remedial measures implemented
6 April 2010	WML automatically became an Environmental Permit in accordance with the Environmental Permitting Regulations (England and Wales) 2010
2010	Leachate treatment system undergoing improvements
20 Jan 2015	Landfill formally taken into Aftercare by NRW
2016	Permit Variation issued to operator of leachate treatment system (EPR/PP3338CQ) CWM Environmental placed soils over central part of aimed at restoring surface drainage patterns

Photographs of the current site conditions are provided in Plates 1 and 2. Other key features are highlighted on Figures 2 and 3. The latter figure is a conceptual site model previously developed for a Hydrogeological Risk Assessment by Geotechnology.



Plate 1. View southwest over western part of site



Plate 2. View South over central part of site

2.1 Landfilling

The landfill was designed in 1984 by W.S. Atkins and Partners and was based on a containment principle. However, there are no details available to demonstrate that any form of engineered containment was adopted. Instead, the design is considered to rely on the in-situ glacial till to provide an impermeable base. A series of leachate interceptor drains are shown on the original site plans. The design drawings also show that Phase 1 was divided into a series of working cells with a total of 25 shown on the plan.

This original plan also describes the working method, which involved vertical layering with working faces of 2 to 2.5m which are then capped with 300mm of inert fill. Subsequent working faces were pushed over each completed layer to form four layers, giving a total landfill thickness of between approximately 8 and 10m. This data was broadly confirmed in subsequent drilling for internal gas wells in 1998, though a maximum waste thickness of 14m was obtained. It is known that over-tipping and further waste layering was undertaken at the site in late 1994 and early 1995 which may account for the increased thickness observed. The original design also shows that at the site boundary a cut-off ditch was constructed which is further isolated from the refuse by a clay bund.

Landfilling ceased in March 1997 and the landfill has not received any wastes since then.

2.2 Capping

During the operational period, measures were undertaken to reduce the leachate yield from the site in the form of FML applications to the flanks. Initially, a 0.5mm polypropylene membrane was used on the southwestern flank though this has been replaced by a 2mm double textured HDPE. All the flanks of the landfill now have a 2mm textured HDPE cover, which in turn is welded to a 1mm smooth HDPE liner on the plateau cap. Prior to the final capping work being completed in December 1999, an intermediate layer of 0.5m of clay soil cover was placed, though it is locally thicker in hollows.

The Phase 1 landfill has therefore been capped since December 1999.

2.3 Restoration

The agricultural restoration of the Phase 1 landfill continued from 1999 up until 2003, although there are no precise records. The restoration process involved the importation of sub-soils from a number of extraneous sources. Geotechnology undertook a soil audit of the areas completed up till November 2002. This is documented in Geotechnology report 237/0/1102 issued in November 2002. Geotechnology was not involved in the final stages of restoration at the landfill.

Agricultural post and wire fencing was placed and the surface seeded to encourage surface soil stabilisation on the restored cap. The fields created by the fences are present today. The vegetation within the fields is, however, overgrown and does not appear to be being grazed or managed in accordance with the intention of the Post Closure Working Plan.

Following the removal of several stockpiles, CWM Environmental placed materials over the central part of the site during 2016. These works were aimed at reinstating the landfill landform and protection of the capping systems.

2.4 Leachate Management

The leachate at the site is collected by a gravity fed under waste drainage system comprising a 225mm diameter spine drain receiving inflows from 150mm diameter spur drains. The drainage system is accessed from the landfill surface by leachate inspection chambers, which rise through the waste. The chambers allow inspection of the leachate system and permit access for routine maintenance, leachate level measurement and cleaning. The position of each chamber has recently been re-surveyed by Geotechnology and is shown on Figure 2. Leachate inspection chambers 9 and 16 could not be found during the survey.

In addition to the under drainage works undertaken during the infilling, further leachate drains were installed at the toe of the flanks to intercept perched leachate which was historically observed to break out along the flanks. This work was completed during the capping period of the restoration in 1999. Both the toe drain and under drain system flow under gravity to the pumping sump from where the leachate is pumped, either to the nearby concrete lined leachate lagoon or the treatment plant. Following treatment, the leachate is discharged to the Afon Bantwen under discharge consent. An application to vary the Permit was prepared by Geotechnology, at the request of CCC in 2015, and this was accepted by NRW in 2016.

3 REGULATORY FRAMEWORK

The Aftercare Management Plan sets out the relevant regulatory framework against which the environmental protection measures should be evaluated. These criteria are summarised in the following sections.

3.1 Leachate Level Limit

The maximum level of leachate that should be observed from a leachate inspection chamber is 0.5m as measured from the base of the chamber.

3.2 Leachate Chemistry Control Levels

Control levels for assessing leachate chemistry are provided in Table 3-1.

Table 3-1 Leachate Control Levels

	Ammoniacal Nitrogen	Chloride	Potassium
	mg l ⁻¹	mg l ⁻¹	mg l ⁻¹
Current Discharge Consent from Effluent Treatment Plant	4		
Leachate Quarterly Control Level for L1	70	250	140
Daily Leachate Control Levels	4		

3.3 Groundwater Compliance Levels

Current groundwater trigger and control levels are summarised in Table 3-2.

Table 3-2 Trigger Levels for Emissions to Groundwater

	Ammoniacal Nitrogen	Chloride	Potassium
	mg l ⁻¹	mg l ⁻¹	mg l ⁻¹
Groundwater Trigger Level BH101, 103, 104, 105 and 117	10	250	40
Groundwater Control level BH101, 103, 104, 105 and 117	4	150	30

3.4 Surface Water Control Levels

Current surface water control levels are summarised in Table 3-3.

Table 3-3 Control Levels for Emissions to Surface Water

	Ammoniacal Nitrogen	Chloride	Suspended Solids
Location	mg l ⁻¹	mg l ⁻¹	mg l ⁻¹
SW1	0.6	150	
Cap run-off discharge			50 mg/l
French Drain Discharge	4		

3.5 Perimeter Gas Compliance Levels

Currently applicable emission limits for the perimeter gas wells are summarised in Table 3-4.

Table 3-4 Landfill Gas in External Monitoring Boreholes Emission Limits

Perimeter gas position	Carbon Dioxide Action Level (% v/v)	Methane Compliance Limit (% v/v)
All positions	3	1

Action levels are for internal use by CCC while methane compliance limits are a Permit requirement.

4 MONITORING NETWORK PERFORMANCE

To demonstrate that the site is functioning as designed, a monitoring programme is being implemented. The current programme is managed by CCC with the monitoring of leachate, downgradient groundwater, surface water and external landfill currently undertaken by Geotechnology under contract. Upgradient groundwater wells are sampled by the current operators of the adjacent operational landfill, CWM Environmental. The available monitoring infrastructure is shown on Figure 2.

A summary of the current monitoring programme is provided in Table 4-1.

Table 4-1 Current Monitoring Programme

Item	Monitoring Point	Type of Monitoring	Monitoring Frequency	Relevant Working Plan	Party Responsible
A	Landfill leachate level	Level and Conditional Observations	Monthly for 12 months starting 2014 and then quarterly	See WP10	WEBS
B	Landfill leachate – L1	Composition	Six monthly	See WP10	Geo
C	Leachate Breakout - Phase 1 flanks (including toe drain)	Visual	Quarterly	See WP10	Geo
D	Upgradient Groundwater – BH203, BH205	Composition		Data provided by CWM Environmental	CCC/CWM
E	Downgradient Groundwater – BH101, 103, 104, 105, 117	Level	Quarterly	See WP11	Geo
F	Downgradient Surface Water – SW1, SW4	Composition	Quarterly	See WP12	Geo
G	Internal landfill gas	Composition	Monthly	See WP13	Infinis
H	French Drain	On-site measurement of composition	When observed to be flowing during inspections by WEBS	See WP12	WEBS
I	Run-off Discharge	Composition	Quarterly	See WP12	Geo
J	Leachate Discharge	Composition	Monthly	See WP10	WEBS
K	Contingency Surface Water Sample Points	Composition		See WP12	Geo
L	Perimeter landfill gas - BH102, 106, 107, 109, 110, 111, 113, 114, 115, 118, 119, 120	Composition	Quarterly	See WP14	Geo
M	Monitoring infrastructure integrity	Observational	Inspect each point when sampling	See WP10 – WP14	Geo
N	Topographic Survey and Settlement Assessment	Topographic Survey	Every 5 years starting 2015	See WP15	Geo

The monitoring aspects undertaken by WEBS, the current operators of the leachate treatment plant, are reported directly to CCC by WEBS. Some of this information is utilised in this report.

4.1 Monitoring Network

Each time Geotechnology undertakes the monitoring, an inspection of the monitoring infrastructure is also completed. Since 2013, clearance of vegetation along the northwestern edge of the landfill has taken place. Routine control of the vegetation significantly aids the safe collection of samples.

Other minor repairs have been undertaken as required to headworks of several wells with further work to be completed.

4.2 Sample Analysis & Laboratory Performance

Samples collected for laboratory testing were submitted to UKAS registered Chemtest laboratories in cooler boxes. The results from the laboratory analysis have been compiled as follows:

- Appendix 1: Laboratory Certificates
- Appendix 2: Leachate Chemistry
- Appendix 3: Groundwater Chemistry
- Appendix 4: Surface water Chemistry

In addition, the current operators of the leachate treatment plant (WEBS) undertake more frequent monitoring of the leachate prior to and following treatment. They also monitor the quality of a French drain along the southern perimeter of the site that was previously installed to collect leachate outbreaks. All of this data is in Appendix 5.

4.3 Site Observations

During the first round of sampling in April 2013 an oil sheen was noticed on the surface of the sample taken from BH104. This has not been observed since.

The restored landfill cap is largely covered by good vegetative cover and appears largely visibly stable. On the eastern flanks and the majority of the plateau, the landfill is parcelled into grassed fields. In some areas, drainage appears to be poor with reeds developing.

The western and northern portions of the landfill have recently been reprofiled by CWM Environmental. The majority of the flanks in the northern and western boundary of the landfill have self-seeded, resulting in the proliferation of a number of dwarf trees (mainly willow), gorse, broom and other flora. Whilst this is not in accordance with the species proposed in the Post Closure Working Plan, they have had the desired effect of stabilising the slopes, especially the near surface restoration soils. No evidence of instability, failure or leachate breakout was observed in the walkovers undertaken in 2016.

Leachate breakout has previously occurred on the southern bund of the landfill. Measures to collect and treat excess leachate have been implemented by CCC. In the same corner, the capping membrane HDPE is exposed and damaged over an area of approximately 1m². Based on visible vehicle tracks, Geotechnology suspects that trafficking has primarily caused the damage rather than any failure of the soil cover. In the southeastern corner of the landfill, Geotechnology suspects perching of leachate within the waste as the ground surface is soft and fully saturated.

The access road down to the leachate treatment plant is tarmacadam and is in good condition.

4.4 Topographic Survey

The landform at Phase 1 has been surveyed on a number of occasions. The most recent of which was in 2015 by Geotechnology. Since this time CWM Environmental has undertaken remedial reprofiling works. The next topographic survey is scheduled for 2020.

5 LEACHATE

5.1 Leachate Quality

Leachate chemistry has been monitored between 1998 and 2002 and from December 2007 to the present day. The results are graphically illustrated in Appendix 2. The data presented includes data gathered by Geotechnology and more frequent monitoring undertaken by WEBS who operate the leachate treatment plant.

The leachate is moderately mineralised with electrical conductivity of approximately 1500 microS/cm. The dominant contaminants within the leachate are ammonia and potassium. The concentration of these parameters and others is variable but appears to be declining with time. The spot sampling undertaken by Geotechnology during 2015 and 2016 indicates ammonia and potassium to be typically less than 50 mg/l. Trace metals within the leachate are at low concentrations. Low level trace organics detected during 2015 and 2016 included speciated polyaromatic hydrocarbons (<3.5 microg/l total PAH) and 2.1 microg/l mecoprop.

The leachate currently has BOD values of <20 mg/l and total organic carbon (TOC) content of <40 mg/l suggesting that the biodegradable component is now low.

5.2 Assessment against Control Levels

The spot samples collected by Geotechnology indicate that leachate quality falls below the control levels (see Table 5-1).

The more detailed routine monitoring undertaken by the leachate treatment operator indicates that during 2016 the treated leachate contained less than 0.41 mg/l ammonia, <37 mg/l suspended solids and <3 mg/l iron (see Table 5-1 and Appendix 5).

Table 5-1 Evaluation of Leachate Chemistry

	Ammoniacal Nitrogen	Chloride	Potassium
	mg l⁻¹	mg l⁻¹	mg l⁻¹
Current Discharge Consent from Effluent Treatment Plant	4		
Leachate Quarterly Control Level for L1	70	250	140
Daily Leachate Control Levels	4		
2016 Maximum value from spot sampling at L1	31.9	79.4	37.6
2016 maximum effluent concentration	<0.41		

6 GROUNDWATER

6.1 Groundwater Quality

All of the groundwater results are provided in Appendix 3.

To assist with describing the hydrochemistry of groundwater within the vicinity of Phase I, several borehole groupings have been created. The groupings are summarised below and are based on the position of each monitoring position relative to Phase I (see Figure 2).

- BH203 and BH205 – Up-gradient of Phase 1
- BH117 – across gradient from Phase 1 on Eastern side
- BH108 – across gradient from Phase 1 on Western side
- BH101, BH103, BH104 and BH105 – Down-gradient of Phase 1

Results for BH108 and BH117 are only available since 2008, whereas downgradient monitoring records are available since 1998.

The relatively low electrical conductivity of downgradient groundwater indicates that groundwater is of relatively good quality despite the proximity of the monitoring positions to the unlined landfill. Groundwater is less mineralised than leachate but does become locally, slightly more mineralised in the wells along the southern edge of the landfill. The concentration of ammonia did not exceed 0.7 mg/l in any samples collected during 2016 and potassium was less than 30 mg/l on all occasions.

Trace elements and oxidised species of nitrogen, such as nitrate, are detected in groundwater around the edge of the landfill but at relatively low concentrations (<4 mg/l nitrate) and below Environmental Quality Standards. This data suggests that either the landfill is not releasing such potential pollutants or that natural attenuation is occurring. Increased COD at BH117 and BH104 has been noted and this data will continue to be carefully scrutinised.

Hazardous substance cadmium has previously been detected in groundwater upgradient and downgradient of the landfill but at a concentration lower than the freshwater EQS. Cadmium was not detected during the last year of monitoring. Mercury was, however, detected at 0.00006 mg/l at BH105 in November 2016. On all other occasions it was below the analytical level of detection.

Given the low TOC content of leachate, all groundwater samples have previously been found to contain <25 mg/l TOC, suggesting that the landfill is not a significant source of organic contaminants. During 2016, trace levels of polyaromatic hydrocarbons were only detected at BH104 (0.3 microg/l total PAH). No other trace organics were detected.

6.2 Assessment against Compliance Levels

The groundwater chemistry observed in 2016 was similar to that observed previously and no breaches of the control and trigger levels occurred, as shown by the summary in Table 6-1.

Table 6-1 Comparison of Groundwater Chemistry with Compliance Levels

		Potassium	Ammoniacal Nitrogen	Chloride
		mg/l	mg/l	mg/l
	Trigger Levels (BH101, 103, 104, 105 and 117)	40	10	250
	Control Levels (BH101, 103, 104, 105 and 117)	30	4	150
	Maximum Value in Groundwater (2016)	4.39	0.631	26.8
BH101	07/01/2016	<1	<0.2	14.8
	24/06/2016	<1	<0.2	16.3
	29/09/2016	<1	<0.2	16.1
	24/11/2016	4.39	<0.2	15
BH103	07/01/2016	<1	0.408	13.9
	24/06/2016	1.73	0.477	14.6
	29/09/2016	<1	<0.2	14.7
	24/11/2016	<1	<0.2	14.2
BH104	07/01/2016	<1	<0.2	13.7
	24/06/2016	2.58	0.316	12.3
	29/09/2016	<1	<0.2	6.5
	24/11/2016	3.06	<0.2	6.2
BH117	07/01/2016	<1	0.261	22.3
	24/06/2016	<1	0.631	26.8
	29/09/2016	<1	<0.2	26.6
	24/11/2016	<1	0.281	26.3

7 SURFACE WATER

All of the surface water results are presented in Appendix 4.

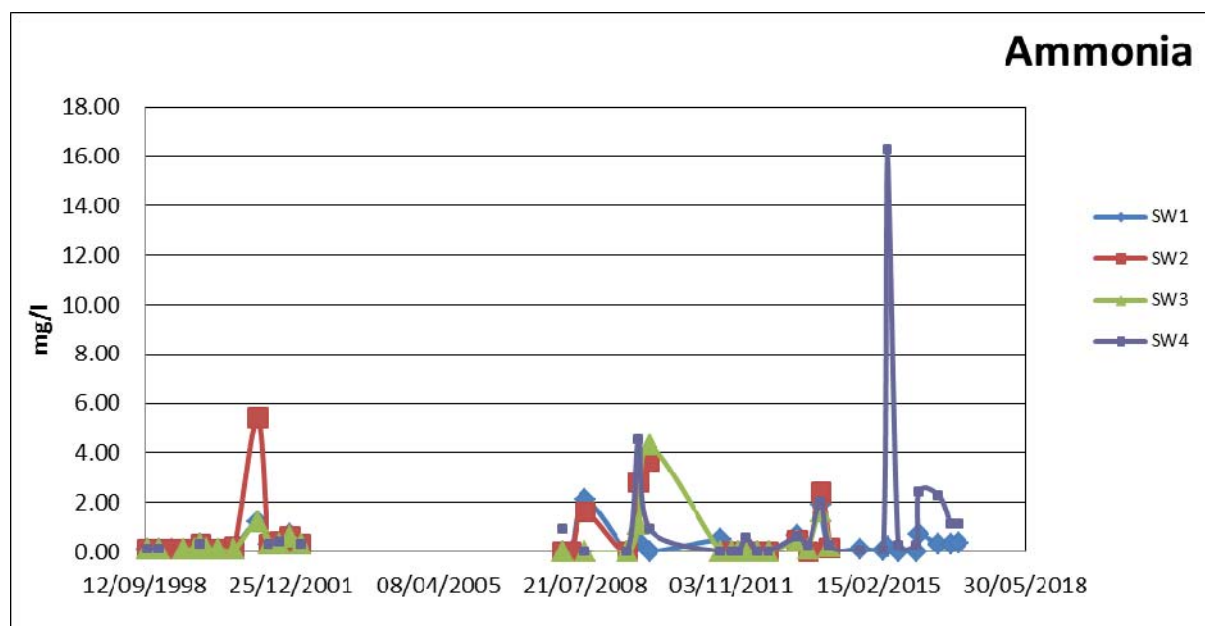
7.1 Contributions

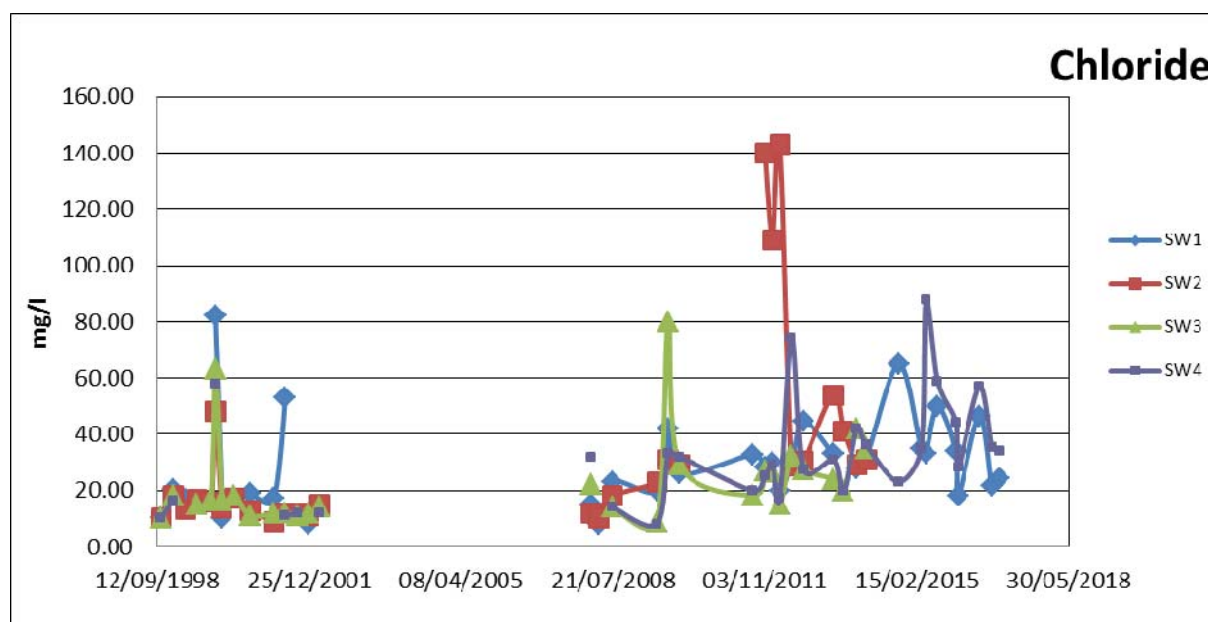
Sample points SW1, SW2, SW3 and SW4 monitor the stream that runs west to east along the southern boundary of the landfill. The location of the surface water sample points is shown on Figure 2.

Surface water quality is primarily influenced by input from the CWM treatment lagoons west of the site and the level of leachate treatment achieved at the Phase I treatment plant.

7.2 Quality

Surface water quality observed during 2016 is similar to that observed previously. The quality of surface water leaving the site at SW1 (the furthest point monitored downgradient of the site) is better than the quality issuing into the stream just upstream of SW4 from the settlement lagoons to the west. As highlighted by the graphs reproduced below and further graphs in Appendix 4, this is best observed by comparing the higher concentration of several parameters observed at SW4 with the lower concentrations at SW1.





7.3 Assessment against Control Levels

The only time any of the control levels were breached at SW1 during 2016 was when the water quality at SW4 was poorer and also in breach (see data for Jan 2016 in Table 7-1). Again, this highlights the influence discharge from the settlement lagoons to the west has on the local surface water catchment. Monitoring of the French drain by the operator of the leachate treatment facility also indicates that the water quality is typically good with ammonia <0.41 mg/l throughout 2016 although increased suspended solids (~ 80 mg/l) were detected during the winter (see Table 7-1 and Appendix 5).

Table 7-1 Comparison of Surface Water Data with Emission Levels

		Ammoniacal Nitrogen as N	Chloride	Suspended solids
		mg/l	mg/l	mg/l
		Ammoniacal Nitrogen	Chloride	Suspended Solids
	Location	mg l ⁻¹	mg l ⁻¹	mg l ⁻¹
	SW1	0.6	150	
	Cap run-off discharge			50 mg/l
	French Drain Discharge	4		
SW1	07/01/2016	0.706	18.3	17
	24/06/2016	0.308	46.5	11
	29/09/2016	0.311	21.8	10.5
	24/11/2016	0.347	24.1	13
SW4	07/01/2016	2.43	28.4	8.5
	24/06/2016	2.27	57	5
	29/09/2016	1.09	35.5	20.5
	24/11/2016	1.08	34	53.5
Cap runoff	24/06/2016			<2
	29/09/2016			6.5
	24/11/2016			2.5
French drain	Max value 2016	<0.41		

8 PERIMETER GROUND GAS

During the quarterly monitoring undertaken since April 2013, all methane concentrations have been below the Permit threshold. Methane has been below 0.3% at all monitoring positions since 2014.

Carbon dioxide (CO₂) has been detected at several positions along the eastern boundary (BH114, BH115, BH116 & BH118). Throughout 2014 and 2015, the concentration of carbon dioxide rarely exceeded 1%. In 2016, 3.3% was detected at BH115 in January and 6.8% at BH116 in June. At all other times less than 2.1% was detected at either position. This data will continue to be carefully scrutinised.

9 SUMMARY AND RECOMMENDATIONS

9.1 Environmental Protection

Groundwater and surface water monitoring completed in support of the Permit at Phase I has shown that the landfill is currently having limited impact. The available information shows that the quality of groundwater has not significantly deteriorated since the start of monitoring in 1998.

Upgradient groundwater already contains a series of low level trace elements including List 1 substance cadmium. Passage of this water below the landfill reveals that the landfill is not significantly impacting groundwater as several trace elements remain at the levels observed upgradient. Potassium is a key contaminant within leachate and despite the mobility of this element it is not significantly elevated in downgradient groundwater. The reason that the landfill is not having a significant impact on groundwater is suspected to be because groundwater has a higher piezometric surface than the basal drainage system of the landfill. The basal drainage system, therefore, intercepts any leachate and groundwater. As a consequence, the landfill is largely considered to be hydraulically isolated. The inward groundwater flow may not, however, prevent some outward diffusive transport, as contaminants move from an area of higher concentration to a lower one i.e. from the leachate to the aquifer. This process does not appear to be having a significant impact.

This model is further confirmed by the surrounding groundwater quality which shows little obvious impact from the landfill.

The quality of surface water within the vicinity of the landfill appears to be variable but generally good and is governed by inputs from the surface water treatment lagoons to the west.

Along the southern flank of the landfill, leachate breakout is known to have previously occurred but this situation is now being actively managed and controlled by CCC. Leachate breakout is the visible consequence of elevated leachate levels within the landfill.

9.2 Monitoring Programme

Now that the site has been formally taken into Aftercare, the monitoring programme agreed in the Aftercare Management Plan has started to be implemented. As part of this Plan, an increased range of chemical parameters were analysed in leachate and groundwater samples as these media had not previously been assessed for the presence of hazardous substances and trace organics. Based on the data gathered during the last 24 months, where most of these substances were not found above detection limits, Geotechnology suggests that the monitoring programme should continue to be implemented as summarised in Table 4-1 but that the analytical suites should be reduced to those summarised in Table 9-1.

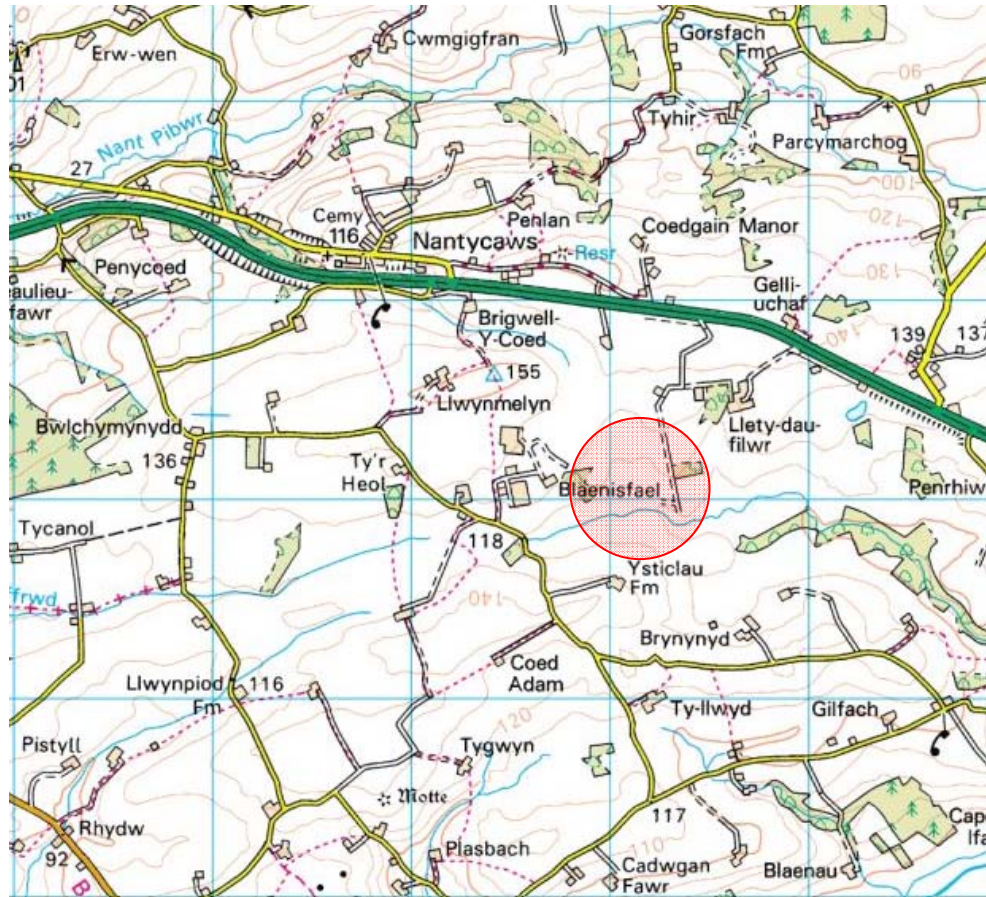
Table 9-1 Analytical Testing Schedule

Media	Lab Testing Required					Field Readings	WEBS	WEBS
	Groundwater		Surface Water	Leachate	Runoff Discharge	Perimeter Gas	Leachate Discharge	French Drain
Suite ID	NYC1	NYC2	NYC3	NYC4	NYC5			
Time of Year	Q1, Q3	Q2, Q4	Q1, Q2, Q3, Q4	Q1, Q3	Q1, Q2, Q3, Q4	Q1, Q2, Q3, Q4	Monthly	When flowing
Sampling locations	BH101, 103, 104, 105, 117		SW1 and SW4	L1	End of pipe discharge point	BH102, 106, 107, 109, 110, 111, 113, 114, 115, 117, 118, 119, 120	End of pipe discharge point	
No. of samples/ year	10	10	8	2	4			
On-site measurements								
Carbon dioxide, methane, hydrogen sulphide, carbon monoxide, differential pressure, air temperature, atmospheric pressure, balance gas	✓		✓		✓	✓	✓	✓
Ammonia, pH, temperature (at treatment plant by operator)	✓		✓		✓	✓	✓	✓
Laboratory Measured Parameters								
pH	✓	✓	✓	✓				
Electrical Conductivity	✓	✓	✓	✓				
Dissolved Oxygen	✓	✓	✓	✓				
Alkalinity	✓	✓	✓	✓	✓	✓	✓	✓
Hardness	✓	✓	✓	✓	✓	✓	✓	✓
BOD	✓	✓	✓	✓	✓	✓	✓	✓
COD	✓	✓	✓	✓	✓	✓	✓	✓
Total Organic Carbon	✓	✓	✓	✓	✓	✓	✓	✓
Total Oxidised Nitrogen	✓	✓	✓	✓	✓	✓	✓	✓
Calcium	✓	✓	✓	✓	✓	✓	✓	✓
Magnesium	✓	✓	✓	✓	✓	✓	✓	✓
Chloride	✓	✓	✓	✓	✓	✓	✓	✓
Potassium	✓	✓	✓	✓	✓	✓	✓	✓
Sodium	✓	✓	✓	✓	✓	✓	✓	✓
Sulphate	✓	✓	✓	✓	✓	✓	✓	✓
Phosphate	✓	✓	✓	✓	✓	✓	✓	✓
Phosphorous	✓	✓	✓	✓	✓	✓	✓	✓
Ammoniacal Nitrogen	✓	✓	✓	✓	✓	✓	✓	✓
Arsenic	✓	✓	✓	✓	✓	✓	✓	✓
Barium	✓	✓	✓	✓	✓	✓	✓	✓
Beryllium	✓	✓	✓	✓	✓	✓	✓	✓
Boron	✓	✓	✓	✓	✓	✓	✓	✓
Cadmium	✓	✓	✓	✓	✓	✓	✓	✓
Chromium	✓	✓	✓	✓	✓	✓	✓	✓
Copper	✓	✓	✓	✓	✓	✓	✓	✓
Iron	✓	✓	✓	✓	✓	✓	✓	✓
Lead	✓	✓	✓	✓	✓	✓	✓	✓
Manganese	✓	✓	✓	✓	✓	✓	✓	✓
Mercury	✓	✓	✓	✓	✓	✓	✓	✓
Nickel	✓	✓	✓	✓	✓	✓	✓	✓
Zinc	✓	✓	✓	✓	✓	✓	✓	✓
Mecoprop		✓		✓	✓	✓	✓	✓
Total PAH		✓		✓	✓	✓	✓	✓
Suspended Solids		✓	✓	✓	✓	✓	✓	✓

9.3 Decommissioning and Surrender

Ahead of the development of the site for the disposal of waste, CCC leased the land from a Mr D Davies as part of a 50 year lease starting in 1983. Since this time, CWM has purchased the land and is now the landlord. Geotechnology understands that the long-term plan of CCC is to start the process of handing the land lease back to CWM once the materials being stored on the surface have been removed and any remedial works completed. Now that this work has been undertaken by CWM during 2016, Geotechnology suggests that this next stage could be initiated through discussions with CWM. Throughout the next phase, Geotechnology understand that CCC will continue to monitor the site and treat leachate and that CWM will continue to be responsible for landfill gas collection and management. Monitoring will continue to be coordinated by CCC until there is no risk to the environment. At that point, a Permit Surrender application will be submitted to NRW bringing together the lines of evidence that demonstrate the site no longer poses a risk to the environment and the infrastructure can be decommissioned.

Figure 1 Site Location Plan



Reproduced from the Ordnance Survey Land Ranger Map
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Figure 2 Available Monitoring Network

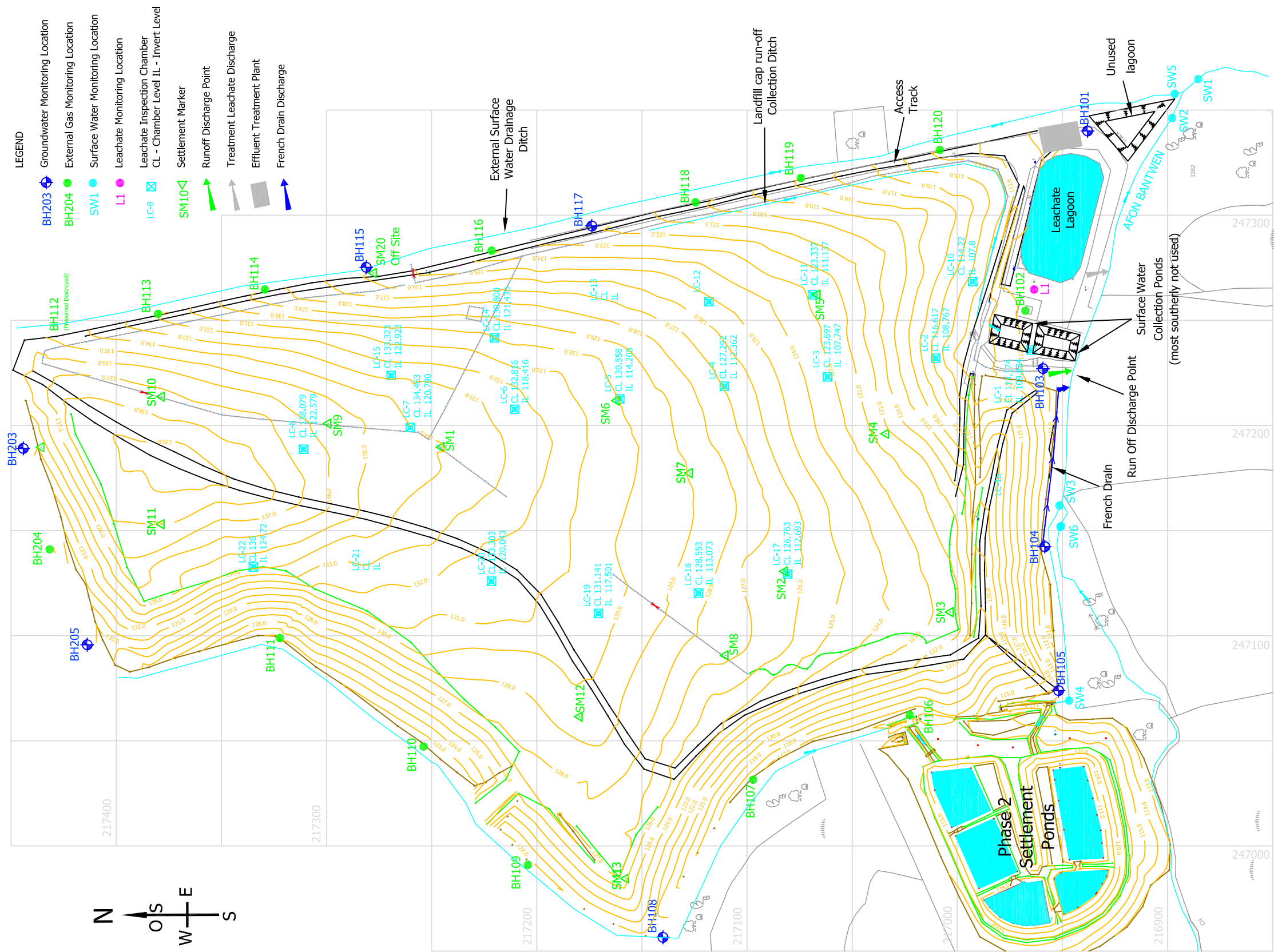
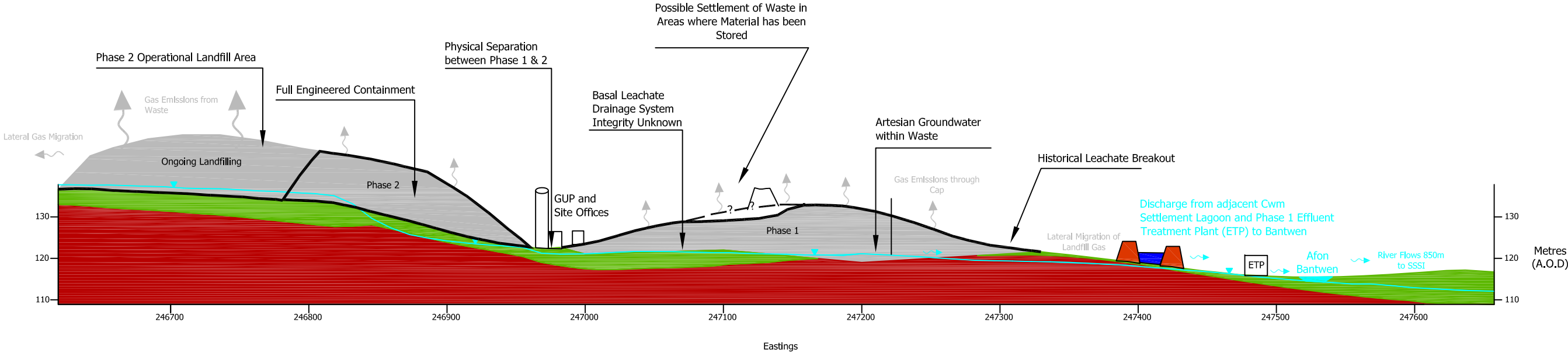


Figure 3 Conceptual Site Model



- Legend
- Waste
 - Glacial Drift
 - Devonian Bedrock
 - Potential Landfill Gas Emission
 - Potential Seepage to Controlled Water
- GUP Gas Utilisation Plant
ETP Effluent Treatment Plant

Note:
Landfill gas can give rise to odour and migrate laterally

**NANT Y CAWS
PHASE 1
CLOSED LANDFILL**

**ENVIRONMENTAL
PERMIT EA WML 34183**

**2016 Annual
Environmental
Monitoring Report**

**Appendix 1
Laboratory Certificates**

Report Number 1551r1v1d0117



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

Attention: Ben Rees

CERTIFICATE OF ANALYSIS

Date: 19 January 2016
Customer: H_GETCNO_NAH
Sample Delivery Group (SDG): 160109-56
Your Reference:
Location: Carmarthen
Report No: 345642

We received 11 samples on Saturday January 09, 2016 and 10 of these samples were scheduled for analysis which was completed on Tuesday January 19, 2016. 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.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:

Sonia McWhan

Operations Manager





SDG:	160109-56	Location:	Carmarthen	Order Number:	
Job:	H_GETCNO_NAH-15	Customer:	Geotechnology	Report Number:	345642
Client Reference:		Attention:	Ben Rees	Superseded Report:	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
12728620	BH101			07/01/2016
12728621	BH103			07/01/2016
12728622	BH104			07/01/2016
12728623	BH105			07/01/2016
12728624	BH117			07/01/2016
12728619	L1			07/01/2016
12728625	NYC RUNOFF			07/01/2016
12728615	NYC SW1			07/01/2016
12728616	NYC SW4			07/01/2016
12728617	WERN SW2			07/01/2016
12728618	WERN SW4			07/01/2016

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



SDG: 160109-56
 Job: H_GETCNO_NAH-15
 Client Reference:

Location: Carmarthen
 Customer: Geotechnology
 Attention: Ben Rees

Order Number:
 Report Number: 345642
 Superseded Report:

LIQUID Results Legend X Test N No Determination Possible	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container	
	12728618		WERN SW4						1l plastic (ALE221)	
	12728617		WERN SW2						1l plastic (ALE221)	
	12728616		NYC SW4						1000ml glass bottle	
	12728615		NYC SW1						1l plastic (ALE221)	
	12728619		L 1						Vial (ALE297)	
Acid Herbicides (W)	All	NDPs: 0 Tests: 1							250ml BOD (ALE21)	
Alkalinity as CaCO3	All	NDPs: 0 Tests: 8							1l plastic (ALE221)	
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 10							1000ml glass bottle	
Anions by Kone (w)	All	NDPs: 0 Tests: 10							1l plastic (ALE221)	
BOD True Total	All	NDPs: 0 Tests: 1							1l plastic (ALE221)	
COD Unfiltered	All	NDPs: 0 Tests: 1							1l plastic (ALE221)	
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 1							1l plastic (ALE221)	
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 1							1l plastic (ALE221)	
Mercury Dissolved	All	NDPs: 0 Tests: 1							1l plastic (ALE221)	
Metals by iCap-OES Dissolved (W)	All	NDPs: 0 Tests: 10							1l plastic (ALE221)	
Metals by iCap-OES Unfiltered (W)	All	NDPs: 0 Tests: 1							1l plastic (ALE221)	
Mineral Oil C10-40 Aqueous (W)	All	NDPs: 0 Tests: 1							1l plastic (ALE221)	
OC, OP Pesticides and Triazine Herb	All	NDPs: 0 Tests: 1							1l plastic (ALE221)	
Organochlorine Pesticides (Aq)	All	NDPs: 0 Tests: 1							1l plastic (ALE221)	
Organophosphorus Pesticides (Aq)	All	NDPs: 0 Tests: 1							1l plastic (ALE221)	

SDG: 160109-56
Job: H_GETCNO_NAH-15
Client Reference:

Location: Carmarthen
Customer: Geotechnology
Attention: Ben Rees

Order Number:
Report Number: 345642
Superseded Report:

LIQUID

Results Legend



Test



No Determination Possible

Lab Sample No(s)

**Customer
Sample Reference**

AGS Reference

Depth (m)

Container

12728618	WERN SW4	1iplastic (ALE221)
12728617	WERN SW2	1iplastic (ALE221)
12728616	NYC SW4	1000ml glass bottle
12728615	NYC SW1	1iplastic (ALE221)
12728619	L1	Vial (ALE297)
		Dissolved Metals P
		250ml BOD (ALE27
		1iplastic (ALE221)
		1000ml glass bottle
12728624	BH117	1iplastic (ALE221)
12728623	BH105	1iplastic (ALE221)
12728622	BH104	1iplastic (ALE221)
12728621	BH103	1iplastic (ALE221)
12728620	BH101	1iplastic (ALE221)

Organotins in Aqueous Samples

All

NDPs: 0
Tests: 1

X

PAH Spec MS - Aqueous (W)

All

NDPs: 0
Tests: 1

X

Suspended Solids

All

NDPs: 0
Tests: 2

	X	X
--	---	---

X	X
---	---

SVOC MS (W) - Aqueous

All

NDPs: 0
Tests: 1

X

Total Organic and Inorganic Carbon

All

NDPs: 0
Tests: 1

X

VOC MS (W)

All

NDPs: 0
Tests: 1

X



CERTIFICATE OF ANALYSIS

SDG: 160109-56
Job: H_GETCNO_NAH-15
Client Reference:

Location: Carmarthen
Customer: Geotechnology
Attention: Ben Rees

Order Number:
Report Number: 345642
Superseded Report:

Results Legend		Customer Sample R Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	BH101	BH103	BH104	BH105	BH117	L1
#	ISO17025 accredited.		Water(GW/SW) 07/01/2016 09/01/2016 160109-56 12728620	Water(GW/SW) 07/01/2016 09/01/2016 160109-56 12728621	Water(GW/SW) 07/01/2016 09/01/2016 160109-56 12728622	Water(GW/SW) 07/01/2016 09/01/2016 160109-56 12728623	Water(GW/SW) 07/01/2016 09/01/2016 160109-56 12728624	Water(GW/SW) 07/01/2016 09/01/2016 160109-56 12728619
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% 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							
1-5&*\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Alkalinity, Total as CaCO3	<2 mg/l	TM043	220	210	270	270	255	430
			#	#	#	#	#	#
BOD, unfiltered	<1 mg/l	TM045						4.58
								◆ #
Organic Carbon, Total	<3 mg/l	TM090						20.1
								#
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2	0.408	<0.2	<0.2	0.261	31.9
			#	#	#	#	#	#
COD, unfiltered	<7 mg/l	TM107						80.6
								#
Arsenic (diss.filt)	<0.12 µg/l	TM152						1.67
								#
Barium (diss.filt)	<0.03 µg/l	TM152						73.7
								#
Beryllium (diss.filt)	<0.07 µg/l	TM152						<0.07
								#
Boron (diss.filt)	<9.4 µg/l	TM152						143
								#
Cadmium (diss.filt)	<0.1 µg/l	TM152						<0.1
								#
Chromium (diss.filt)	<0.22 µg/l	TM152						4.18
								#
Copper (diss.filt)	<0.85 µg/l	TM152						2.01
								#
Lead (diss.filt)	<0.02 µg/l	TM152						0.443
								#
Manganese (diss.filt)	<0.04 µg/l	TM152						237
								#
Nickel (diss.filt)	<0.15 µg/l	TM152						3.88
								#
Phosphorus (diss.filt)	<6.3 µg/l	TM152						57.7
								#
Zinc (diss.filt)	<0.41 µg/l	TM152						6.43
								#
Mineral oil >C10 C40 (aq)	<10 µg/l	TM172						<10
Mercury (diss.filt)	<0.01 µg/l	TM183						<0.01
								#
Sulphate	<2 mg/l	TM184						14.6
								#
Chloride	<2 mg/l	TM184	14.8	13.9	13.7	10.7	22.3	79.4
			#	#	#	#	#	#
Phosphate (ortho) as PO4	<0.05 mg/l	TM184						<0.05
								#
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184						1.64
								#
Cyanide, Total	<0.05 mg/l	TM227						<0.05
								#
Cyanide, Free	<0.05 mg/l	TM227						<0.05
								#
Calcium (diss.filt)	<0.012 mg/l	TM228						89.8
								#
Sodium (diss.filt)	<0.076 mg/l	TM228						47.4
								#
Magnesium (diss.filt)	<0.036 mg/l	TM228						10.9
								#
Potassium (diss.filt)	<1 mg/l	TM228	<1	<1	<1	<1	<1	37.6
			#	#	#	#	#	#
Iron (diss.filt)	<0.019 mg/l	TM228						0.424
								#
Hardness, Total as CaCO3 unfiltered	<0.35 mg/l	TM228						297
Etridiazole	<0.01 µg/l	TM314						<0.01

SDG: 160109-56
Job: H_GETCNO_NAH-15
Client Reference:

Location: Carmarthen
Customer: Geotechnology
Attention: Ben Rees

Order Number:
Report Number: 345642
Superseded Report:

[illegible]

Order Number:
Report Number: 345642
Superseded Report:

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Order Number:
Report Number: 345642
Superseded Report:

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CERTIFICATE OF ANALYSIS

SDG: 160109-56
Job: H_GETCNO_NAH-15
Client Reference:

Location: Carmarthen
Customer: Geotechnology
Attention: Ben Rees

Order Number:
Report Number: 345642
Superseded Report:

OC, OP Pesticides and Triazine Herb

Results Legend		Customer Sample R	L1				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Water(GW/SW) 07/01/2016 09/01/2016 160109-56 12728619				
M	mCERTS accredited.						
aq	Aqueous / settled sample.						
diss.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted test.						
**	% 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						
1-5&*\$@	Sample deviation (see appendix)						
Component	LOD/Units	Method					
Dichlorvos	<0.01 µg/l	TM231	<0.01				
Mevinphos	<0.01 µg/l	TM231	<0.01				
Tecnazene	<0.01 µg/l	TM231	<0.01				
Hexachlorobenzene	<0.01 µg/l	TM231	<0.01				
Trifluralin	<0.01 µg/l	TM231	<0.01				
alpha-Hexachlorocyclohexane (HCH / Lindane)	<0.01 µg/l	TM231	<0.01				
Quintozene (PCNB)	<0.01 µg/l	TM231	<0.01				
Diazinon	<0.01 µg/l	TM231	<0.01				
Triallate	<0.01 µg/l	TM231	<0.01				
Etrimphos	<0.01 µg/l	TM231	<0.01				
gamma-Hexachlorocyclohexane (HCH / Lindane)	<0.01 µg/l	TM231	<0.01				
Disulfoton	<0.01 µg/l	TM231	<0.01				
Propetamphos	<0.01 µg/l	TM231	<0.01				
Heptachlor	<0.01 µg/l	TM231	<0.01				
Chlorpyrifos methyl	<0.01 µg/l	TM231	<0.01				
Dimethoate	<0.01 µg/l	TM231	<0.01				
Aldrin	<0.01 µg/l	TM231	<0.01				
Chlorothalonil	<0.01 µg/l	TM231	<0.01				
Pirimiphos-methyl	<0.01 µg/l	TM231	<0.01				
beta-Hexachlorocyclohexane (HCH / Lindane)	<0.01 µg/l	TM231	<0.01				
Chlorpyrifos	<0.01 µg/l	TM231	<0.01				
Telodrin	<0.01 µg/l	TM231	<0.01				
Methyl parathion	<0.01 µg/l	TM231	<0.01				
Isodrin	<0.01 µg/l	TM231	<0.01				
Malathion	<0.01 µg/l	TM231	<0.01				
Fenthion	<0.01 µg/l	TM231	<0.01				
Fenitrothion	<0.01 µg/l	TM231	<0.01				
Heptachlor epoxide	<0.01 µg/l	TM231	<0.01				
Triadimefon	<0.01 µg/l	TM231	<0.01				
Pendimethalin	<0.01 µg/l	TM231	<0.01				
Parathion	<0.01 µg/l	TM231	<0.01				
o,p-DDE	<0.01 µg/l	TM231	<0.01				

Order Number:
Report Number: 345642
Superseded Report:

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Order Number:
Report Number: 345642
Superseded Report:

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CERTIFICATE OF ANALYSIS

SDG: 160109-56
Job: H_GETCNO_NAH-15
Client Reference:

Location: Carmarthen
Customer: Geotechnology
Attention: Ben Rees

Order Number:
Report Number: 345642
Superseded Report:

SVOC MS (W) - Aqueous

Results Legend		Customer Sample R		L1				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Water(GW/SW) 07/01/2016 09/01/2016 160109-56 12728619					
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% 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							
1-5	@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<2	#				
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<2	#				
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<2	#				
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<2					
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<2	#				
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<2	#				
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<2	#				
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<2	#				
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<2	#				
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<2	#				
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<2	#				
2-Chlorophenol (aq)	<1 µg/l	TM176	<2	#				
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<2	#				
2-Methylphenol (aq)	<1 µg/l	TM176	<2	#				
2-Nitroaniline (aq)	<1 µg/l	TM176	<2	#				
2-Nitrophenol (aq)	<1 µg/l	TM176	<2	#				
3-Nitroaniline (aq)	<1 µg/l	TM176	<2	#				
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<2	#				
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<2	#				
4-Chloroaniline (aq)	<1 µg/l	TM176	<2					
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<2	#				
4-Methylphenol (aq)	<1 µg/l	TM176	<2	#				
4-Nitroaniline (aq)	<1 µg/l	TM176	<2	#				
4-Nitrophenol (aq)	<1 µg/l	TM176	<2					
Azobenzene (aq)	<1 µg/l	TM176	<2	#				
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<2	#				
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<2	#				
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<4	#				
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<2	#				
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<2	#				
Carbazole (aq)	<1 µg/l	TM176	<2	#				
Dibenzofuran (aq)	<1 µg/l	TM176	<2	#				

Order Number:
Report Number: 345642
Superseded Report:

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CERTIFICATE OF ANALYSIS

SDG: 160109-56
Job: H_GETCNO_NAH-15
Client Reference:

Location: Carmarthen
Customer: Geotechnology
Attention: Ben Rees

Order Number:
Report Number: 345642
Superseded Report:

VOC MS (W)

Results Legend		Customer Sample R		L1				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Water(GW/SW) 07/01/2016 09/01/2016 160109-56 12728619					
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% 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							
1-5&\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Dibromofluoromethane**	%	TM208	113					
Toluene-d8**	%	TM208	100					
4-Bromofluorobenzene**	%	TM208	98.5					
Dichlorodifluoromethane	<1 µg/l	TM208	<1					
Chloromethane	<1 µg/l	TM208	<1	#				
Vinyl chloride	<1 µg/l	TM208	<1	#				
Bromomethane	<1 µg/l	TM208	<1	#				
Chloroethane	<1 µg/l	TM208	<1	#				
Trichlorofluoromethane	<1 µg/l	TM208	<1	#				
1,1-Dichloroethene	<1 µg/l	TM208	<1	#				
Carbon disulphide	<1 µg/l	TM208	<1	#				
Dichloromethane	<3 µg/l	TM208	<3	#				
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	#				
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1	#				
1,1-Dichloroethane	<1 µg/l	TM208	<1	#				
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1	#				
2,2-Dichloropropane	<1 µg/l	TM208	<1					
Bromochloromethane	<1 µg/l	TM208	<1	#				
Chloroform	<1 µg/l	TM208	<1	#				
1,1,1-Trichloroethane	<1 µg/l	TM208	<1	#				
1,1-Dichloropropene	<1 µg/l	TM208	<1	#				
Carbontetrachloride	<1 µg/l	TM208	<1	#				
1,2-Dichloroethane	<1 µg/l	TM208	<1					
Benzene	<1 µg/l	TM208	<1	#				
Trichloroethene	<1 µg/l	TM208	<1	#				
1,2-Dichloropropane	<1 µg/l	TM208	<1	#				
Dibromomethane	<1 µg/l	TM208	<1	#				
Bromodichloromethane	<1 µg/l	TM208	<1	#				
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1	#				
Toluene	<1 µg/l	TM208	<1	#				
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1	#				
1,1,2-Trichloroethane	<1 µg/l	TM208	<1	#				



SDG: 160109-56
Job: H_GETCNO_NAH-15
Client Reference:

Location: Carmarthen
Customer: Geotechnology
Attention: Ben Rees

Order Number:
Report Number: 345642
Superseded Report:

VOC MS (W)

Results Legend		Customer Sample R	L1				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Water(GW/SW) 07/01/2016 09/01/2016 160109-56 12728619				
M	mCERTS accredited.						
aq	Aqueous / settled sample.						
dis.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted test.						
**	% 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						
1-5&5@	Sample deviation (see appendix)						
Component	LOD/Units	Method					
1,3-Dichloropropane	<1 µg/l	TM208	<1	#			
Tetrachloroethene	<1 µg/l	TM208	<1	#			
Dibromochloromethane	<1 µg/l	TM208	<1	#			
1,2-Dibromoethane	<1 µg/l	TM208	<1	#			
Chlorobenzene	<1 µg/l	TM208	<1	#			
1,1,1,2-Tetrachloroethane	<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	#			
Styrene	<1 µg/l	TM208	<1	#			
Bromoform	<1 µg/l	TM208	<1	#			
Isopropylbenzene	<1 µg/l	TM208	<1	#			
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1				
1,2,3-Trichloropropane	<1 µg/l	TM208	<1	#			
Bromobenzene	<1 µg/l	TM208	<1	#			
Propylbenzene	<1 µg/l	TM208	<1	#			
2-Chlorotoluene	<1 µg/l	TM208	<1	#			
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1	#			
4-Chlorotoluene	<1 µg/l	TM208	<1	#			
tert-Butylbenzene	<1 µg/l	TM208	<1	#			
1,2,4-Trimethylbenzene	<1 µg/l	TM208	<1	#			
sec-Butylbenzene	<1 µg/l	TM208	<1	#			
4-iso-Propyltoluene	<1 µg/l	TM208	<1	#			
1,3-Dichlorobenzene	<1 µg/l	TM208	<1	#			
1,4-Dichlorobenzene	<1 µg/l	TM208	<1	#			
n-Butylbenzene	<1 µg/l	TM208	<1	#			
1,2-Dichlorobenzene	<1 µg/l	TM208	<1				
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1				
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1	#			
Hexachlorobutadiene	<1 µg/l	TM208	<1	#			
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1	#			
Naphthalene	<1 µg/l	TM208	<1	#			

SDG: 160109-56
Job: H_GETCNO_NAH-15
Client Reference:

Location: Carmarthen
Customer: Geotechnology
Attention: Ben Rees

Order Number:
Report Number: 345642
Superseded Report:

VOC MS (W)

[illegible]



SDG: 160109-56
Job: H_GETCNO_NAH-15
Client Reference:

Location: Carmarthen
Customer: Geotechnology
Attention: Ben Rees

Order Number:
Report Number: 345642
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters		
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples		
TM045	MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130	Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids		
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water		
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser		
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit		
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH in Waters		
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS		
TM178	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters		
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM186	Determination of Acidic Herbicides in Groundwater and Potable Water by LC/MSD Using Selective Ion Monitoring. Agilent Technologies Inc. Application Note 5988-5882EN.	The Determination of Acid Herbicides in Environmental Water Samples and Leachates by LC/MS QQQ.		
TM191	Standard Methods for the examination of waters and wastewaters 16th Edition, ALPHA, Washington DC, USA. ISBN 0-87553-131-8.	Determination of Unfiltered Metals in Water Matrices by ICP-MS		
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters		
TM227	Standard methods for the examination of waters and wastewaters 20th Edition, AWWA/APHA Method 4500.	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate		
TM228	US EPA Method 6010B	Determination of Major Cations in Water by iCap 6500 Duo ICP-OES		
TM231	Agilent 6890 Gas Chromatograph system using an Agilent 5973 Mass Selective Detector (MSD)	Determination of Organochlorine and Organophosphorus Pesticides and Triazine Herbicides by GCMS		
TM314		Analysis of Organochlorine Pesticides in Aqueous sample by GCMS		
TM315		Analysis of Organophosphorus Pesticides in Aqueous samples by GCMS		
TM324		Analysis of Acid Herbicides in Aqueous Sample by LCQQQ		
TM328				

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.



SDG: 160109-56
Job: H_GETCNO_NAH-15
Client Reference:

Location: Carmarthen
Customer: Geotechnology
Attention: Ben Rees

Order Number:
Report Number: 345642
Superseded Report:

Test Completion Dates

Lab Sample No(s)	12728620	12728621	12728622	12728623	12728624	12728619	12728615	12728616	12728617	12728618
Customer Sample Ref.	BH101	BH103	BH104	BH105	BH117	L1	NYC SW1	NYC SW4	WERN SW2	WERN SW4
AGS Ref.										
Depth										
Type	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
Acid Herbicides (W)						15-Jan-2016				
Alkalinity as CaCO3	14-Jan-2016	14-Jan-2016	18-Jan-2016	18-Jan-2016	18-Jan-2016	14-Jan-2016	13-Jan-2016	18-Jan-2016		
Ammoniacal Nitrogen	14-Jan-2016	14-Jan-2016	12-Jan-2016	12-Jan-2016	12-Jan-2016	14-Jan-2016	12-Jan-2016	12-Jan-2016	12-Jan-2016	12-Jan-2016
Anions by Kone (w)	14-Jan-2016	14-Jan-2016	12-Jan-2016	12-Jan-2016	12-Jan-2016	14-Jan-2016	12-Jan-2016	12-Jan-2016	12-Jan-2016	12-Jan-2016
BOD True Total						15-Jan-2016				
COD Unfiltered						10-Jan-2016				
Cyanide Comp/Free/Total/Thiocyanate						15-Jan-2016				
Dissolved Metals by ICP-MS						18-Jan-2016				
Mercury Dissolved						15-Jan-2016				
Metals by iCap-OES Dissolved (W)	15-Jan-2016	15-Jan-2016	12-Jan-2016	12-Jan-2016	12-Jan-2016	15-Jan-2016	12-Jan-2016	12-Jan-2016	12-Jan-2016	12-Jan-2016
Metals by iCap-OES Unfiltered (W)						15-Jan-2016				
Mineral Oil C10-40 Aqueous (W)						15-Jan-2016				
OC, OP Pesticides and Triazine Herb						19-Jan-2016				
Organochlorine Pesticides (Aq)						18-Jan-2016				
Organophosphorus Pesticides (Aq)						18-Jan-2016				
Organotins in Aqueous Samples						19-Jan-2016				
PAH Spec MS - Aqueous (W)						18-Jan-2016				
Suspended Solids							14-Jan-2016	14-Jan-2016		
SVOC MS (W) - Aqueous						18-Jan-2016				
Total Organic and Inorganic Carbon						14-Jan-2016				
VOC MS (W)						12-Jan-2016				



SDG: 160109-56
Job: H_GETCNO_NAH-15
Client Reference:

Location: Carmarthen
Customer: Geotechnology
Attention: Ben Rees

Order Number:
Report Number: 345642
Superseded Report:

Appendix General

1. Results are expressed on a dry weight basis (dried at 35°C) 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. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. 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. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. 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.

5. 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.

6. 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 (2005), 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. The quantity of asbestos present is not determined unless specifically requested.

7. 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.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

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

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals -total metals must be requested separately.

11. Results relate only to the items tested.

12. LODs for wet tests reported on a dry weight basis are not corrected for moisture content.

13. **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%, they are generally wider for volatiles analysis, 50-150%. 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.

14. **Product analyses** -Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

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

18. 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.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

20. 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.

21. For all leachate preparations (NRA, DIN, TCLP, BSEN 12457-1, 2, 3) volatile loss may occur, as we do not employ zero headspace extraction.

22. 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.

23. 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.

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
\$	Sampled on date not provided
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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 Alcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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.

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.



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

Attention: Ben Rees

CERTIFICATE OF ANALYSIS

Date: 11 July 2016
Customer: H_GETCNO_NAH
Sample Delivery Group (SDG): 160628-13
Your Reference:
Location: CCC
Report No: 368464

We received 14 samples on Tuesday June 28, 2016 and 13 of these samples were scheduled for analysis which was completed on Monday July 11, 2016. 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.

All chemical testing (unless subcontracted) is performed at ALcontrol Hawarden Laboratories.

Approved By:

Sonia McWhan

Operations Manager





SDG:	160628-13	Location:	CCC	Order Number:	1284/1551
Job:	H_GETCNO_NAH-22	Customer:	Geotechnology	Report Number:	368464
Client Reference:		Attention:	Ben Rees	Superseded Report:	

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
13667422	BH101			24/06/2016
13667426	BH103			24/06/2016
13667430	BH104			24/06/2016
13667427	BH105			24/06/2016
13667421	BH117			24/06/2016
13667431	EAST LAGOON			23/06/2016
13667424	LAGOON1			23/06/2016
13667435	NO ID			
13667432	NYC SW1			
13667434	NYC SW4			24/06/2016
13667429	RUNOFF			24/06/2016
13667425	SW LAGOON			23/06/2016
13667433	WERN SW2			24/06/2016
13667428	WERN SW4			24/06/2016

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



SDG: 160628-13
Job: H_GETCNO_NAH-22
Client Reference:

Location: CCC
Customer: Geotechnology
Attention: Ben Rees

Order Number: 1284/1551
Report Number: 368464
Superseded Report:

LIQUID Results Legend X Test N No Determination Possible	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container	
	13667433		WERN SW2						H2SO4 (ALE244)	
	13667425		SW LAGOON						1000ml glass bottle	
	13667429		RUNOFF						1000ml glass bottle	
	13667434		NYC SW4						1000ml glass bottle	
	13667432		NYC SW1						1000ml glass bottle	
	13667424		LAGOON1						1000ml glass bottle	
	13667431		EAST LAGOON						1000ml glass bottle	
	13667421		BH117						1000ml glass bottle	
	13667427		BH105						1000ml glass bottle	
	13667430		BH104						1000ml glass bottle	
	13667426		BH103						1000ml glass bottle	
	13667422		BH101						1000ml glass bottle	
									1000ml glass bottle	
									1000ml glass bottle	
Acid Herbicides (W)	All	NDPs: 0 Tests: 5								
Alkalinity as CaCO3	All	NDPs: 0 Tests: 7								
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 12								
Anions by Kone (w)	All	NDPs: 0 Tests: 12								
BOD True Total	All	NDPs: 0 Tests: 5								
COD Unfiltered	All	NDPs: 0 Tests: 5								
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 13								
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 5								
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 5								
Mercury Dissolved	All	NDPs: 0 Tests: 5								
Metals by iCap-OES Dissolved (W)	All	NDPs: 0 Tests: 12								
Metals by iCap-OES Unfiltered (W)	All	NDPs: 0 Tests: 5								
Mineral Oil C10-40 Aqueous (W)	All	NDPs: 0 Tests: 5								
OC, OP Pesticides and Triazine Herb	All	NDPs: 0 Tests: 5								
Organochlorine Pesticides (Aq)	All	NDPs: 0 Tests: 5								



SDG: 160628-13
 Job: H_GETCNO_NAH-22
 Client Reference:

Location: CCC
 Customer: Geotechnology
 Attention: Ben Rees

Order Number: 1284/1551
 Report Number: 368464
 Superseded Report:

LIQUID Results Legend X Test N No Determination Possible	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container	
	13667433		WERN SW2							H2SO4 (ALE244) 11plastic (ALE221)
	13667425		SW LAGOON							H2SO4 (ALE244) 1000ml glass bottle
	13667429		RUNOFF							11plastic (ALE221) H2SO4 (ALE244)
	13667434		NYC SW4							1000ml glass bottle H2SO4 (ALE244)
	13667432		NYC SW1							500ml Plastic (ALE2) H2SO4 (ALE244)
	13667424		LAGOON1							1000ml glass bottle H2SO4 (ALE244)
	13667431		EAST LAGOON							1000ml glass bottle Vial (ALE297)
	13667421		BH117							Dissoved Metals Pr 500ml Plastic (ALE2 250ml BOD (ALE21 1000ml glass bottle
	13667427		BH105							Vial (ALE297) H2SO4 (ALE244) Dissoved Metals Pr 250ml BOD (ALE21 11plastic (ALE221) 1000ml glass bottle
	13667430		BH104							Vial (ALE297) H2SO4 (ALE244) Dissoved Metals Pr 250ml BOD (ALE21 11plastic (ALE221) 1000ml glass bottle
	13667426		BH103							Vial (ALE297) H2SO4 (ALE244) Dissoved Metals Pr 250ml BOD (ALE21 11plastic (ALE221) 1000ml glass bottle
	13667422		BH101							Vial (ALE297) Dissoved Metals Pr 500ml Plastic (ALE2 250ml BOD (ALE21 1000ml glass bottle
Organophosphorus Pesticides (Aq)	All	NDPs: 0 Tests: 5								X
Organotins in Aqueous Samples	All	NDPs: 0 Tests: 5								X
PAH Spec MS - Aqueous (W)	All	NDPs: 0 Tests: 5								X
pH Value	All	NDPs: 0 Tests: 13								X
Suspended Solids	All	NDPs: 0 Tests: 3								X
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 5								X
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 5								X
VOC MS (W)	All	NDPs: 0 Tests: 5								X



SDG: 160628-13
Job: H_GETCNO_NAH-22
Client Reference:

Location: CCC
Customer: Geotechnology
Attention: Ben Rees

Order Number: 1284/1551
Report Number: 368464
Superseded Report:

LIQUID Results Legend  Test  No Determination Possible	Lab Sample No(s)		13667433	13667428
	Customer Sample Reference		WERN SW2	WERN SW4
	AGS Reference			
	Depth (m)			
	Container		HNO3 Filtered (ALE) H2SO4 (ALE24) 11plastic (ALE221) HNO3 Filtered (ALE)	HNO3 Filtered (ALE)
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 12		
Anions by Kone (w)	All	NDPs: 0 Tests: 12		
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 13		
Metals by iCap-OES Dissolved (W)	All	NDPs: 0 Tests: 12		
pH Value	All	NDPs: 0 Tests: 13		



CERTIFICATE OF ANALYSIS

SDG: 160628-13
Job: H_GETCNO_NAH-22
Client Reference:

Location: CCC
Customer: Geotechnology
Attention: Ben Rees

Order Number: 1284/1551
Report Number: 368464
Superseded Report:

Results Legend		Customer Sample R Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	BH101	BH103	BH104	BH105	BH117	EAST LAGOON
#	ISO17025 accredited.		Water(GW/SW) 24/06/2016	Water(GW/SW) 24/06/2016	Water(GW/SW) 24/06/2016	Water(GW/SW) 24/06/2016	Water(GW/SW) 24/06/2016	Water(GW/SW) 23/06/2016
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% 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							
1-5&\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Alkalinity, Total as CaCO3	<2 mg/l	TM043	225	203	295	270	335	
BOD, unfiltered	<1 mg/l	TM045	<1	<1	<1	<1	2.69	
Organic Carbon, Total	<3 mg/l	TM090	<3	<3	6.14	<3	<3	
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2	0.477	0.316	0.221	0.631	
COD, unfiltered	<7 mg/l	TM107	12.7	10.2	248	470	673	
Conductivity @ 20 deg.C	<0.005 mS/cm	TM120	0.421	0.421	0.508	0.481	0.507	
Arsenic (diss.filt)	<0.12 µg/l	TM152	0.3	1	0.983	0.403	0.759	
Barium (diss.filt)	<0.03 µg/l	TM152	119	66.7	18.4	55.9	104	
Beryllium (diss.filt)	<0.07 µg/l	TM152	<0.07	<0.07	<0.07	<0.07	<0.07	
Boron (diss.filt)	<9.4 µg/l	TM152	<9.4	<9.4	<9.4	<9.4	<9.4	
Cadmium (diss.filt)	<0.1 µg/l	TM152	<0.1	<0.1	<0.1	<0.1	<0.1	
Chromium (diss.filt)	<0.22 µg/l	TM152	4.93	5.56	6.01	5.61	6.03	
Copper (diss.filt)	<0.85 µg/l	TM152	<0.85	<0.85	1.87	<0.85	<0.85	
Lead (diss.filt)	<0.02 µg/l	TM152	<0.02	0.056	<0.02	<0.02	<0.02	
Manganese (diss.filt)	<0.04 µg/l	TM152	<0.04	0.119	214	4.85	1.96	
Nickel (diss.filt)	<0.15 µg/l	TM152	0.58	1.46	1.47	1.04	1.07	
Phosphorus (diss.filt)	<6.3 µg/l	TM152	6.84	49.8	12.9	16.3	12.3	
Zinc (diss.filt)	<0.41 µg/l	TM152	2.58	1.51	0.539	1.19	<0.41	
Mineral oil >C10 C40 (aq)	<10 µg/l	TM172	<10	<10	265	<10	387	
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01	<0.01	<0.01	<0.01	<0.01	
Sulphate	<2 mg/l	TM184	10	9.8	19.1	<2	16.7	
Chloride	<2 mg/l	TM184	16.3	14.6	12.3	11	26.8	
Phosphate (ortho) as PO4	<0.05 mg/l	TM184	<0.05	0.393	<0.05	<0.05	<0.05	
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	2.72	2.1	0.468	1.17	0.679	
Cyanide, Total	<0.05 mg/l	TM227	<0.05	<0.05	<0.05	<0.05	<0.05	
Cyanide, Free	<0.05 mg/l	TM227	<0.05	<0.05	<0.05	<0.05	<0.05	
Calcium (diss.filt)	<0.012 mg/l	TM228	65.4	70.7	87.4	91.7	92.4	
Sodium (diss.filt)	<0.076 mg/l	TM228	14.2	13.3	10.2	11.5	11.8	
Magnesium (diss.filt)	<0.036 mg/l	TM228	11.2	8.03	9.7	9.66	6.79	
Potassium (diss.filt)	<1 mg/l	TM228	<1	1.73	2.58	1.26	<1	
Iron (diss.filt)	<0.019 mg/l	TM228	<0.019	<0.019	0.0471	<0.019	<0.019	
Hardness, Total as CaCO3 unfiltered	<0.35 mg/l	TM228	239	232	391	345	990	

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SDG: 160628-13
Job: H_GETCNO_NAH-22
Client Reference:

Location: CCC
Customer: Geotechnology
Attention: Ben Rees

Order Number: 1284/1551
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Superseded Report:

[illegible]

SDG: 160628-13
Job: H_GETCNO_NAH-22
Client Reference:

Location: CCC
Customer: Geotechnology
Attention: Ben Rees

Order Number: 1284/1551
Report Number: 368464
Superseded Report:

Acid Herbicides (W)

[illegible]



CERTIFICATE OF ANALYSIS

SDG: 160628-13
Job: H_GETCNO_NAH-22
Client Reference:

Location: CCC
Customer: Geotechnology
Attention: Ben Rees

Order Number: 1284/1551
Report Number: 368464
Superseded Report:

OC, OP Pesticides and Triazine Herb

Results Legend			Customer Sample R		BH101	BH103	BH104	BH105	BH117	
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		Water(GW/SW) 24/06/2016	Water(GW/SW) 24/06/2016	Water(GW/SW) 24/06/2016	Water(GW/SW) 24/06/2016	Water(GW/SW) 24/06/2016	
M	mCERTS accredited.									
aq	Aqueous / settled sample.									
diss.filt	Dissolved / filtered sample.									
tot.unfilt	Total / unfiltered sample.									
*	Subcontracted test.									
**	% 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				28/06/2016 160628-13 13667422	28/06/2016 160628-13 13667426	28/06/2016 160628-13 13667430	28/06/2016 160628-13 13667427	28/06/2016 160628-13 13667421	
(F)	Trigger breach confirmed									
1-5&*\$@	Sample deviation (see appendix)									
Component	LOD/Units	Method								
Dichlorvos	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Mevinphos	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Tecnazene	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Hexachlorobenzene	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Trifluralin	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
alpha-Hexachlorocyclohexane (HCH / Lindane)	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Quintozene (PCNB)	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Diazinon	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Triallate	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Etrimphos	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
gamma-Hexachlorocyclohexane (HCH / Lindane)	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Disulfoton	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Propetamphos	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Heptachlor	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Chlorpyrifos methyl	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Dimethoate	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Aldrin	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Chlorothalonil	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Pirimiphos-methyl	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
beta-Hexachlorocyclohexane (HCH / Lindane)	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Chlorpyrifos	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Telodrin	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Methyl parathion	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Isodrin	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Malathion	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Fenthion	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Fenitrothion	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Heptachlor epoxide	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Triadimefon	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Pendimethalin	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
Parathion	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	
o,p-DDE	<0.01 µg/l	TM231			<0.01	<0.01	<0.01	<0.01	<0.01	

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CERTIFICATE OF ANALYSIS

SDG: 160628-13
Job: H_GETCNO_NAH-22
Client Reference:

Location: CCC
Customer: Geotechnology
Attention: Ben Rees

Order Number: 1284/1551
Report Number: 368464
Superseded Report:

SVOC MS (W) - Aqueous

Results Legend			Customer Sample R		BH101	BH103	BH104	BH105	BH117	
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		Water(GW/SW) 24/06/2016	Water(GW/SW) 24/06/2016	Water(GW/SW) 24/06/2016	Water(GW/SW) 24/06/2016	Water(GW/SW) 24/06/2016	
M	mCERTS accredited.									
aq	Aqueous / settled sample.									
diss.filt	Dissolved / filtered sample.									
tot.unfilt	Total / unfiltered sample.									
*	Subcontracted test.									
**	% 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				28/06/2016 160628-13 13667422	28/06/2016 160628-13 13667426	28/06/2016 160628-13 13667430	28/06/2016 160628-13 13667427	28/06/2016 160628-13 13667421	
(F)	Trigger breach confirmed									
1-5–@	Sample deviation (see appendix)									
Component	LOD/Units	Method								
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
						@			@	
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
2,4-Dichlorophenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
2,4-Dimethylphenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
2-Chloronaphthalene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
2-Chlorophenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
2-Methylnaphthalene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
2-Methylphenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
2-Nitroaniline (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
2-Nitrophenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
3-Nitroaniline (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
4-Bromophenylphenylether (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
4-Chloroaniline (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
4-Methylphenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
4-Nitroaniline (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
4-Nitrophenol (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
Azobenzene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176			<2	<2	<2	<2	<2	
					#	@ #	#	#	@ #	
Butylbenzyl phthalate (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
Carbazole (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	
Dibenzofuran (aq)	<1 µg/l	TM176			<1	<1	<1	<1	<1	
					#	@ #	#	#	@ #	

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CERTIFICATE OF ANALYSIS

SDG: 160628-13
Job: H_GETCNO_NAH-22
Client Reference:

Location: CCC
Customer: Geotechnology
Attention: Ben Rees

Order Number: 1284/1551
Report Number: 368464
Superseded Report:

VOC MS (W)

Results Legend		Customer Sample R	BH101	BH103	BH104	BH105	BH117	
#	ISO17025 accredited.							
M	mCERTS accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Water(GW/SW) 24/06/2016 28/06/2016 160628-13 13667422	Water(GW/SW) 24/06/2016 28/06/2016 160628-13 13667426	Water(GW/SW) 24/06/2016 28/06/2016 160628-13 13667430	Water(GW/SW) 24/06/2016 28/06/2016 160628-13 13667427	Water(GW/SW) 24/06/2016 28/06/2016 160628-13 13667421	
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% 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							
1-5&\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Dibromofluoromethane**	%	TM208	106	103	110	106	104	
Toluene-d8**	%	TM208	97.7	96.9	98	97.1	96.8	
4-Bromofluorobenzene**	%	TM208	95.9	94.2	98.1	96.4	94.3	
Dichlorodifluoromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Chloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Vinyl chloride	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Bromomethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Chloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Trichlorofluoromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
1,1-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Carbon disulphide	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Dichloromethane	<3 µg/l	TM208	<3	<3	<3	<3	<3	
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	<1	<1	<1	<1	
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
1,1-Dichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
2,2-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Bromochloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Chloroform	<1 µg/l	TM208	<1	<1	<1	<1	<1	
1,1,1-Trichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
1,1-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Carbontetrachloride	<1 µg/l	TM208	<1	<1	<1	<1	<1	
1,2-Dichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Benzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Trichloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
1,2-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Dibromomethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Bromodichloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
Toluene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
1,1,2-Trichloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	



CERTIFICATE OF ANALYSIS

SDG: 160628-13
Job: H_GETCNO_NAH-22
Client Reference:

Location: CCC
Customer: Geotechnology
Attention: Ben Rees

Order Number: 1284/1551
Report Number: 368464
Superseded Report:

VOC MS (W)

Results Legend			Customer Sample R		BH101	BH103	BH104	BH105	BH117	
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	
M	mCERTS accredited.				24/06/2016	24/06/2016	24/06/2016	24/06/2016	24/06/2016	
aq	Aqueous / settled sample.									
dis.filt	Dissolved / filtered sample.									
tot.unfilt	Total / unfiltered sample.									
*	Subcontracted test.									
**	% 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				28/06/2016	28/06/2016	28/06/2016	28/06/2016	28/06/2016	
(F)	Trigger breach confirmed				160628-13	160628-13	160628-13	160628-13	160628-13	
1-5&+5@	Sample deviation (see appendix)				13667422	13667426	13667430	13667427	13667421	
Component	LOD/Units	Method								
1,3-Dichloropropane	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Tetrachloroethene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Dibromochloromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,2-Dibromoethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Chlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Ethylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
m,p-Xylene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
o-Xylene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Styrene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Bromoform	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Isopropylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	
1,2,3-Trichloropropane	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Bromobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Propylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
2-Chlorotoluene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,3,5-Trimethylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
4-Chlorotoluene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
tert-Butylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,2,4-Trimethylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
sec-Butylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
4-iso-Propyltoluene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,3-Dichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,4-Dichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
n-Butylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
1,2-Dichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
1,2-Dibromo-3-chloroprop ane	<1 µg/l	TM208			<1	<1	<1	<1	<1	
1,2,4-Trichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Hexachlorobutadiene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	
Naphthalene	<1 µg/l	TM208			<1	<1	<1	<1	<1	
					#	#	#	#	#	

SDG: 160628-13
Job: H_GETCNO_NAH-22
Client Reference:

Location: CCC
Customer: Geotechnology
Attention: Ben Rees

Order Number: 1284/1551
Report Number: 368464
Superseded Report:

VOC MS (W)

[illegible]



SDG: 160628-13
Job: H_GETCNO_NAH-22
Client Reference:

Location: CCC
Customer: Geotechnology
Attention: Ben Rees

Order Number: 1284/1551
Report Number: 368464
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters		
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples		
TM045	MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130	Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids		
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water		
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser		
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit		
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter		
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH in Waters		
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS		
TM178	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters		
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM186	Determination of Acidic Herbicides in Groundwater and Potable Water by LC/MSD Using Selective Ion Monitoring. Agilent Technologies Inc. Application Note 5988-5882EN.	The Determination of Acid Herbicides in Environmental Water Samples and Leachates by LC/MS QQQ.		
TM191	Standard Methods for the examination of waters and wastewaters 16th Edition, ALPHA, Washington DC, USA. ISBN 0-87553-131-8.	Determination of Unfiltered Metals in Water Matrices by ICP-MS		
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters		
TM227	Standard methods for the examination of waters and wastewaters 20th Edition, AWWA/APHA Method 4500.	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate		
TM228	US EPA Method 6010B	Determination of Major Cations in Water by iCap 6500 Duo ICP-OES		
TM231	Agilent 6890 Gas Chromatograph system using an Agilent 5973 Mass Selective Detector (MSD)	Determination of Organochlorine and Organophosphorus Pesticides and Triazine Herbicides by GCMS		
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter		
TM314		Analysis of Organochlorine Pesticides in Aqueous sample by GCMS		
TM315		Analysis of Organophosphorus Pesticides in Aqueous samples by GCMS		
TM328				

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.



CERTIFICATE OF ANALYSIS

SDG: 160628-13
Job: H_GETCNO_NAH-22
Client Reference:

Location: CCC
Customer: Geotechnology
Attention: Ben Rees

Order Number: 1284/1551
Report Number: 368464
Superseded Report:

Test Completion Dates

Lab Sample No(s)	13667422	13667426	13667430	13667427	13667421	13667431	13667424	13667432	13667434	13667429
Customer Sample Ref.	BH101	BH103	BH104	BH105	BH117	EAST LAGOON	LAGOON1	NYC SW1	NYC SW4	RUNOFF
AGS Ref.										
Depth										
Type	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
Acid Herbicides (W)	05-Jul-2016	05-Jul-2016	05-Jul-2016	05-Jul-2016	05-Jul-2016					
Alkalinity as CaCO ₃	30-Jun-2016	30-Jun-2016	01-Jul-2016	30-Jun-2016	04-Jul-2016			01-Jul-2016	30-Jun-2016	
Ammoniacal Nitrogen	29-Jun-2016	29-Jun-2016	29-Jun-2016	29-Jun-2016	29-Jun-2016	05-Jul-2016	29-Jun-2016	29-Jun-2016	29-Jun-2016	
Anions by Kone (w)	30-Jun-2016	05-Jul-2016	30-Jun-2016	05-Jul-2016	30-Jun-2016	30-Jun-2016	30-Jun-2016	29-Jun-2016	30-Jun-2016	
BOD True Total	03-Jul-2016	03-Jul-2016	03-Jul-2016	03-Jul-2016	03-Jul-2016					
COD Unfiltered	29-Jun-2016	29-Jun-2016	29-Jun-2016	29-Jun-2016	29-Jun-2016					
Conductivity (at 20 deg.C)	28-Jun-2016	30-Jun-2016	28-Jun-2016	30-Jun-2016	28-Jun-2016	30-Jun-2016	30-Jun-2016	28-Jun-2016	30-Jun-2016	30-Jun-2016
Cyanide Comp/Free/Total/Thiocyanate	01-Jul-2016	01-Jul-2016	01-Jul-2016	01-Jul-2016	01-Jul-2016					
Dissolved Metals by ICP-MS	06-Jul-2016	07-Jul-2016	06-Jul-2016	06-Jul-2016	06-Jul-2016					
Mercury Dissolved	06-Jul-2016	06-Jul-2016	06-Jul-2016	06-Jul-2016	06-Jul-2016					
Metals by iCap-OES Dissolved (W)	30-Jun-2016	07-Jul-2016	11-Jul-2016	07-Jul-2016	30-Jun-2016	04-Jul-2016	06-Jul-2016	30-Jun-2016	06-Jul-2016	
Metals by iCap-OES Unfiltered (W)	30-Jun-2016	04-Jul-2016	30-Jun-2016	04-Jul-2016	30-Jun-2016					
Mineral Oil C10-40 Aqueous (W)	04-Jul-2016	04-Jul-2016	04-Jul-2016	04-Jul-2016	04-Jul-2016					
OC, OP Pesticides and Triazine Herb	06-Jul-2016	06-Jul-2016	06-Jul-2016	06-Jul-2016	06-Jul-2016					
Organochlorine Pesticides (Aq)	07-Jul-2016	07-Jul-2016	07-Jul-2016	07-Jul-2016	07-Jul-2016					
Organophosphorus Pesticides (Aq)	07-Jul-2016	07-Jul-2016	07-Jul-2016	07-Jul-2016	07-Jul-2016					
Organotins in Aqueous Samples	01-Jul-2016	01-Jul-2016	01-Jul-2016	01-Jul-2016	01-Jul-2016					
PAH Spec MS - Aqueous (W)	06-Jul-2016	06-Jul-2016	06-Jul-2016	06-Jul-2016	06-Jul-2016					
pH Value	01-Jul-2016	01-Jul-2016	30-Jun-2016	01-Jul-2016	01-Jul-2016	01-Jul-2016	01-Jul-2016	01-Jul-2016	01-Jul-2016	01-Jul-2016
Suspended Solids								28-Jun-2016	30-Jun-2016	30-Jun-2016
SVOC MS (W) - Aqueous	06-Jul-2016	06-Jul-2016	06-Jul-2016	06-Jul-2016	06-Jul-2016					
Total Organic and Inorganic Carbon	06-Jul-2016	06-Jul-2016	06-Jul-2016	06-Jul-2016	06-Jul-2016					
VOC MS (W)	05-Jul-2016	04-Jul-2016	05-Jul-2016	05-Jul-2016	04-Jul-2016					

Lab Sample No(s)	13667425	13667433	13667428
Customer Sample Ref.	SW LAGOON	WERN SW2	WERN SW4
AGS Ref.			
Depth			
Type	LIQUID	LIQUID	LIQUID
Ammoniacal Nitrogen	29-Jun-2016	29-Jun-2016	29-Jun-2016
Anions by Kone (w)	30-Jun-2016	29-Jun-2016	30-Jun-2016
Conductivity (at 20 deg.C)	30-Jun-2016	28-Jun-2016	30-Jun-2016
Metals by iCap-OES Dissolved (W)	06-Jul-2016	30-Jun-2016	30-Jun-2016
pH Value	01-Jul-2016	01-Jul-2016	01-Jul-2016



SDG: 160628-13
Job: H_GETCNO_NAH-22
Client Reference:

Location: CCC
Customer: Geotechnology
Attention: Ben Rees

Order Number: 1284/1551
Report Number: 368464
Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) 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. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. 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. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. 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.

5. 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.

6. 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 (2005), 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.

7. 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.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

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

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

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

13. **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%, they are generally wider for volatiles analysis, 50-150%. 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.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

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

18. 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.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

General

20. 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.

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

22. 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.

23. 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 (BTX). 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.

24. **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.

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
\$	Sampled on date not provided
+	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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 ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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.

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.



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

Attention: Ben Rees

CERTIFICATE OF ANALYSIS

Date: 09 December 2016
Customer: H_GETCNO_NAH
Sample Delivery Group (SDG): 161003-48
Your Reference:
Location: Carmarthen
Report No: 389758

This report has been revised and directly supersedes 383128 in its entirety.

We received 13 samples on Saturday October 01, 2016 and 13 of these samples were scheduled for analysis which was completed on Friday December 09, 2016. 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 ALcontrol Hawarden (Method codes TM) or ALcontrol Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG:	161003-48	Client Reference:	Report Number:	389758
Location:	Carmarthen	Order Number:	Superseded Report:	383128

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
14254788	BH10			29/09/2016
14254789	BH14			29/09/2016
14254783	BH103			29/09/2016
14254782	BH104			29/09/2016
14254781	BH105			29/09/2016
14254785	BH117			29/09/2016
14254784	GW101			29/09/2016
14254794	L1			29/09/2016
14254795	RUN OFF			29/09/2016
14254787	SW1NYC			29/09/2016
14254786	SW4NYC			29/09/2016
14254792	SW2 WERN			29/09/2016
14254791	SW4 WERN			29/09/2016

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



CERTIFICATE OF ANALYSIS

SDG: 161003-48
Location: Carmarthen

Client Reference:
Order Number: 1284/1551

Report Number: 389758
Superseded Report: 383128

LIQUID Results Legend Test No Determination Possible	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container	
	14254791		SW4 WERN						H2SO4 (ALE244)	1000ml glass bottle (ALE
	14254792		SW2 WERN						H2SO4 (ALE244)	1000ml glass bottle (ALE
	14254786		SW4NYC						H2SO4 (ALE244)	1000ml glass bottle (ALE
	14254787		SW1NYC						H2SO4 (ALE244)	1000ml glass bottle (ALE
	14254795		RUN OFF						1000ml glass bottle (ALE	1000ml glass bottle (ALE
	14254794		L1						Vial (ALE297)	H2SO4 (ALE244)
									Disolved Metals Preser	1000ml glass bottle (ALE
	14254784		GW101						1000ml glass bottle (ALE	1000ml glass bottle (ALE
	14254785		BH117						1000ml glass bottle (ALE	1000ml glass bottle (ALE
	14254781		BH105						1000ml glass bottle (ALE	1000ml glass bottle (ALE
	14254782		BH104						1000ml glass bottle (ALE	1000ml glass bottle (ALE
	14254783		BH103						1000ml glass bottle (ALE	1000ml glass bottle (ALE
	14254789		BH14						H2SO4 (ALE244)	1000ml glass bottle (ALE
									Disolved Metals Preser	1000ml glass bottle (ALE
									1000ml glass bottle (ALE	1000ml glass bottle (ALE
	14254788		BH10						H2SO4 (ALE244)	1000ml glass bottle (ALE
									Disolved Metals Preser	1000ml glass bottle (ALE
									1000ml glass bottle (ALE	1000ml glass bottle (ALE
Acid Herbicides (W)	All	NDPs: 0 Tests: 3								
Alkalinity as CaCO3	All	NDPs: 0 Tests: 8								
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 12								
Anions by Kone (w)	All	NDPs: 0 Tests: 12								
BOD True Total	All	NDPs: 0 Tests: 1								
COD Unfiltered	All	NDPs: 0 Tests: 1								
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 13								
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 1								
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 3								
Mercury Dissolved	All	NDPs: 0 Tests: 3								
Metals by iCap-OES Dissolved (W)	All	NDPs: 0 Tests: 12								
Metals by iCap-OES Unfiltered (W)	All	NDPs: 0 Tests: 1								
Mineral Oil C10-40 Aqueous (W)	All	NDPs: 0 Tests: 1								
OC, OP Pesticides and Triazine Herb	All	NDPs: 0 Tests: 1								
Organochlorine Pesticides (Aq)	All	NDPs: 0 Tests: 1								
Organophosphorus Pesticides (Aq)	All	NDPs: 0 Tests: 1								



CERTIFICATE OF ANALYSIS

SDG: 161003-48
Location: Carmarthen

Client Reference:
Order Number: 1284/1551

Report Number: 389758
Superseded Report: 383128

LIQUID Results Legend X Test N No Determination Possible	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container	
	14254791		SW4 WERN						H2SO4 (ALE24)	1000ml glass bottle (ALE
	14254792		SW2 WERN						H2SO4 (ALE24)	1000ml glass bottle (ALE
	14254786		SW4NYC						H2SO4 (ALE24)	1000ml glass bottle (ALE
	14254787		SW1NYC						H2SO4 (ALE24)	1000ml glass bottle (ALE
	14254795		RUN OFF						1000ml glass bottle (ALE	1000ml glass bottle (ALE
	14254794		L1						Vial (ALE297)	H2SO4 (ALE24)
									1000ml glass bottle (ALE	1000ml glass bottle (ALE
	14254784		GW101						1000ml glass bottle (ALE	1000ml glass bottle (ALE
	14254785		BH117						1000ml glass bottle (ALE	1000ml glass bottle (ALE
	14254781		BH105						1000ml glass bottle (ALE	1000ml glass bottle (ALE
	14254782		BH104						1000ml glass bottle (ALE	1000ml glass bottle (ALE
	14254783		BH103						1000ml glass bottle (ALE	1000ml glass bottle (ALE
	14254789		BH14						H2SO4 (ALE24)	1000ml glass bottle (ALE
	14254788		BH10						1000ml glass bottle (ALE	1000ml glass bottle (ALE
Organotins in Aqueous Samples	All	NDPs: 0 Tests: 1								
PAH Spec MS - Aqueous (W)	All	NDPs: 0 Tests: 3								
pH Value	All	NDPs: 0 Tests: 13								
Suspended Solids	All	NDPs: 0 Tests: 3								
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 1								
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 1								
VOC MS (W)	All	NDPs: 0 Tests: 3								

Report Number:	389758
Superseded Report:	383128

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CERTIFICATE OF ANALYSIS

SDG: 161003-48
Location: Carmarthen

Client Reference:
Order Number: 1284/1551

Report Number: 389758
Superseded Report: 383128

Results Legend		Customer Sample Ref.	GW101	L1	RUN OFF	SW1NYC	SW4NYC	SW2 WERN
#	ISO17025 accredited.							
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% 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							
1-5&+5@	Sample deviation (see appendix)							
		Depth (m)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)
		Sample Type	29/09/2016	29/09/2016	29/09/2016	29/09/2016	29/09/2016	29/09/2016
		Date Sampled						
		Sample Time						
		Date Received	01/10/2016	01/10/2016	01/10/2016	01/10/2016	01/10/2016	01/10/2016
		SDG Ref	161003-48	161003-48	161003-48	161003-48	161003-48	161003-48
		Lab Sample No.(s)	14254784	14254794	14254795	14254787	14254786	14254792
		AGS Reference						
Component	LOD/Units	Method						
Suspended solids, Total	<2 mg/l	TM022			6.5	10.5	20.5	
					#	#	#	
Alkalinity, Total as CaCO3	<2 mg/l	TM043	225	400		100	150	
			#	#		#	#	
BOD, unfiltered	<1 mg/l	TM045		3.21				
				◆ #				
Organic Carbon, Total	<3 mg/l	TM090		28.1				
				◆ #				
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2	17.1		0.311	1.09	<0.2
			#	#		#	#	#
COD, unfiltered	<7 mg/l	TM107		101				
				#				
Conductivity @ 20 deg.C	<0.005 mS/cm	TM120	0.427	0.889	0.494	0.283	0.426	0.451
			#	#	#	#	#	#
Arsenic (diss.filt)	<0.51 µg/l	TM152		1.06				
				#				
Barium (diss.filt)	<0.2 µg/l	TM152		76.7				
				#				
Beryllium (diss.filt)	<0.1 µg/l	TM152		<0.1				
				#				
Boron (diss.filt)	<5 µg/l	TM152		92.4				
				#				
Cadmium (diss.filt)	<0.08 µg/l	TM152		<0.08				
				#				
Chromium (diss.filt)	<1.2 µg/l	TM152		<1.2				
				#				
Copper (diss.filt)	<0.85 µg/l	TM152		3.82				
				#				
Lead (diss.filt)	<0.1 µg/l	TM152		0.242				
				#				
Manganese (diss.filt)	<0.76 µg/l	TM152		217				
				#				
Nickel (diss.filt)	<0.44 µg/l	TM152		3.45				
				#				
Phosphorus (diss.filt)	<15 µg/l	TM152		52				
				#				
Zinc (diss.filt)	<1.3 µg/l	TM152		11.4				
				#				
Mineral oil >C10 C40 (aq)	<10 µg/l	TM172		<10				
Mercury (diss.filt)	<0.01 µg/l	TM183		<0.01				
				#				
Sulphate	<2 mg/l	TM184		27.3				
				#				
Chloride	<2 mg/l	TM184	16.1	76.4		21.8	35.5	13.7
			#	#		#	#	#
Phosphate (ortho) as PO4	<0.05 mg/l	TM184		<0.05				
				#				
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184		1.41				
				#				
Cyanide, Total	<0.05 mg/l	TM227		<0.05				
				#				
Cyanide, Free	<0.05 mg/l	TM227		<0.05				
				#				
Calcium (diss.filt)	<0.012 mg/l	TM228		112				
				#				
Sodium (diss.filt)	<0.076 mg/l	TM228		40.3				
				#				
Magnesium (diss.filt)	<0.036 mg/l	TM228		9.67				
				#				
Potassium (diss.filt)	<1 mg/l	TM228	<1	37.2		9.62	20.7	4.08
			#	#		#	#	#
Iron (diss.filt)	<0.019 mg/l	TM228		0.297				
				#				

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Location:	Carmarthen

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SDG: 161003-48
Location: Carmarthen

Client Reference:
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OC, OP Pesticides and Triazine Herb

Results Legend		Customer Sample Ref.	L1				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Water(GW/SW) 29/09/2016 01/10/2016 161003-48 14254794				
M	mCERTS accredited.						
aq	Aqueous / settled sample.						
dis.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted test.						
**	% 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						
1-5$	Sample deviation (see appendix)						
Component	LOD/Units	Method					
Dichlorvos	<0.01 µg/l	TM231	<0.01				
Mevinphos	<0.01 µg/l	TM231	<0.01				
Tecnazene	<0.01 µg/l	TM231	<0.01				
Hexachlorobenzene	<0.01 µg/l	TM231	<0.01				
Trifluralin	<0.01 µg/l	TM231	<0.01				
alpha-Hexachlorocyclohexane (HCH / Lindane)	<0.01 µg/l	TM231	<0.01				
Quintozene (PCNB)	<0.01 µg/l	TM231	<0.01				
Diazinon	<0.01 µg/l	TM231	<0.01				
Triallate	<0.01 µg/l	TM231	<0.01				
Etrimphos	<0.01 µg/l	TM231	<0.01				
gamma-Hexachlorocyclohexane (HCH / Lindane)	<0.01 µg/l	TM231	<0.01				
Disulfoton	<0.01 µg/l	TM231	<0.01				
Propetamphos	<0.01 µg/l	TM231	<0.01				
Heptachlor	<0.01 µg/l	TM231	<0.01				
Chlorpyrifos methyl	<0.01 µg/l	TM231	<0.01				
Dimethoate	<0.01 µg/l	TM231	<0.01				
Aldrin	<0.01 µg/l	TM231	<0.01				
Chlorothalonil	<0.01 µg/l	TM231	<0.01				
Pirimiphos-methyl	<0.01 µg/l	TM231	<0.01				
beta-Hexachlorocyclohexane (HCH / Lindane)	<0.01 µg/l	TM231	<0.01				
Chlorpyrifos	<0.01 µg/l	TM231	<0.01				
Telodrin	<0.01 µg/l	TM231	<0.01				
Methyl parathion	<0.01 µg/l	TM231	<0.01				
Isodrin	<0.01 µg/l	TM231	<0.01				
Malathion	<0.01 µg/l	TM231	<0.01				
Fenthion	<0.01 µg/l	TM231	<0.01				
Fenitrothion	<0.01 µg/l	TM231	<0.01				
Heptachlor epoxide	<0.01 µg/l	TM231	<0.01				
Triadimefon	<0.01 µg/l	TM231	<0.01				
Pendimethalin	<0.01 µg/l	TM231	<0.01				
Parathion	<0.01 µg/l	TM231	<0.01				
o,p-DDE	<0.01 µg/l	TM231	<0.01				

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[illegible]

SDG:	161003-48
Location:	Carmarthen

Client Reference:
Order Number: 1284/1551

Report Number:	389758
Superseded Report:	383128

PAH Spec MS - Aqueous (W)

[illegible]



CERTIFICATE OF ANALYSIS

SDG: 161003-48
Location: Carmarthen

Client Reference:
Order Number: 1284/1551

Report Number: 389758
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SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	L1				
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Water(GW/SW) 29/09/2016 01/10/2016 161003-48 14254794				
M	mCERTS accredited.						
aq	Aqueous / settled sample.						
dis.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted test.						
**	% 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						
1-5$	Sample deviation (see appendix)						
Component	LOD/Units	Method					
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<1	#			
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	#			
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	#			
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	#			
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<1	#			
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<1	#			
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<1	#			
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<1	#			
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	#			
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<1	#			
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<1	#			
2-Chlorophenol (aq)	<1 µg/l	TM176	<1	#			
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<1	#			
2-Methylphenol (aq)	<1 µg/l	TM176	<1	#			
2-Nitroaniline (aq)	<1 µg/l	TM176	<1	#			
2-Nitrophenol (aq)	<1 µg/l	TM176	<1	#			
3-Nitroaniline (aq)	<1 µg/l	TM176	<1	#			
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<1	#			
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<1	#			
4-Chloroaniline (aq)	<1 µg/l	TM176	<1	#			
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<1	#			
4-Methylphenol (aq)	<1 µg/l	TM176	<1	#			
4-Nitroaniline (aq)	<1 µg/l	TM176	<1	#			
4-Nitrophenol (aq)	<1 µg/l	TM176	<1	#			
Azobenzene (aq)	<1 µg/l	TM176	<1	#			
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<1	#			
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<1	#			
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<2	#			
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<1	#			
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<1	#			
Carbazole (aq)	<1 µg/l	TM176	<1	#			
Dibenzofuran (aq)	<1 µg/l	TM176	<1	#			

SDG:	161003-48
Location:	Carmarthen

Client Reference:
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SVOC MS (W) - Aqueous

[illegible]



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SDG: 161003-48
Location: Carmarthen

Client Reference:
Order Number: 1284/1551

Report Number: 389758
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VOC MS (W)

Results Legend		Customer Sample Ref.	BH10	BH14	L1			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference						
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
dis.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% 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							
1-5&+5@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Dibromofluoromethane**	%	TM208			112			
Toluene-d8**	%	TM208	110	109	97.4			
			1	1				
4-Bromofluorobenzene**	%	TM208			97.3			
Dichlorodifluoromethane	<1 µg/l	TM208			<1			
Chloromethane	<1 µg/l	TM208			<1			#
Vinyl chloride	<1 µg/l	TM208			<1			#
Bromomethane	<1 µg/l	TM208			<1			#
Chloroethane	<1 µg/l	TM208			<1			#
Trichlorofluoromethane	<1 µg/l	TM208			<1			#
1,1-Dichloroethene	<1 µg/l	TM208			<1			#
Carbon disulphide	<1 µg/l	TM208			<1			#
Dichloromethane	<3 µg/l	TM208			<3			#
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1	<1	<1			#
			1 #	1 #				#
trans-1,2-Dichloroethene	<1 µg/l	TM208			<1			#
1,1-Dichloroethane	<1 µg/l	TM208			<1			#
cis-1,2-Dichloroethene	<1 µg/l	TM208			<1			#
2,2-Dichloropropane	<1 µg/l	TM208			<1			
Bromochloromethane	<1 µg/l	TM208			<1			#
Chloroform	<1 µg/l	TM208			<1			#
1,1,1-Trichloroethane	<1 µg/l	TM208			<1			#
1,1-Dichloropropene	<1 µg/l	TM208			<1			#
Carbontetrachloride	<1 µg/l	TM208			<1			#
1,2-Dichloroethane	<1 µg/l	TM208			<1			
Benzene	<1 µg/l	TM208	1.16	<1	<1			#
			1 #	1 #				#
Trichloroethene	<1 µg/l	TM208			<1			#
1,2-Dichloropropane	<1 µg/l	TM208			<1			#
Dibromomethane	<1 µg/l	TM208			<1			#
Bromodichloromethane	<1 µg/l	TM208			<1			#
cis-1,3-Dichloropropene	<1 µg/l	TM208			<1			#
Toluene	<1 µg/l	TM208	<1	<1	<1			#
			1 #	1 #				#
trans-1,3-Dichloropropene	<1 µg/l	TM208			<1			#
1,1,2-Trichloroethane	<1 µg/l	TM208			<1			#



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SDG: 161003-48
Location: Carmarthen

Client Reference:
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VOC MS (W)

Results Legend		Customer Sample Ref.	BH10	BH14	L1			
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference						
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% 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							
1-5&*&@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
1,3-Dichloropropane	<1 µg/l	TM208			<1	#		
Tetrachloroethene	<1 µg/l	TM208			<1	#		
Dibromochloromethane	<1 µg/l	TM208			<1	#		
1,2-Dibromoethane	<1 µg/l	TM208			<1	#		
Chlorobenzene	<1 µg/l	TM208			<1	#		
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208			<1	#		
Ethylbenzene	<1 µg/l	TM208	<1 1 #	<1 1 #	<1	#		
m,p-Xylene	<1 µg/l	TM208	7.11 1 #	<1 1 #	<1	#		
o-Xylene	<1 µg/l	TM208	1.06 1 #	<1 1 #	<1	#		
Styrene	<1 µg/l	TM208			<1	#		
Bromoform	<1 µg/l	TM208			<1	#		
Isopropylbenzene	<1 µg/l	TM208			<1	#		
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208			<1	#		
1,2,3-Trichloropropane	<1 µg/l	TM208			<1	#		
Bromobenzene	<1 µg/l	TM208			<1	#		
Propylbenzene	<1 µg/l	TM208			<1	#		
2-Chlorotoluene	<1 µg/l	TM208			<1	#		
1,3,5-Trimethylbenzene	<1 µg/l	TM208			<1	#		
4-Chlorotoluene	<1 µg/l	TM208			<1	#		
tert-Butylbenzene	<1 µg/l	TM208			<1	#		
1,2,4-Trimethylbenzene	<1 µg/l	TM208			<1	#		
sec-Butylbenzene	<1 µg/l	TM208			<1	#		
4-iso-Propyltoluene	<1 µg/l	TM208			<1	#		
1,3-Dichlorobenzene	<1 µg/l	TM208			<1	#		
1,4-Dichlorobenzene	<1 µg/l	TM208			<1	#		
n-Butylbenzene	<1 µg/l	TM208			<1	#		
1,2-Dichlorobenzene	<1 µg/l	TM208			<1	#		
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208			<1	#		
1,2,4-Trichlorobenzene	<1 µg/l	TM208			<1	#		
Hexachlorobutadiene	<1 µg/l	TM208			<1	#		
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208			<1	#		
Naphthalene	<1 µg/l	TM208			<1	#		

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SDG:	161003-48	Client Reference:		Report Number:	389758
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Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters		
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples		
TM045	MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130	Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids		
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water		
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser		
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit		
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter		
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH in Waters		
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS		
TM178	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters		
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM186	Determination of Acidic Herbicides in Groundwater and Potable Water by LC/MSD Using Selective Ion Monitoring. Agilent Technologies Inc. Application Note 5988-5882EN.	The Determination of Acid Herbicides in Environmental Water Samples and Leachates by LC/MS QQQ.		
TM191	Standard Methods for the examination of waters and wastewaters 16th Edition, ALPHA, Washington DC, USA. ISBN 0-87553-131-8.	Determination of Unfiltered Metals in Water Matrices by ICP-MS		
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters		
TM227	Standard methods for the examination of waters and wastewaters 20th Edition, AWWA/APHA Method 4500.	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate		
TM228	US EPA Method 6010B	Determination of Major Cations in Water by iCap 6500 Duo ICP-OES		
TM231	Agilent 6890 Gas Chromatograph system using an Agilent 5973 Mass Selective Detector (MSD)	Determination of Organochlorine and Organophosphorus Pesticides and Triazine Herbicides by GCMS		
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter		
TM314		Analysis of Organochlorine Pesticides in Aqueous sample by GCMS		
TM315		Analysis of Organophosphorus Pesticides in Aqueous samples by GCMS		
TM328				

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

Chemical testing (unless subcontracted) performed at ALcontrol Hawarden (Method codes TM) or ALcontrol Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

SDG: 161003-48
Location: Carmarthen

Client Reference:
Order Number: 1284/1551

Report Number: 389758
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Test Completion Dates

Lab Sample No(s)	14254788	14254789	14254783	14254782	14254781	14254785	14254784	14254794	14254795	14254787
Customer Sample Ref.	BH10	BH14	BH103	BH104	BH105	BH117	GW101	L1	RUN OFF	SW1NYC
AGS Ref.										
Depth										
Type	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
Acid Herbicides (W)	09-Dec-2016	14-Oct-2016						09-Dec-2016		
Alkalinity as CaCO ₃			05-Oct-2016	05-Oct-2016	07-Oct-2016	05-Oct-2016	05-Oct-2016	05-Oct-2016		10-Oct-2016
Ammoniacal Nitrogen	10-Oct-2016	10-Oct-2016	10-Oct-2016	10-Oct-2016	10-Oct-2016	10-Oct-2016	10-Oct-2016	10-Oct-2016		10-Oct-2016
Anions by Kone (w)	08-Oct-2016	05-Oct-2016	10-Oct-2016	10-Oct-2016	10-Oct-2016	10-Oct-2016	10-Oct-2016	08-Oct-2016		10-Oct-2016
BOD True Total								09-Oct-2016		
COD Unfiltered								05-Oct-2016		
Conductivity (at 20 deg.C)	06-Oct-2016	06-Oct-2016	07-Oct-2016	06-Oct-2016	07-Oct-2016	07-Oct-2016	06-Oct-2016	07-Oct-2016	06-Oct-2016	07-Oct-2016
Cyanide Comp/Free/Total/Thiocyanate								06-Oct-2016		
Dissolved Metals by ICP-MS	07-Oct-2016	07-Oct-2016						07-Oct-2016		
Mercury Dissolved	07-Oct-2016	10-Oct-2016						07-Oct-2016		
Metals by iCap-OES Dissolved (W)	10-Oct-2016	10-Oct-2016	10-Oct-2016	10-Oct-2016	10-Oct-2016	10-Oct-2016	10-Oct-2016	10-Oct-2016		10-Oct-2016
Metals by iCap-OES Unfiltered (W)								07-Oct-2016		
Mineral Oil C10-40 Aqueous (W)								07-Oct-2016		
OC, OP Pesticides and Triazine Herb								07-Oct-2016		
Organochlorine Pesticides (Aq)								12-Oct-2016		
Organophosphorus Pesticides (Aq)								12-Oct-2016		
Organotins in Aqueous Samples								06-Oct-2016		
PAH Spec MS - Aqueous (W)	07-Oct-2016	11-Oct-2016						11-Oct-2016		
pH Value	07-Oct-2016	10-Oct-2016	10-Oct-2016	07-Oct-2016	10-Oct-2016	07-Oct-2016	07-Oct-2016	07-Oct-2016	07-Oct-2016	07-Oct-2016
Suspended Solids									05-Oct-2016	05-Oct-2016
SVOC MS (W) - Aqueous								07-Oct-2016		
Total Organic and Inorganic Carbon								07-Oct-2016		
VOC MS (W)	10-Oct-2016	10-Oct-2016						07-Oct-2016		

Lab Sample No(s)	14254792	14254791	14254786
Customer Sample Ref.	SW2 WERN	SW4 WERN	SW4NYC
AGS Ref.			
Depth			
Type	LIQUID	LIQUID	LIQUID
Alkalinity as CaCO ₃			06-Oct-2016
Ammoniacal Nitrogen	10-Oct-2016	10-Oct-2016	10-Oct-2016
Anions by Kone (w)	10-Oct-2016	10-Oct-2016	10-Oct-2016
Conductivity (at 20 deg.C)	06-Oct-2016	06-Oct-2016	06-Oct-2016
Metals by iCap-OES Dissolved (W)	10-Oct-2016	10-Oct-2016	10-Oct-2016
pH Value	07-Oct-2016	07-Oct-2016	07-Oct-2016
Suspended Solids			06-Oct-2016



SDG: 161003-48
Job: H_GETCNO_NAH-15
Client Reference:

Location: Carmarthen
Customer: Geotechnology
Attention: Ben Rees

Order Number: 1284/1551
Report Number: 389758
Superseded Report: 383128

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) 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. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. 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. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. 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.

5. 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.

6. 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 (2005), 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.

7. 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.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

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

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

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

13. **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%, they are generally wider for volatiles analysis, 50-150%. 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.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

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

18. 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.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

General

20. 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.

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

22. 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.

23. 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 (BTX). 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.

24. **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.

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
\$	Sampled on date not provided
+	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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 ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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.

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.



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

Attention: Ben Rees

CERTIFICATE OF ANALYSIS

Date: 07 December 2016
Customer: H_GETCNO_NAH
Sample Delivery Group (SDG): 161127-4
Your Reference:
Location: Carmarthen
Report No: 389389

We received 13 samples on Saturday November 26, 2016 and 13 of these samples were scheduled for analysis which was completed on Wednesday December 07, 2016. 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 ALcontrol Hawarden (Method codes TM) or ALcontrol Aberdeen (Method codes S).

Approved By:

Sonia McWhan

Operations Manager



**SDG:** 161127-4
Location: Carmarthen**Client Reference:**
Order Number:**Report Number:** 389389
Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
14604192	BH101	ES		24/11/2016
14604193	BH103	ES		24/11/2016
14604194	BH104	ES		24/11/2016
14604195	BH105	ES		24/11/2016
14604196	BH117	ES		24/11/2016
14604199	EAST LAGOON	ES		24/11/2016
14604198	EFFLUENT	ES		24/11/2016
14604197	INFLUENT	ES		24/11/2016
14604200	NYC RUNOFF	ES		24/11/2016
14604201	NYC SW1	ES		24/11/2016
14604202	NYC SW4	ES		24/11/2016
14604203	WERN SW2	ES		24/11/2016
14604204	WERN SW4	ES		24/11/2016

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



CERTIFICATE OF ANALYSIS

SDG: 161127-4
Location: Carmarthen

Client Reference:
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LIQUID Results Legend X Test N No Determination Possible	Lab Sample No(s)		Customer Sample Reference		AGS Reference		Depth (m)		Container		
	14604204		WERN SW4		ES				H2SO4 (ALE244) 11plastic (ALE221)		
	14604203		WERN SW2		ES				H2SO4 (ALE244) 11plastic (ALE221)		
	14604202		NYC SW4		ES				H2SO4 (ALE244) 11plastic (ALE221)		
	14604201		NYC SW1		ES				H2SO4 (ALE244) 11plastic (ALE221)		
14604200		NYC RUNOFF		ES						11plastic (ALE221)	
14604197		INFLUENT		ES						11plastic (ALE221)	
14604198		EFFLUENT		ES						H2SO4 (ALE244)	
14604199		EAST LAGOON		ES						11plastic (ALE221)	
14604196		BH117		ES						H2SO4 (ALE244) 11plastic (ALE221)	
14604195		BH105		ES						Dissolved Metals Preser 1000ml glass bottle (ALE Vial (ALE297) H2SO4 (ALE244)	
14604194		BH104		ES						Dissolved Metals Preser 11plastic (ALE221) 1000ml glass bottle (ALE Vial (ALE297) H2SO4 (ALE244)	
14604193		BH103		ES						Dissolved Metals Preser 11plastic (ALE221) 1000ml glass bottle (ALE Vial (ALE297) H2SO4 (ALE244)	
14604192		BH101		ES						Dissolved Metals Preser 250ml BOD (ALE212) 11plastic (ALE221) 1000ml glass bottle (ALE	
Acid Herbicides (W)	All	NDPs: 0 Tests: 5	X		X						
Alkalinity as CaCO3	All	NDPs: 0 Tests: 7		X		X				X	X
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 12			X		X			X	X
Anions by Kone (w)	All	NDPs: 0 Tests: 12	X			X				X	X
BOD True Total	All	NDPs: 0 Tests: 5		X		X					
COD Unfiltered	All	NDPs: 0 Tests: 5		X		X					
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 13	X		X		X		X	X	X
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 5	X		X		X		X		
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 5	X		X		X		X		
Mercury Dissolved	All	NDPs: 0 Tests: 5		X		X			X		
Metals by iCap-OES Dissolved (W)	All	NDPs: 0 Tests: 9	X		X		X		X		X
Metals by iCap-OES Unfiltered (W)	All	NDPs: 0 Tests: 8	X		X		X		X	X	X
Mineral Oil C10-40 Aqueous (W)	All	NDPs: 0 Tests: 5	X		X		X		X		
OC, OP Pesticides and Triazine Herb	All	NDPs: 0 Tests: 5	X		X		X		X		
Organochlorine Pesticides (Aq)	All	NDPs: 0 Tests: 5	X		X		X		X		
Organophosphorus Pesticides (Aq)	All	NDPs: 0 Tests: 5	X		X		X		X		



CERTIFICATE OF ANALYSIS

SDG: 161127-4
Location: Carmarthen

Client Reference:
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LIQUID Results Legend X Test N No Determination Possible	Lab Sample No(s)	Customer Sample Reference	AGS Reference	Depth (m)	Container
	14604204	WERN SW4	ES		H2SO4 (ALE24)
	14604203	WERN SW2	ES		11plastic (ALE221)
	14604202	NYC SW4	ES		H2SO4 (ALE24)
	14604201	NYC SW1	ES		11plastic (ALE221)
	14604200	NYC RUNOFF	ES		H2SO4 (ALE24)
	14604197	INFLUENT	ES		11plastic (ALE221)
	14604198	EFFLUENT	ES		H2SO4 (ALE24)
	14604199	EAST LAGOON	ES		11plastic (ALE221)
	14604196	BH117	ES		H2SO4 (ALE24)
14604195	BH105	ES		Dissolved Metals Preser 11plastic (ALE221)	
14604194	BH104	ES		1000ml glass bottle (ALE Vial (ALE297)	
14604193	BH103	ES		Dissolved Metals Preser 11plastic (ALE221)	
14604192	BH101	ES		1000ml glass bottle (ALE Vial (ALE297)	
					H2SO4 (ALE24)
					Dissolved Metals Preser 250ml BOD (ALE212)
					11plastic (ALE221)
					1000ml glass bottle (ALE
Organotins in Aqueous Samples	All	NDPs: 0 Tests: 5			X
PAH Spec MS - Aqueous (W)	All	NDPs: 0 Tests: 5			X
pH Value	All	NDPs: 0 Tests: 13			X
Suspended Solids	All	NDPs: 0 Tests: 3			
SVOC MS (W) - Aqueous	All	NDPs: 0 Tests: 5			X
Total Organic and Inorganic Carbon	All	NDPs: 0 Tests: 5			X
VOC MS (W)	All	NDPs: 0 Tests: 5			X



CERTIFICATE OF ANALYSIS

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Results Legend		Customer Sample Ref.	BH101	BH103	BH104	BH105	BH117	EAST LAGOON
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)	Water(GW/SW)
M	mCERTS accredited.		24/11/2016	24/11/2016	24/11/2016	24/11/2016	24/11/2016	24/11/2016
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% 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		26/11/2016	26/11/2016	26/11/2016	26/11/2016	26/11/2016	26/11/2016
(F)	Trigger breach confirmed		161127-4	161127-4	161127-4	161127-4	161127-4	161127-4
1-5&+5@	Sample deviation (see appendix)		14604192	14604193	14604194	14604195	14604196	14604199
			ES	ES	ES	ES	ES	ES
Component	LOD/Units	Method						
Alkalinity, Total as CaCO3	<2 mg/l	TM043	200	190	270	250	280	
			#	#	#	#	#	
BOD, unfiltered	<1 mg/l	TM045	<1	<1	<1	<1	<1	
			♦ #	♦ #	♦ #	♦ #	♦ #	
Organic Carbon, Total	<3 mg/l	TM090	<3	<3	6.49	<3	<3	
			#	#	#	#	#	
Ammoniacal Nitrogen as N	<0.2 mg/l	TM099	<0.2	<0.2	<0.2	<0.2	0.281	23.7
			#	#	#	#	#	#
COD, unfiltered	<7 mg/l	TM107	9.33	18.4	455	22.6	226	
			#	#	#	#	#	
Conductivity @ 20 deg.C	<0.005 mS/cm	TM120	0.441	0.41	0.517	0.479	0.513	0.956
			#	#	#	#	#	#
Arsenic (diss.filt)	<0.51 µg/l	TM152	<0.51	<0.51	0.656	<0.51	0.612	
			#	#	#	#	#	
Barium (diss.filt)	<0.2 µg/l	TM152	135	66.4	17.8	56.9	122	
			#	#	#	#	#	
Beryllium (diss.filt)	<0.1 µg/l	TM152	<0.1	<0.1	<0.1	<0.1	<0.1	
			#	#	#	#	#	
Boron (diss.filt)	<5 µg/l	TM152	7.64	7.12	8.75	8.17	7.06	
			#	#	#	#	#	
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08	<0.08	<0.08	<0.08	<0.08	
			#	#	#	#	#	
Chromium (diss.filt)	<1.2 µg/l	TM152	<1.2	<1.2	<1.2	<1.2	<1.2	
			#	#	#	#	#	
Copper (diss.filt)	<0.85 µg/l	TM152	<0.85	<0.85	1.59	<0.85	<0.85	
			#	#	#	#	#	
Lead (diss.filt)	<0.1 µg/l	TM152	<0.1	<0.1	<0.1	<0.1	<0.1	
			#	#	#	#	#	
Manganese (diss.filt)	<0.76 µg/l	TM152	<0.76	<0.76	24.7	7.9	87.7	
			#	#	#	#	#	
Nickel (diss.filt)	<0.44 µg/l	TM152	<0.44	<0.44	<0.44	<0.44	<0.44	
			#	#	#	#	#	
Phosphorus (diss.filt)	<15 µg/l	TM152	<15	18.8	<15	<15	15.3	
			#	#	#	#	#	
Zinc (diss.filt)	<1.3 µg/l	TM152	<1.3	<1.3	<1.3	<1.3	<1.3	
			#	#	#	#	#	
Mineral oil >C10 C40 (aq)	<10 µg/l	TM172	<10	<10	62.6	<10	77.7	
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01	<0.01	<0.01	0.0647	<0.01	
Sulphate	<2 mg/l	TM184	8.2	6	18.4	5.1	12.6	
			#	#	#	#	#	
Chloride	<2 mg/l	TM184	15	14.2	6.2	11.3	26.3	89.3
			#	#	#	#	#	#
Phosphate (ortho) as PO4	<0.05 mg/l	TM184	<0.05	<0.05	<0.05	<0.05	<0.05	
			#	#	#	#	#	
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	2.61	1.96	0.95	1.3	0.66	
			#	#	#	#	#	
Cyanide, Total	<0.05 mg/l	TM227	<0.05	<0.05	<0.05	<0.05	<0.05	
			#	#	#	#	#	
Cyanide, Free	<0.05 mg/l	TM227	<0.05	<0.05	<0.05	<0.05	<0.05	
			#	#	#	#	#	
Calcium (diss.filt)	<0.012 mg/l	TM228	61.6	66.2	86.7	78.3	88.7	
			#	#	#	#	#	
Sodium (diss.filt)	<0.076 mg/l	TM228	14.4	10.3	7.61	10.5	14.6	
			#	#	#	#	#	
Magnesium (diss.filt)	<0.036 mg/l	TM228	10.7	7.52	9.06	8.31	6.27	
			#	#	#	#	#	
Potassium (diss.filt)	<1 mg/l	TM228	4.39	<1	3.06	2.56	<1	
			#	#	#	#	#	
Potassium (tot.unfilt)	<2 mg/l	TM228						21.5
Iron (diss.filt)	<0.019 mg/l	TM228	<0.019	<0.019	0.0231	<0.019	<0.019	
			#	#	#	#	#	

SDG:	161127-4
Location:	Carmarthen

Client Reference:
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[illegible]

CERTIFICATE OF ANALYSIS

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OC, OP Pesticides and Triazine Herb

Results Legend		Customer Sample Ref.	BH101	BH103	BH104	BH105	BH117	
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference						
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
dis.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% 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							
1-5&\$@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
Dichlorvos	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Mevinphos	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Tecnazene	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Hexachlorobenzene	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Trifluralin	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
alpha-Hexachlorocyclohexane (HCH / Lindane)	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Quintozene (PCNB)	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Diazinon	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Triallate	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Etrimpfos	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
gamma-Hexachlorocyclohexane (HCH / Lindane)	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Disulfoton	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Propetamphos	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Heptachlor	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Chlorpyrifos methyl	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Dimethoate	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Aldrin	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Chlorothalonil	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Pirimiphos-methyl	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
beta-Hexachlorocyclohexane (HCH / Lindane)	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Chlorpyrifos	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Telodrin	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Methyl parathion	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Isodrin	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Malathion	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Fenthion	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Fenitrothion	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Heptachlor epoxide	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Triadimefon	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Pendimethalin	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
Parathion	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	
o,p-DDE	<0.01 µg/l	TM231	<0.01	<0.01	<0.01	<0.01	<0.01	

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SDG: 161127-4
Location: Carmarthen

Client Reference:
Order Number:

Report Number: 389389
Superseded Report:

SVOC MS (W) - Aqueous

Results Legend		Customer Sample Ref.	BH101	BH103	BH104	BH105	BH117	
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference						
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
dis.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% 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							
1-5&+5@	Sample deviation (see appendix)							
Component	LOD/Units	Method						
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
2-Chlorophenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
2-Methylphenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
2-Nitroaniline (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
2-Nitrophenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
3-Nitroaniline (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
4-Chloroaniline (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
4-Methylphenol (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
4-Nitroaniline (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
4-Nitrophenol (aq)	<1 µg/l	TM176	<1	<1	<1	<1	<1	
Azobenzene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<2 #	<2 #	<2 #	<2 #	<2 #	
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
Carbazole (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	
Dibenzofuran (aq)	<1 µg/l	TM176	<1 #	<1 #	<1 #	<1 #	<1 #	

Report Number: 389389
Superseded Report:

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CERTIFICATE OF ANALYSIS

SDG: 161127-4
Location: Carmarthen

Client Reference:
Order Number:

Report Number: 389389
Superseded Report:

VOC MS (W)

Results Legend		Customer Sample Ref.	BH101	BH103	BH104	BH105	BH117
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference					
M	mCERTS accredited.						
aq	Aqueous / settled sample.						
dis.filt	Dissolved / filtered sample.						
tot.unfilt	Total / unfiltered sample.						
*	Subcontracted test.						
**	% 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						
1-5&+5@	Sample deviation (see appendix)						
Component	LOD/Units	Method					
Dibromofluoromethane**	%	TM208	109	106	107	108 1	107
Toluene-d8**	%	TM208	99.9	99.9	101	99.1 1	99.2
4-Bromofluorobenzene**	%	TM208	101	100	101	101 1	98.8
Dichlorodifluoromethane	<1 µg/l	TM208	<1	<1	<1	<1 1	<1
Chloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
Vinyl chloride	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
Bromomethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
Chloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
Trichlorofluoromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
1,1-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
Carbon disulphide	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
Dichloromethane	<3 µg/l	TM208	<3 #	<3 #	<3 #	<3 1 #	<3 #
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
1,1-Dichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
2,2-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1 1	<1
Bromochloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
Chloroform	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
1,1,1-Trichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
1,1-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
Carbontetrachloride	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
1,2-Dichloroethane	<1 µg/l	TM208	<1	<1	<1	<1 1	<1
Benzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
Trichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
1,2-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
Dibromomethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
Bromodichloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
Toluene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #
1,1,2-Trichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 1 #	<1 #



CERTIFICATE OF ANALYSIS

SDG: 161127-4
Location: Carmarthen

Client Reference:
Order Number:

Report Number: 389389
Superseded Report:

VOC MS (W)

Results Legend		Customer Sample Ref.	BH101	BH103	BH104	BH105	BH117	
#	ISO17025 accredited.	Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference	Water(GW/SW) 24/11/2016	Water(GW/SW) 24/11/2016	Water(GW/SW) 24/11/2016	Water(GW/SW) 24/11/2016	Water(GW/SW) 24/11/2016	
M	mCERTS accredited.							
aq	Aqueous / settled sample.							
diss.filt	Dissolved / filtered sample.							
tot.unfilt	Total / unfiltered sample.							
*	Subcontracted test.							
**	% 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		26/11/2016	26/11/2016	26/11/2016	26/11/2016	26/11/2016	
(F)	Trigger breach confirmed		161127-4	161127-4	161127-4	161127-4	161127-4	
1-5&+@	Sample deviation (see appendix)		14604192	14604193	14604194	14604195	14604196	
			ES	ES	ES	ES	ES	
Component	LOD/Units	Method						
1,3-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
Tetrachloroethene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
Dibromochloromethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
1,2-Dibromoethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
Chlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
1,1,1,2-Tetrachloroethane	<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 #	#	
Styrene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
Bromoform	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
Isopropylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
						1		
1,2,3-Trichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
Bromobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
Propylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
2-Chlorotoluene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
4-Chlorotoluene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
tert-Butylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
1,2,4-Trimethylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
sec-Butylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
4-iso-Propyltoluene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
1,3-Dichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
1,4-Dichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
n-Butylbenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
1,2-Dichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
						1		
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1	<1	<1	<1	<1	
						1		
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
Hexachlorobutadiene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	
Naphthalene	<1 µg/l	TM208	<1	<1	<1	<1	<1	
			#	#	#	1 #	#	

Report Number: 389389
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SDG: 161127-4
Location: Carmarthen

Client Reference:
Order Number:

Report Number: 389389
Superseded Report:

Table of Results - Appendix

Method No	Reference	Description	Wet/Dry Sample ¹	Surrogate Corrected
TM022	Method 2540D, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part120 1981;BS EN 872	Determination of total suspended solids in waters		
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples		
TM045	MEWAM BOD5 2nd Ed.HMSO 1988 / Method 5210B, AWWA/APHA, 20th Ed., 1999; SCA Blue Book 130	Determination of BOD5 (ATU) Filtered by Oxygen Meter on liquids		
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)		
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water		
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser		
TM107	ISO 6060-1989	Determination of Chemical Oxygen Demand using COD Dr Lange Kit		
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter		
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS		
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH in Waters		
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS		
TM178	Modified: US EPA Method 8100	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters		
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry		
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers		
TM186	Determination of Acidic Herbicides in Groundwater and Potable Water by LC/MSD Using Selective Ion Monitoring. Agilent Technologies Inc. Application Note 5988-5882EN.	The Determination of Acid Herbicides in Environmental Water Samples and Leachates by LC/MS QQQ.		
TM191	Standard Methods for the examination of waters and wastewaters 16th Edition, ALPHA, Washington DC, USA. ISBN 0-87553-131-8.	Determination of Unfiltered Metals in Water Matrices by ICP-MS		
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters		
TM227	Standard methods for the examination of waters and wastewaters 20th Edition, AWWA/APHA Method 4500.	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate		
TM228	US EPA Method 6010B	Determination of Major Cations in Water by iCap 6500 Duo ICP-OES		
TM231	Agilent 6890 Gas Chromatograph system using an Agilent 5973 Mass Selective Detector (MSD)	Determination of Organochlorine and Organophosphorus Pesticides and Triazine Herbicides by GCMS		
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter		
TM314		Analysis of Organochlorine Pesticides in Aqueous sample by GCMS		
TM315		Analysis of Organophosphorus Pesticides in Aqueous samples by GCMS		
TM328				

¹ Applies to Solid samples only. DRY indicates samples have been dried at 35°C. NA = not applicable.

Chemical testing (unless subcontracted) performed at ALcontrol Hawarden (Method codes TM) or ALcontrol Aberdeen (Method codes S).



CERTIFICATE OF ANALYSIS

SDG: 161127-4
Location: Carmarthen

Client Reference:
Order Number:

Report Number: 389389
Superseded Report:

Test Completion Dates

Lab Sample No(s)	14604192	14604193	14604194	14604195	14604196	14604199	14604198	14604197	14604200	14604201
Customer Sample Ref.	BH101	BH103	BH104	BH105	BH117	EAST LAGOON	EFFLUENT	INFLUENT	NYC RUNOFF	NYC SW1
AGS Ref.	ES	ES	ES	ES	ES	ES	ES	ES	ES	ES
Depth										
Type	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID	LIQUID
Acid Herbicides (W)	30-Nov-2016	30-Nov-2016	30-Nov-2016	30-Nov-2016	06-Dec-2016					
Alkalinity as CaCO ₃	30-Nov-2016	30-Nov-2016	30-Nov-2016	30-Nov-2016	30-Nov-2016					02-Dec-2016
Ammoniacal Nitrogen	03-Dec-2016	03-Dec-2016	03-Dec-2016	03-Dec-2016	03-Dec-2016	03-Dec-2016	03-Dec-2016	03-Dec-2016		03-Dec-2016
Anions by Kone (w)	06-Dec-2016	06-Dec-2016	06-Dec-2016	06-Dec-2016	06-Dec-2016	03-Dec-2016	03-Dec-2016	03-Dec-2016		03-Dec-2016
BOD True Total	04-Dec-2016	04-Dec-2016	04-Dec-2016	04-Dec-2016	04-Dec-2016					
COD Unfiltered	02-Dec-2016	02-Dec-2016	02-Dec-2016	02-Dec-2016	02-Dec-2016					
Conductivity (at 20 deg.C)	30-Nov-2016	30-Nov-2016	30-Nov-2016	30-Nov-2016	30-Nov-2016	02-Dec-2016	05-Dec-2016	05-Dec-2016	02-Dec-2016	05-Dec-2016
Cyanide Comp/Free/Total/Thiocyanate	30-Nov-2016	30-Nov-2016	30-Nov-2016	30-Nov-2016	30-Nov-2016					
Dissolved Metals by ICP-MS	06-Dec-2016	06-Dec-2016	06-Dec-2016	06-Dec-2016	06-Dec-2016					
Mercury Dissolved	06-Dec-2016	06-Dec-2016	06-Dec-2016	06-Dec-2016	06-Dec-2016					
Metals by iCap-OES Dissolved (W)	06-Dec-2016	07-Dec-2016	07-Dec-2016	06-Dec-2016	06-Dec-2016					05-Dec-2016
Metals by iCap-OES Unfiltered (W)	02-Dec-2016	02-Dec-2016	02-Dec-2016	02-Dec-2016	02-Dec-2016	06-Dec-2016	06-Dec-2016	06-Dec-2016		
Mineral Oil C10-40 Aqueous (W)	06-Dec-2016	06-Dec-2016	06-Dec-2016	06-Dec-2016	06-Dec-2016					
OC, OP Pesticides and Triazine Herb	01-Dec-2016	01-Dec-2016	01-Dec-2016	01-Dec-2016	01-Dec-2016					
Organochlorine Pesticides (Aq)	05-Dec-2016	05-Dec-2016	05-Dec-2016	05-Dec-2016	05-Dec-2016					
Organophosphorus Pesticides (Aq)	05-Dec-2016	05-Dec-2016	05-Dec-2016	05-Dec-2016	05-Dec-2016					
Organotins in Aqueous Samples	02-Dec-2016	02-Dec-2016	02-Dec-2016	02-Dec-2016	02-Dec-2016					
PAH Spec MS - Aqueous (W)	06-Dec-2016	07-Dec-2016	06-Dec-2016	06-Dec-2016	06-Dec-2016					
pH Value	05-Dec-2016	05-Dec-2016	05-Dec-2016	05-Dec-2016	05-Dec-2016	05-Dec-2016	05-Dec-2016	05-Dec-2016	05-Dec-2016	05-Dec-2016
Suspended Solids									02-Dec-2016	06-Dec-2016
SVOC MS (W) - Aqueous	06-Dec-2016	06-Dec-2016	06-Dec-2016	06-Dec-2016	06-Dec-2016					
Total Organic and Inorganic Carbon	01-Dec-2016	01-Dec-2016	01-Dec-2016	01-Dec-2016	01-Dec-2016					
VOC MS (W)	05-Dec-2016	05-Dec-2016	05-Dec-2016	05-Dec-2016	05-Dec-2016					

Lab Sample No(s)	14604202	14604203	14604204
Customer Sample Ref.	NYC SW4	WERN SW2	WERN SW4
AGS Ref.	ES	ES	ES
Depth			
Type	LIQUID	LIQUID	LIQUID
Alkalinity as CaCO ₃	05-Dec-2016		
Ammoniacal Nitrogen	03-Dec-2016	03-Dec-2016	03-Dec-2016
Anions by Kone (w)	03-Dec-2016	03-Dec-2016	03-Dec-2016
Conductivity (at 20 deg.C)	02-Dec-2016	02-Dec-2016	05-Dec-2016
Metals by iCap-OES Dissolved (W)	05-Dec-2016	07-Dec-2016	05-Dec-2016
pH Value	05-Dec-2016	05-Dec-2016	05-Dec-2016
Suspended Solids	02-Dec-2016		



SDG: 161127-4
Job: H_GETCNO_NAH-15
Client Reference:

Location: Carmarthen
Customer: Geotechnology
Attention: Ben Rees

Order Number:
Report Number: 389389
Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) 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. Samples will be run in duplicate upon request, but an additional charge may be incurred.

3. 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. ALcontrol Laboratories reserve the right to charge for samples received and stored but not analysed.

4. 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.

5. 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.

6. 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 (2005), 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.

7. 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.

8. If appropriate preserved bottles are not received preservation will take place on receipt. However, the integrity of the data may be compromised.

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

10. Metals in water are performed on a filtered sample, and therefore represent dissolved metals - total metals must be requested separately.

11. Results relate only to the items tested.

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

13. **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%, they are generally wider for volatiles analysis, 50-150%. 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.

14. **Product analyses** - Organic analyses on products can only be semi-quantitative due to the matrix effects and high dilution factors employed.

15. Phenols monohydric by HPLC include phenol, cresols (2-Methylphenol, 3-Methylphenol and 4-Methylphenol) and Xylenols (2,3 Dimethylphenol, 2,4 Dimethylphenol, 2,5 Dimethylphenol, 2,6 Dimethylphenol, 3,4 Dimethylphenol, 3,5 Dimethylphenol).

16. Total of 5 speciated phenols by HPLC includes Phenol, 2,3,5-Trimethyl Phenol, 2-Isopropylphenol, Cresols and Xylenols (as detailed in 15).

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

18. 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.

19. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

General

20. 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.

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

22. 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.

23. 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 (BTX). 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.

24. **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.

Sample Deviations

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Holding time exceeded before sample received
5	Samples exceeded holding time before preservation was performed
\$	Sampled on date not provided
+	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to sampled on date
&	Sample Holding Time exceeded - Late arrival of instructions.

Asbestos

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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 ALcontrol Laboratories (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

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.

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.

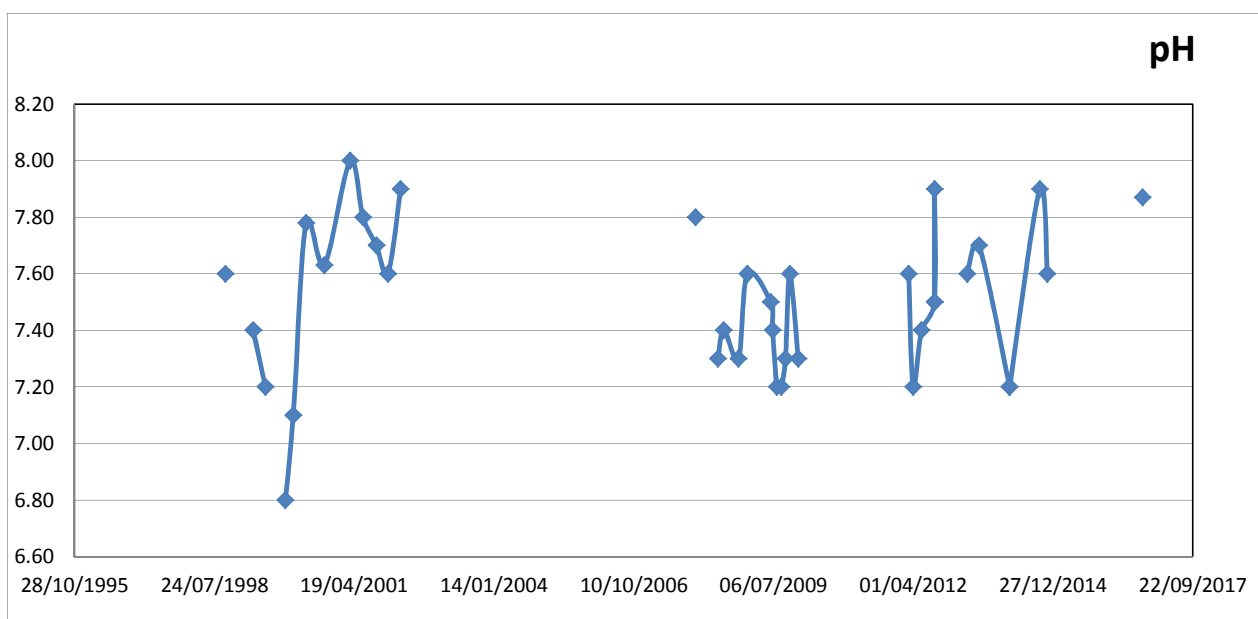
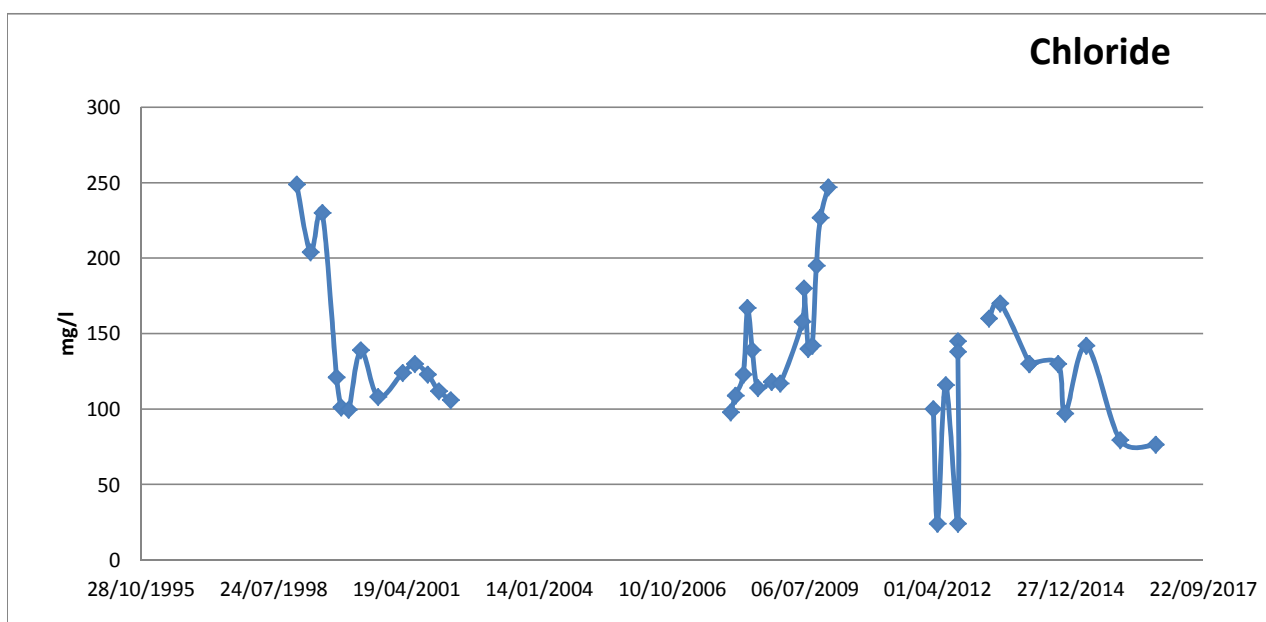
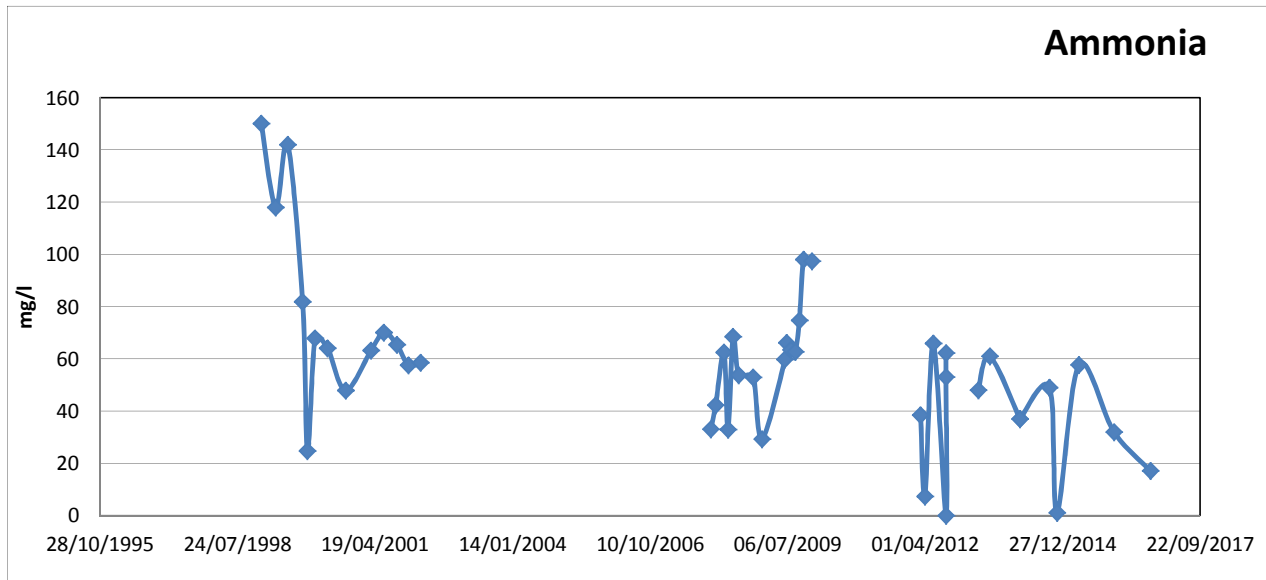
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PHASE 1
CLOSED LANDFILL**

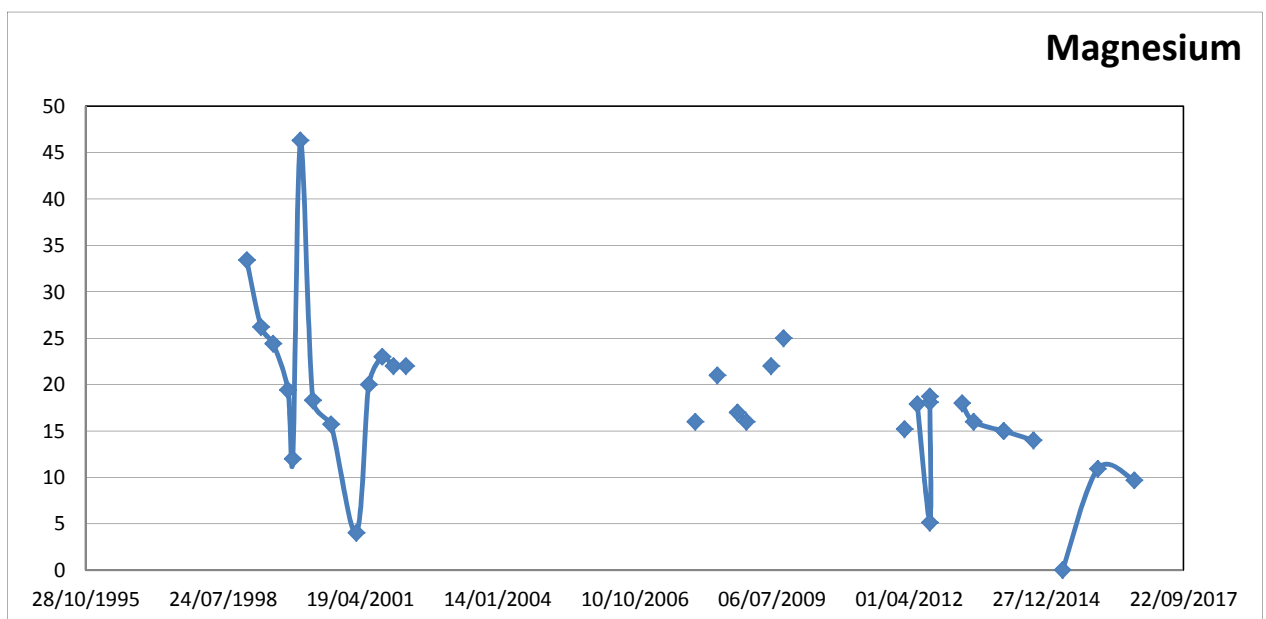
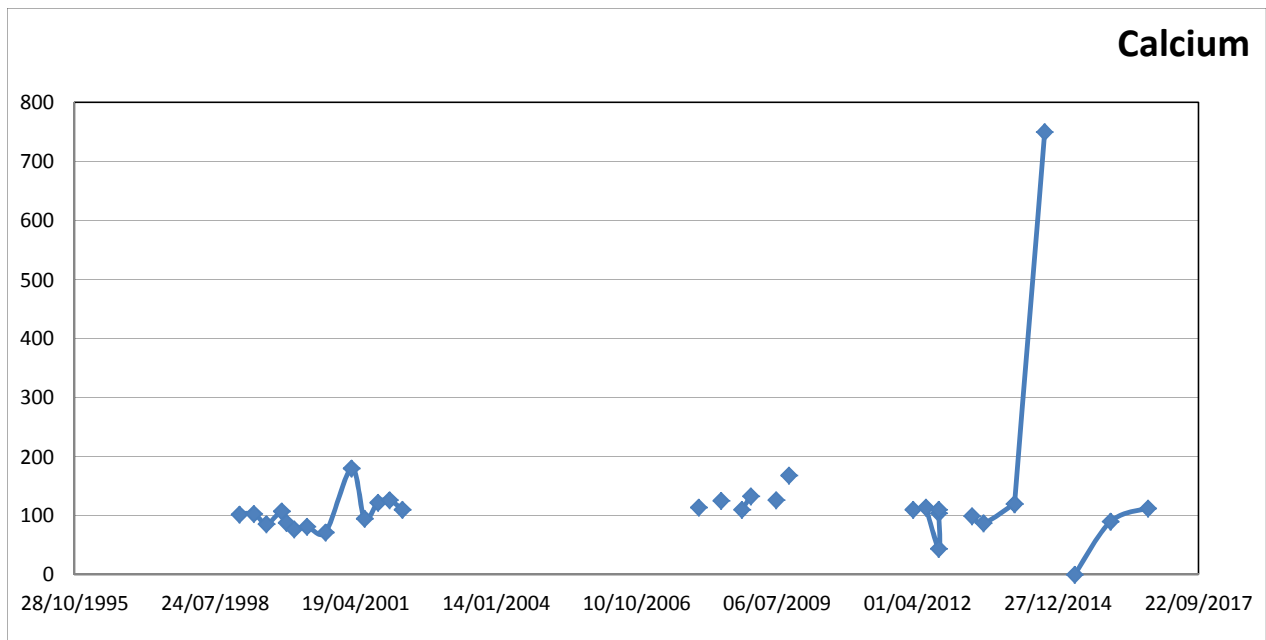
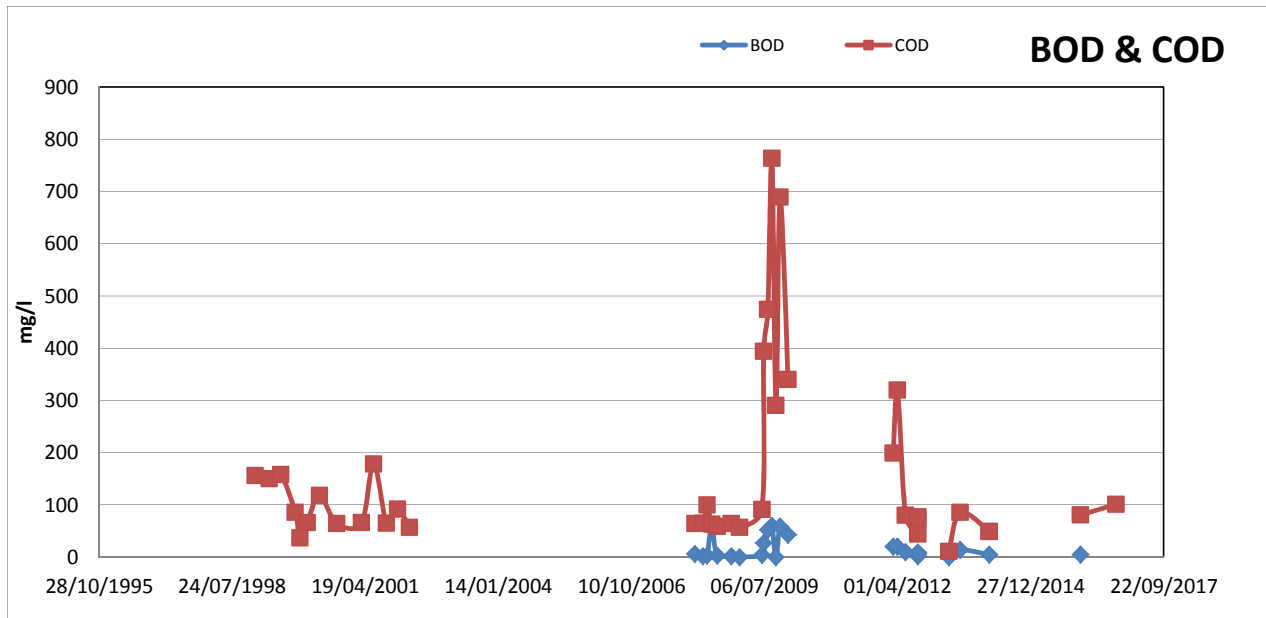
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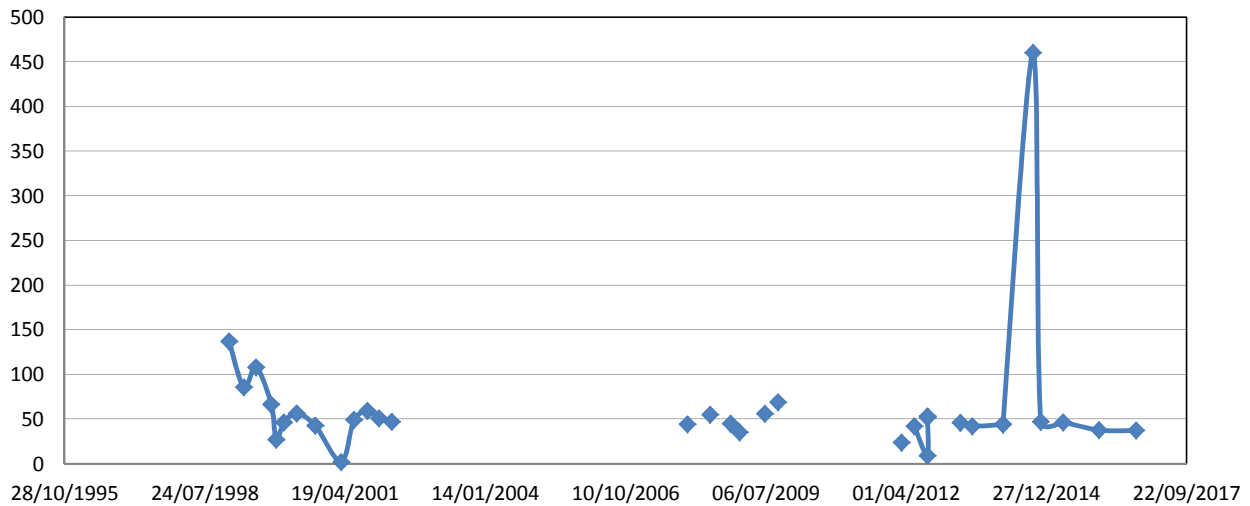
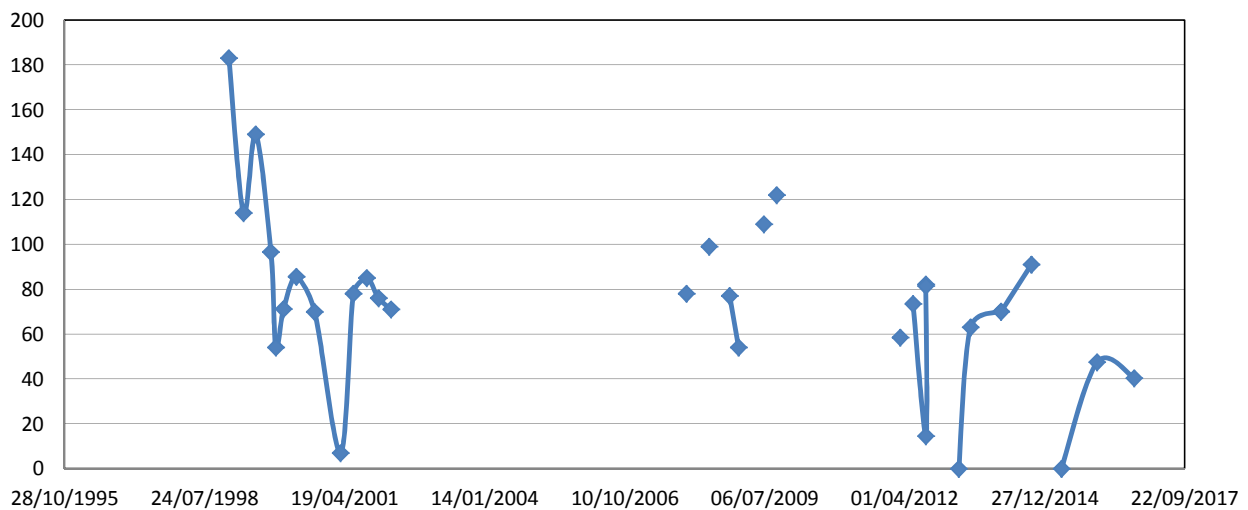
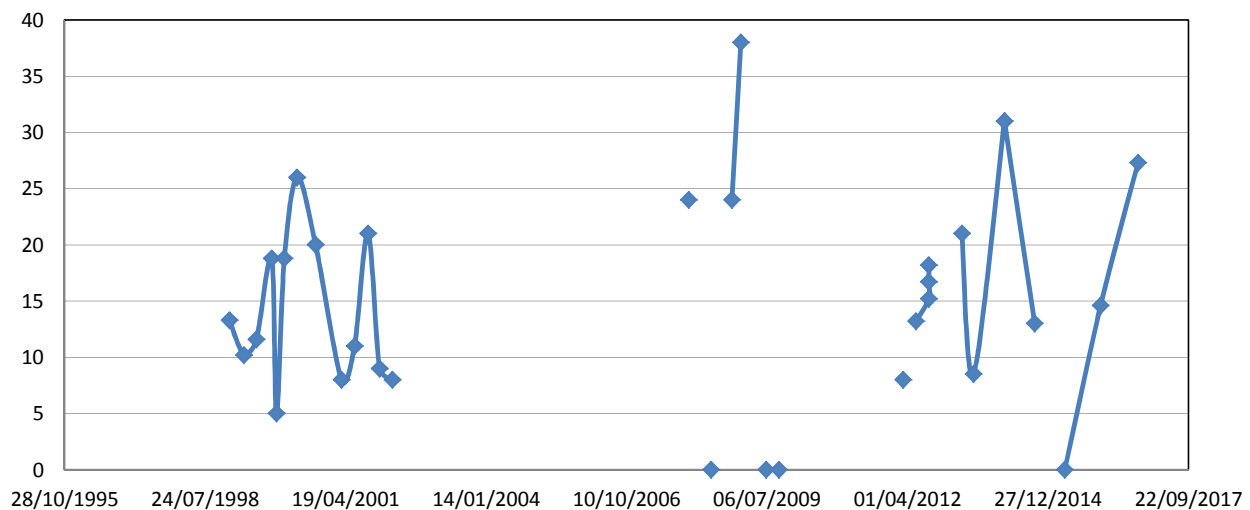
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**Appendix 2
Leachate Chemistry**

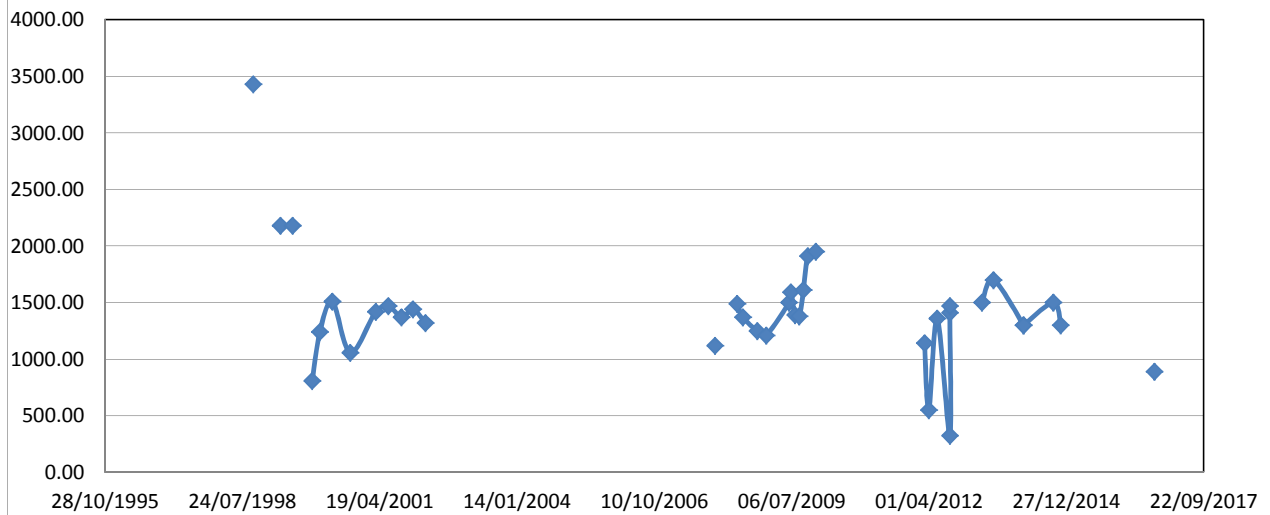
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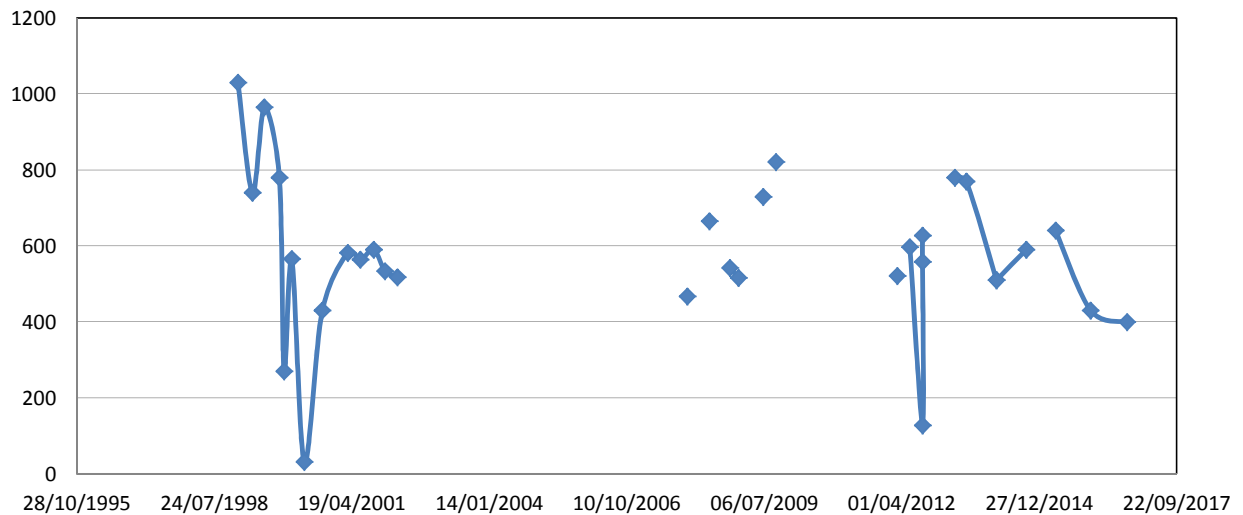


Potassium**Sodium****Sulphate**

Electrical Conductivity



Alkalinity



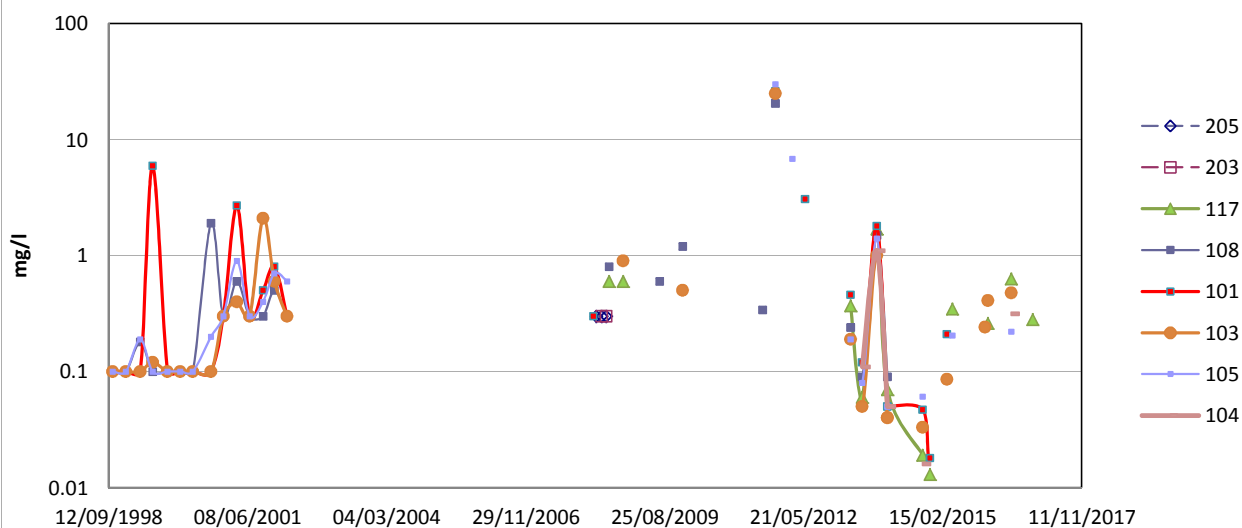
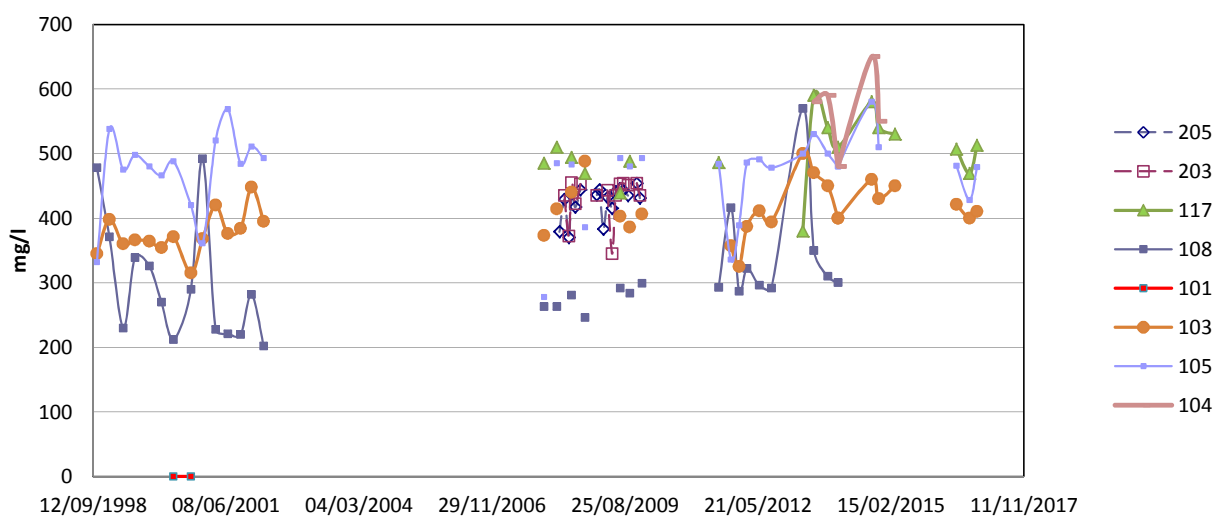
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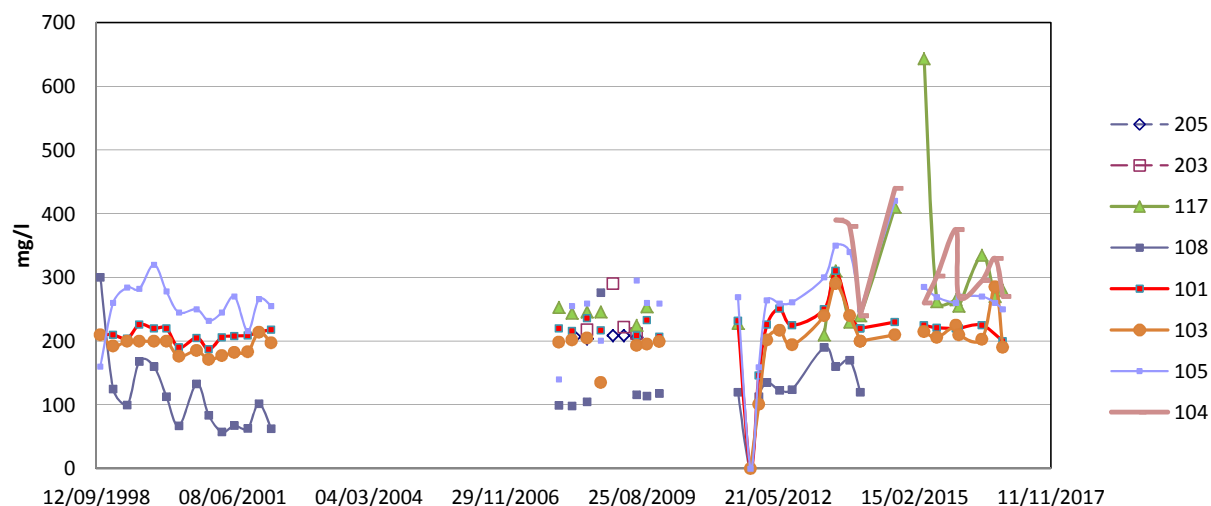
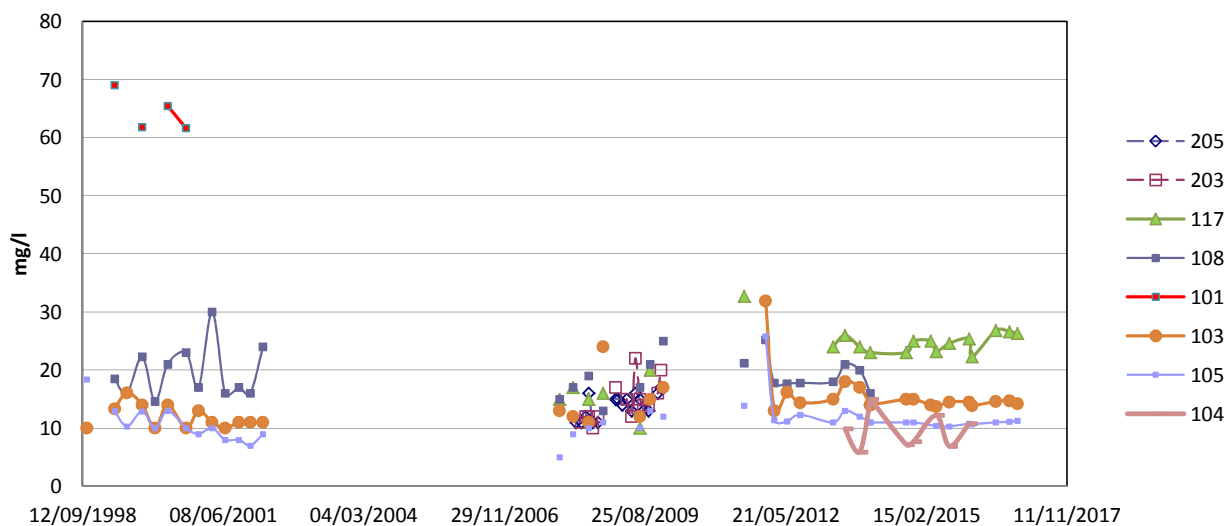
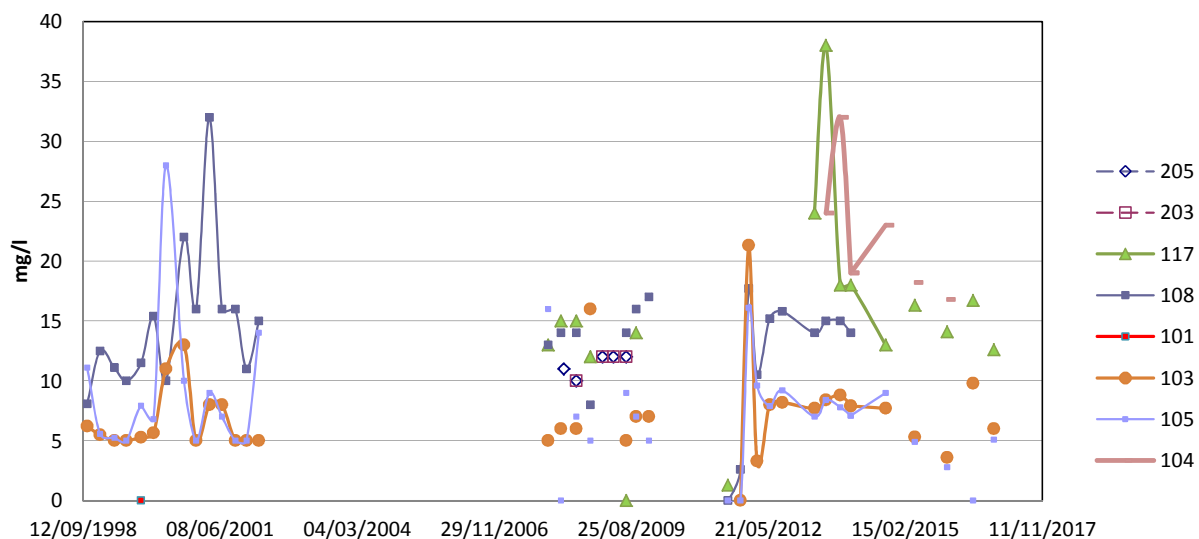
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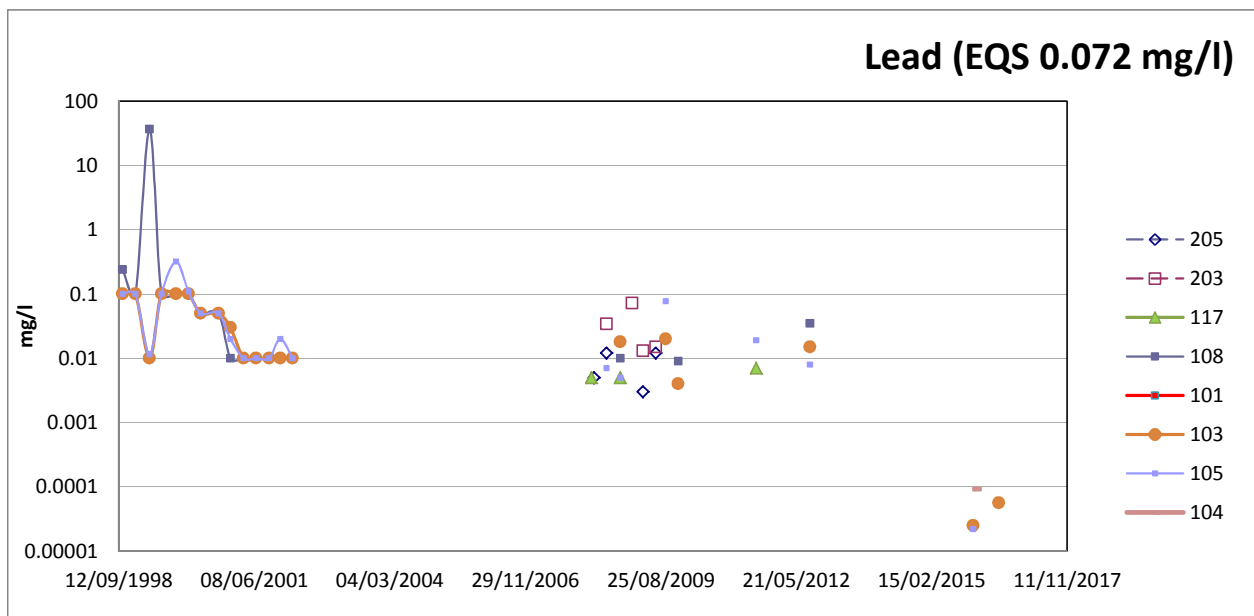
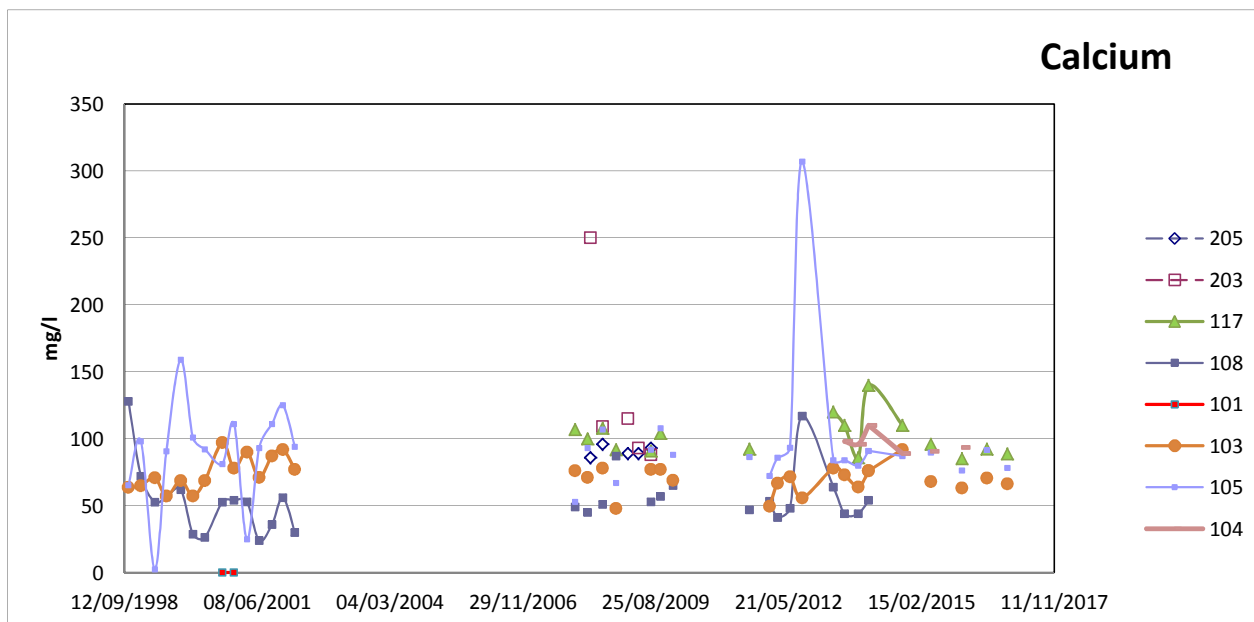
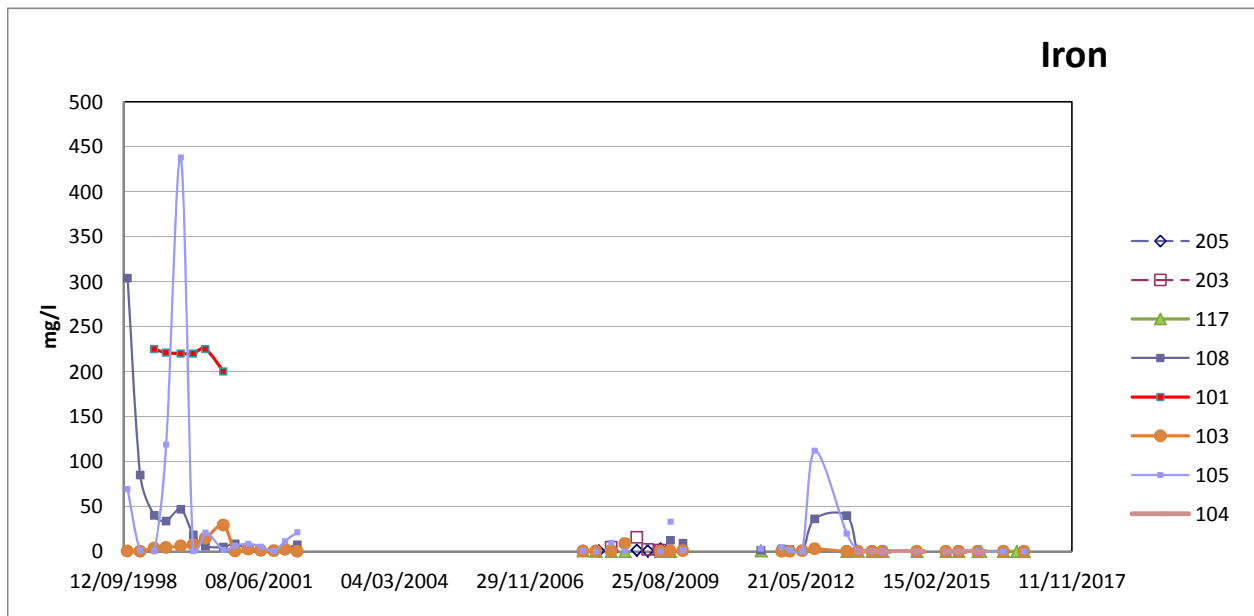
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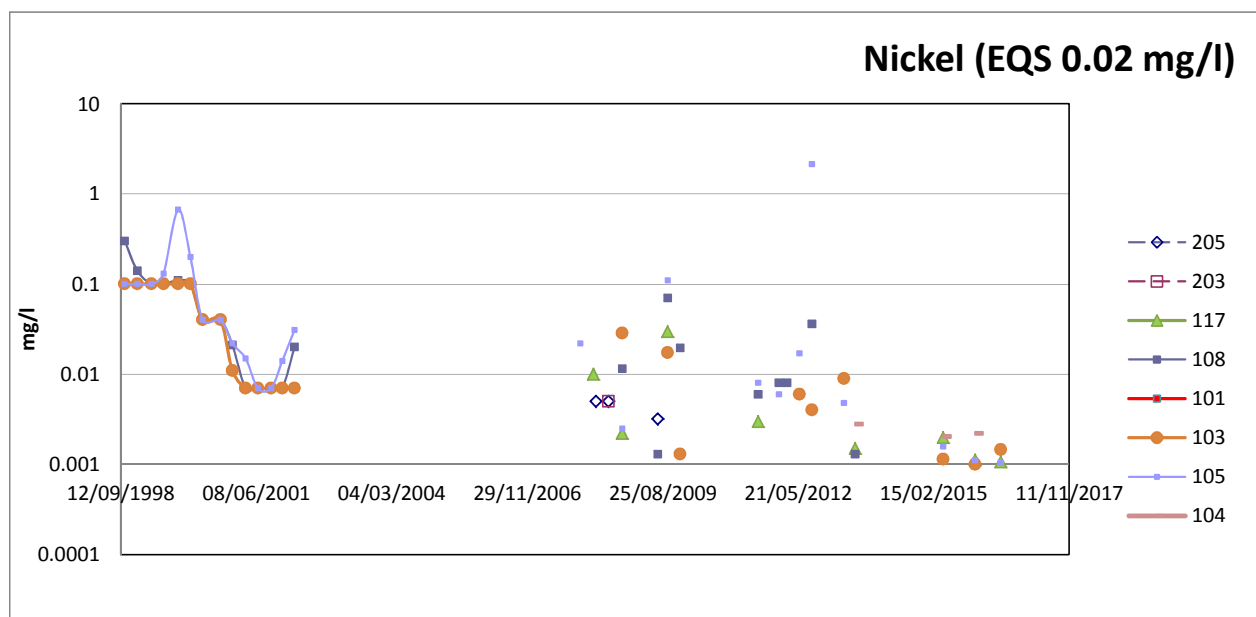
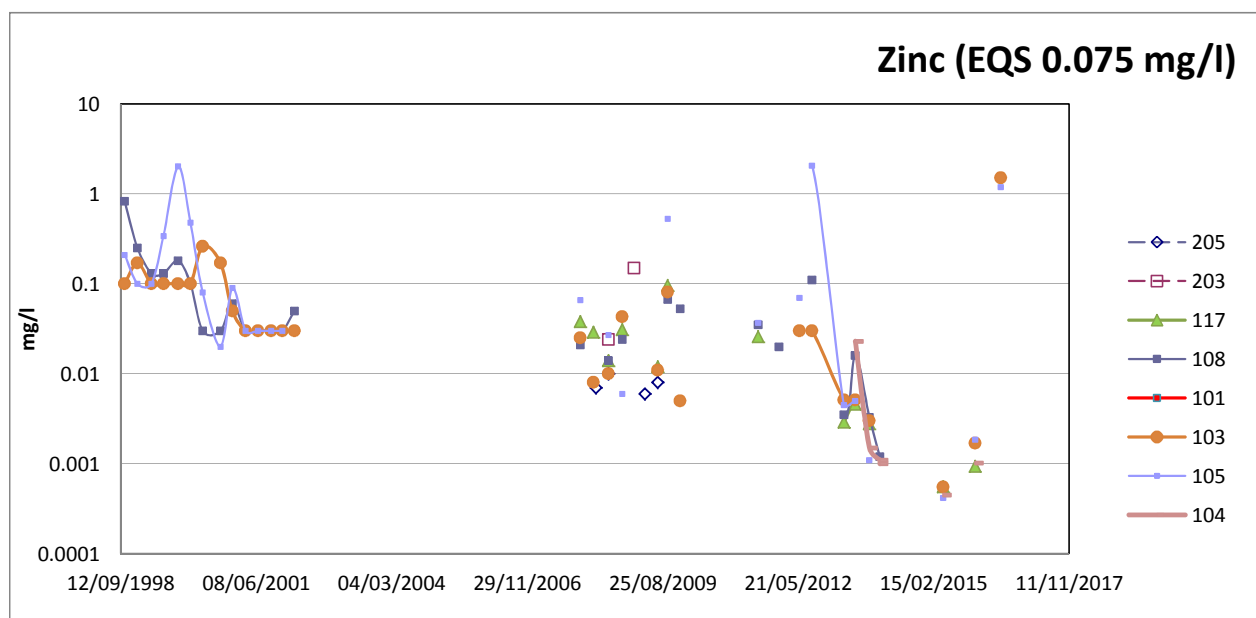
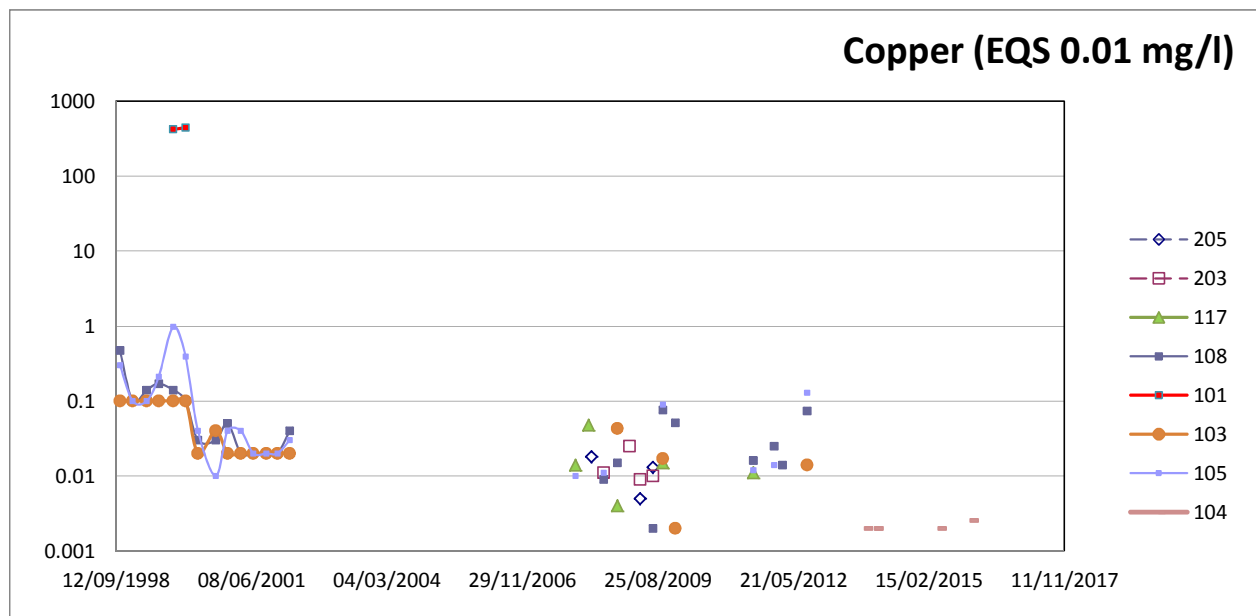
**Appendix 3
Groundwater Chemistry**

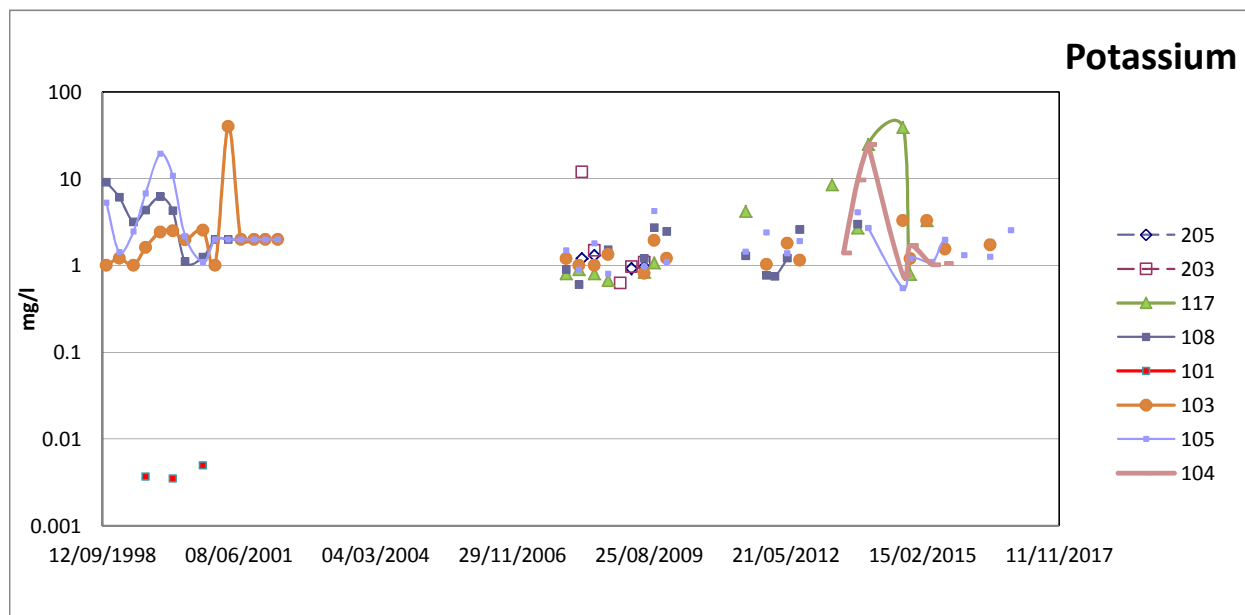
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pH**Ammonia****Electrical Conductivity**

Alkalinity**Chloride****Sulphate (EQS 400 mg/l)**







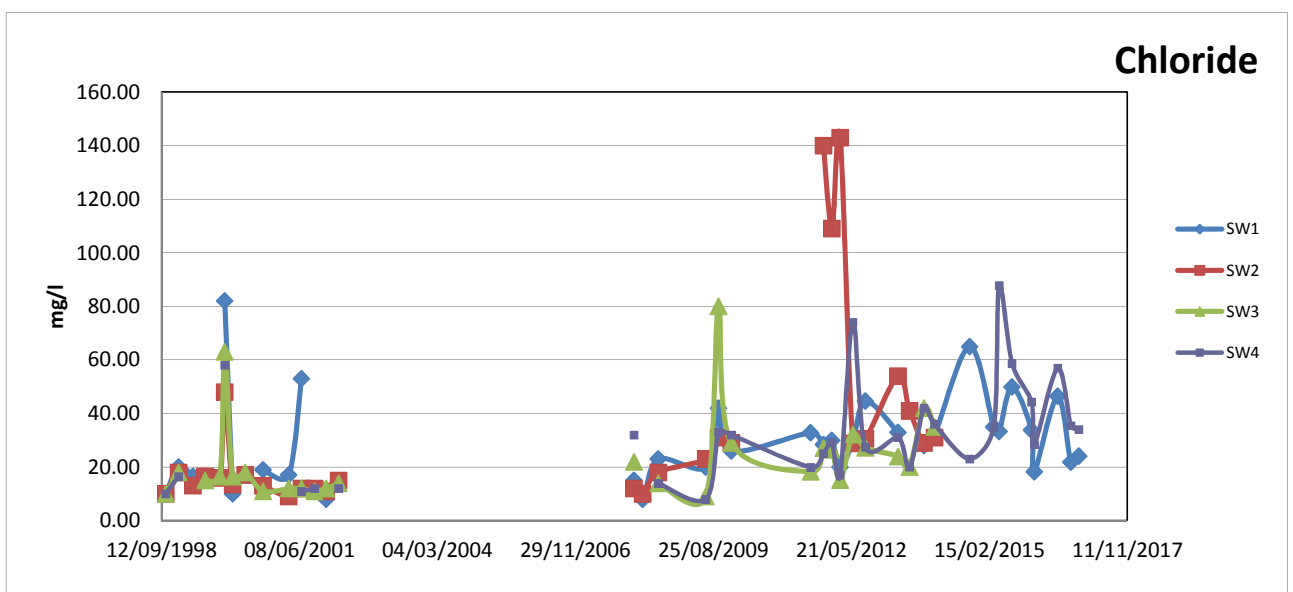
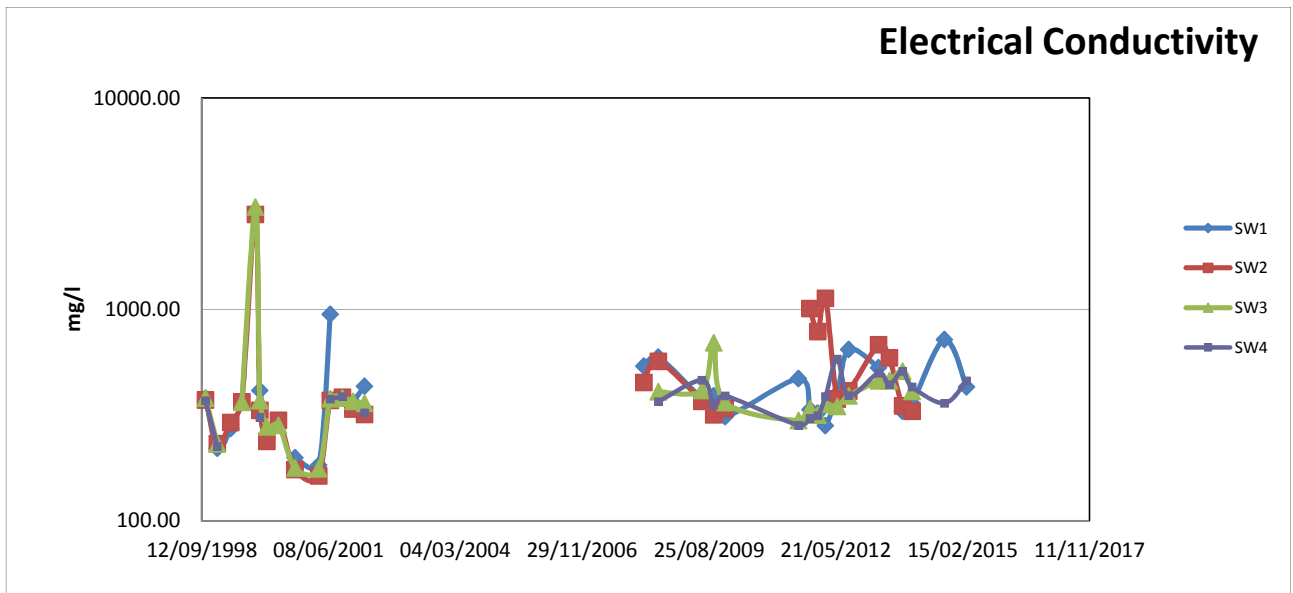
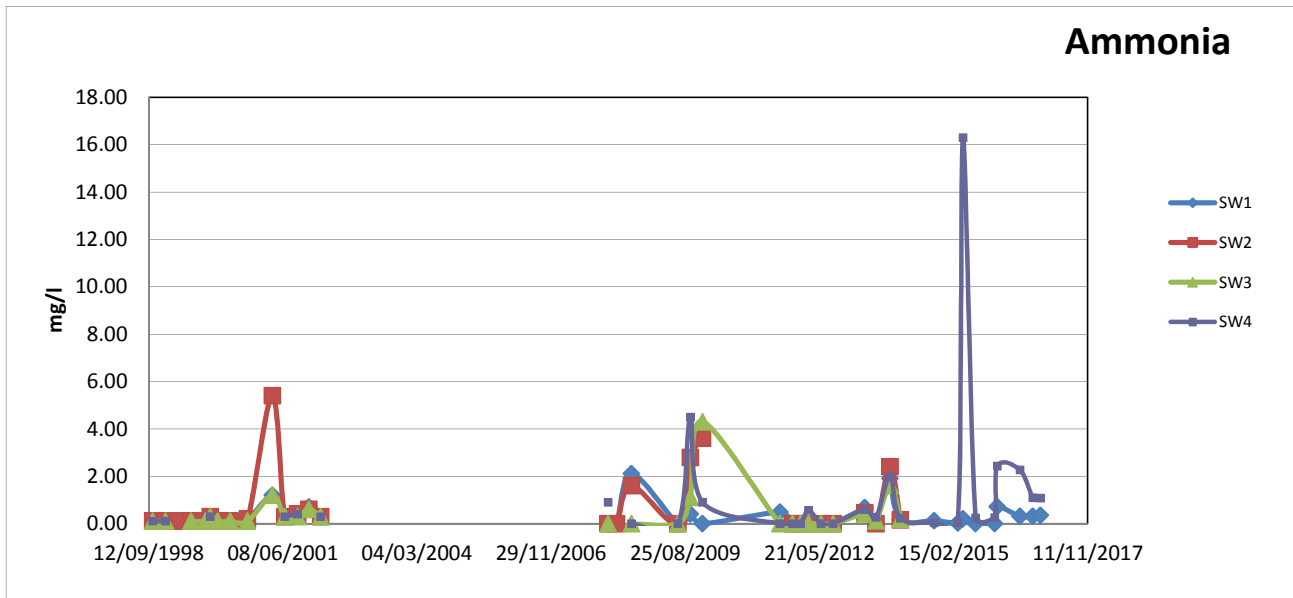
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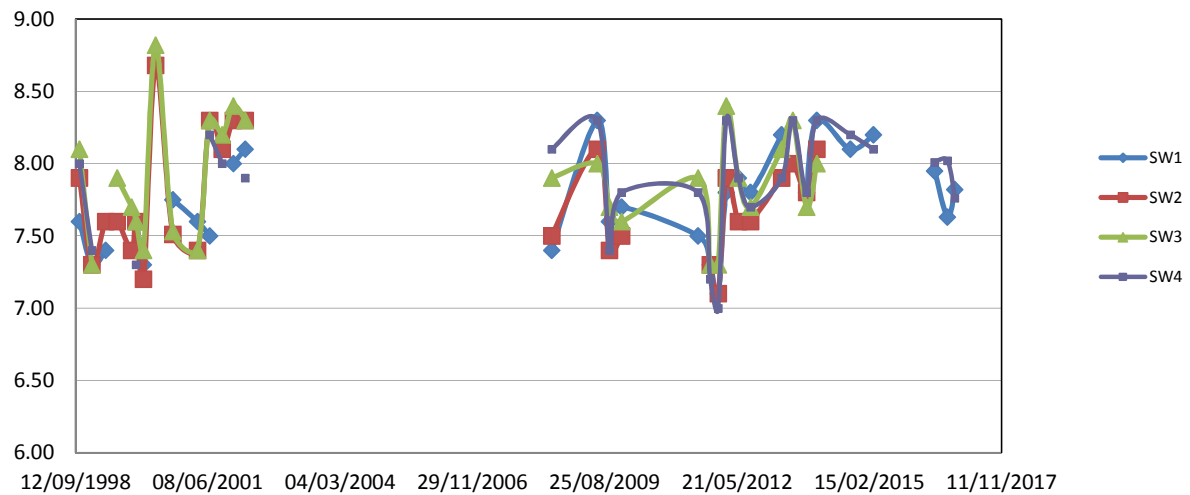
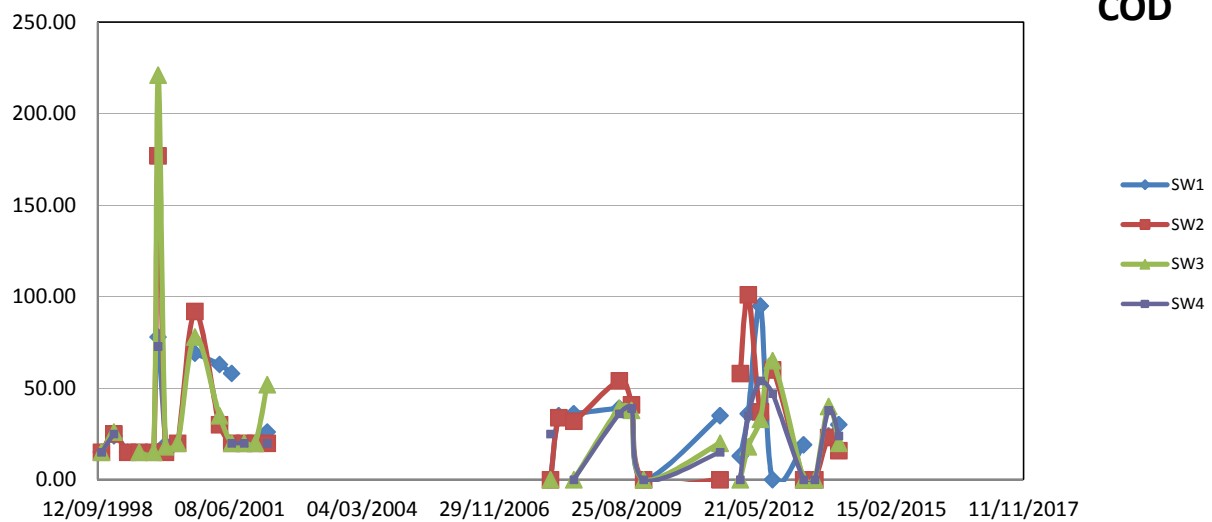
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**Appendix 4
Surface Water
Chemistry**

Report Number 1551r1v1d0117



pH**COD****Potassium**

25

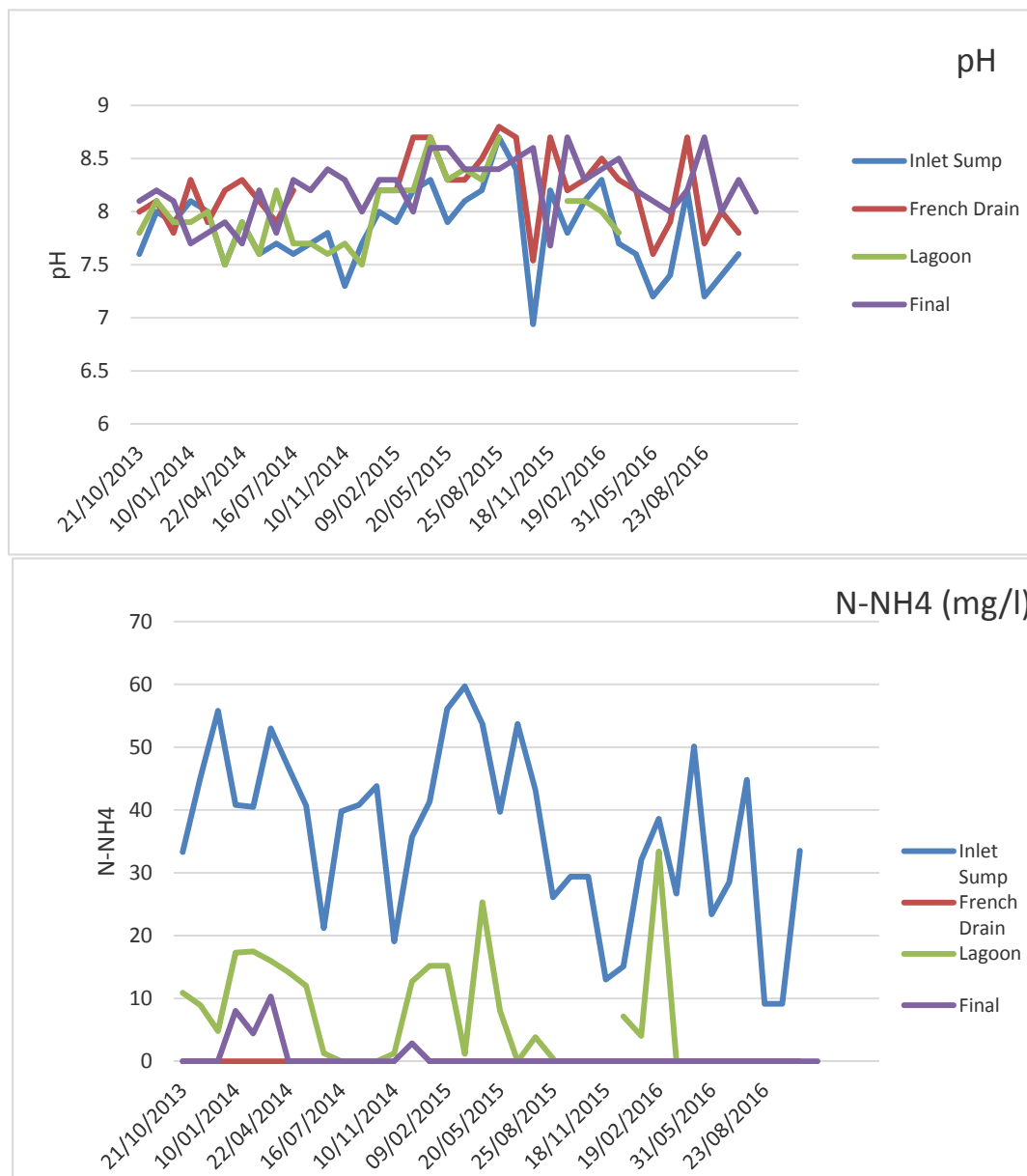
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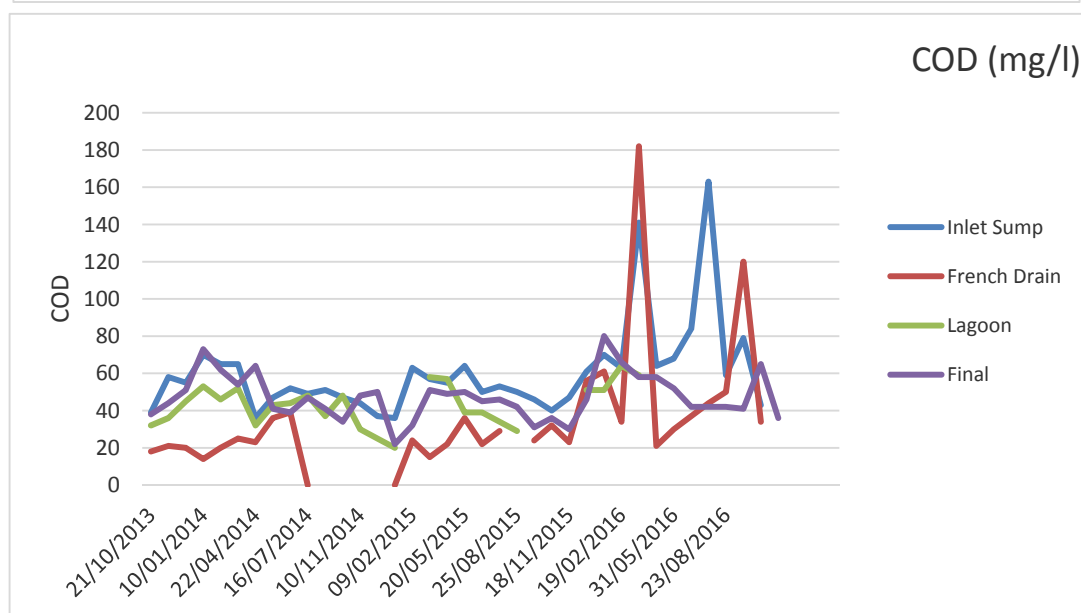
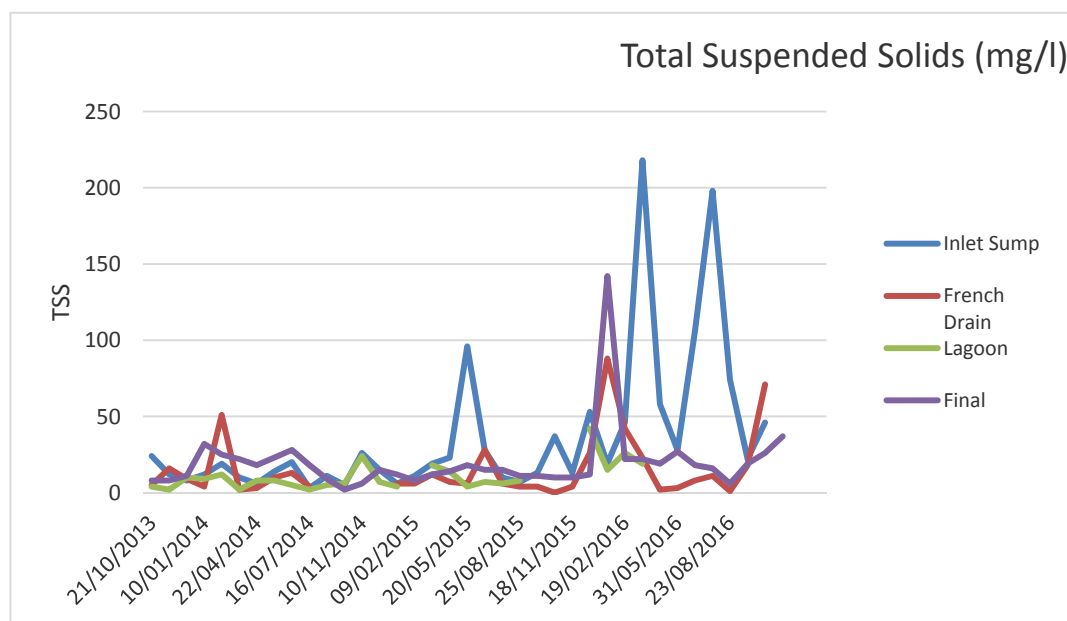
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**Appendix 5
Monitoring Data
provided by Leachate
Treatment Plant
Operator**

Report Number 1551r1v1d0117







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