Technical Note

TO	Gideon Jones, WSP	**FROM**	Natalie Jones, WSP
DATE	**18 July 2023**	**CONFIDENTIALITY**	**Internal**
SUBJECT	**Groundwater Inflow Assessment for Ewenny Road, Maesteg**		

INTRODUCTION

The enclosed technical note provides a groundwater inflow assessment and water quality assessment to support a proposed residential development at Ewenny Road, Maesteg (the site, as shown in **Figure 1**).

Figure 1: Site Location Plan. Taken from: 'Ewenny Road Adit Intrusive Investigation: Outline Methodology CA APP-003129 / Adit Reference: 286190-003'.

Background

A former mine adit is known to be buried within the site boundary (as shown on **Figure 1** and **Figure 2**). The precise location and condition of this adit is unknown; albeit this information is essential to determine whether remedial works are required to manage future long-term liabilities, whilst maximising future development potential of the site. It has been proposed for an area of site to be excavated to allow for identification, inspection, and monitoring of this adit. To accommodate this, a groundwater flow discharge

assessment is required to understand the groundwater inflows, quality and the likely quantities of groundwater that will need to be dewatered for the excavation works and abstraction licence application.

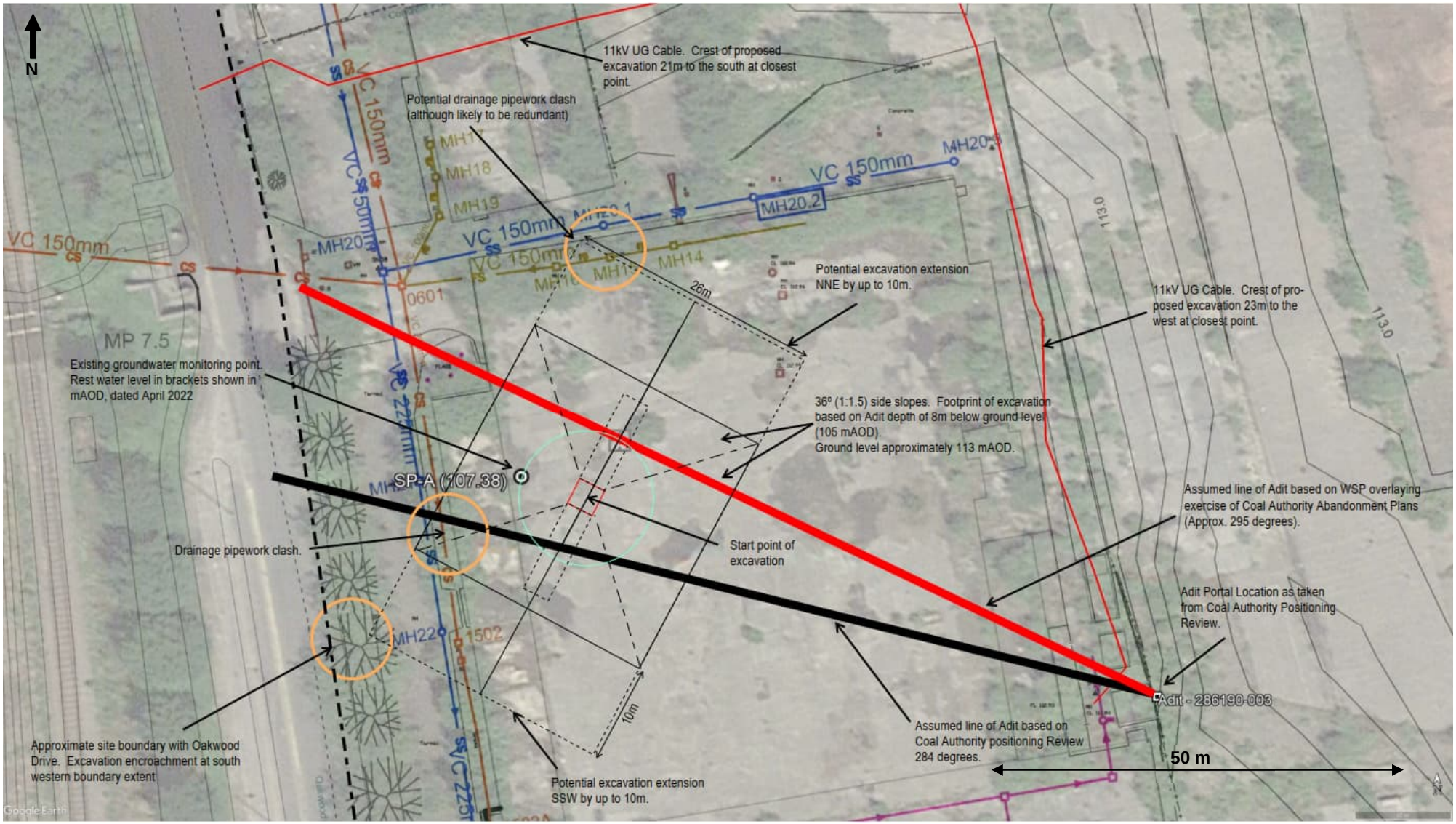
Proposed Excavation

It is proposed that an area of 26 m x 26 m (which could be increased to 26 m x 46 m should there be difficulties locating the adit) is excavated to an approximate depth of 8 metres below ground level (m bgl) to a base level of 105 metres above Ordnance Datum (m AOD). The proposed excavation extent relative to the potential location of the adit is shown on **Figure 2**.

Proposed Discharge of Groundwater

It is proposed that any pumped groundwater from the excavation would be discharged via soakaway. The intention being to offer an attenuation route before the groundwater, ultimately discharges into Llynfi River downstream.

Figure 2: Plan of Proposed Excavation. Taken from: 'Ewenny Road Adit Intrusive Investigation: Outline Methodology CA APP-003129 / Adit Reference: 286190-003'.



Temporary Discharge License

Under National Resource Wales (NRW) policy guidance, a temporary abstraction license is required to support dewatering during the excavation works. A temporary discharge license may also be required to facilitate the discharge of the abstracted water to a nearby watercourse. The findings from the groundwater inflow assessment, alongside the findings from a supplementary water quality assessment (also enclosed), will help assist with these licence applications.

Scope of Works

To address the above, the scope of works comprises the following:

- A review of the site hydrogeological conceptual model in relation to the proposed excavation.
- This includes a review of falling and rising head test data that was undertaken at the site in June 2023.
- A groundwater flow discharge assessment; and,
- A water quality assessment for a groundwater sample obtained from a borehole within the proposed excavation area in June 2023.
-

HYDROGEOLOGICAL CONCEPTUAL MODEL

Geology and Aquifers

The site geology, along with the associated Aquifer designations, is summarised in **Table 1**. Based on the information provided in **Figure 2** and **Table 1**, the proposed excavation will cut into the Made Ground and superficial deposits (comprising mainly alluvium overlaying glacial till). The excavation is unlikely to intercept the underlying bedrock.

Table 1: Summary of Ground Conditions

Strata	Description	Thickness (m)	Aquifer Designation
Made Ground (based on the 2017 ground investigation findings[1])			
Reinforced concrete / tarmac	Grey concrete with steel rebar or black tarmac, above a sandy GRAVEL limestone or mudstone aggregate.	0.2 – 1.6	n/a
Sand / Gravel	Variable dark grey to brown silty gravelly SAND, or silty sandy GRAVEL, with ash and cobbles. Gravel is generally mudstone, siltstone and coal with occasional brick, concrete, slag, ceramic and glass (mainly colliery spoil). The deposits have created several seepage locations around the site.	5.35 – 11.55*	n/a
Superficial Deposits (based on the 2017 ground investigation findings[1])			
Alluvium	Brownish grey sandy SILT with an organic odour and occasional rootlets. The alluvium approximately follows the course of the Llynfi River.	0.8 – 2.5	Secondary A

[1] Opus International Consultants (UK) Ltd. Pontardawe Coal and Metals Company Ltd. Geo-Environmental Investigation Report. Ewenny Road, Maestag. December 2017.

Strata	Description	Thickness (m)	Aquifer Designation
Glacial Till / Valley Gravels	Grey to brown silty sandy GRAVEL, or silty gravelly SAND, with cobbles. Gravel and cobbles are generally subrounded to rounded sandstone, mudstone, and siltstone.	2.8 – 9.1*	Secondary Undifferentiated
Bedrock (not encountered during 2017 ground investigation; information based on British Geological Survey[2])			
South Wales Middle Coal Measures Formation	Grey, (productive) coal-bearing mudstones/siltstones, with seatearths and minor sandstones. Several coal seams are present within this bedrock sequence, including the Pentre, Eighteen Inch, Caedefid, Upper Four Foot, Lower Four Feet, Six Feet, and Lower Nine Feet seams. The 1:50,000 scale map indicates that the Caedefid seam outcrops across the centre of the site from east to west. The coal seams are dipping northeast to southwest in proximity to the site.	120 - 240	Secondary A

*Unproven thickness

Groundwater Elevation and Flow Direction

The direction of groundwater flow is expected to be primarily west to east across the site towards the Llynfi River. During the 2017 ground investigation undertaken by Opus International Consultants (UK) Ltd., groundwater was encountered in six boreholes at elevations of between approximately 105 metres above ordnance datum (m AOD) and 109m AOD, within both the Made Ground and superficial deposits.

More recent groundwater levels from April 2022 and June 2023 have been obtained from SP-A (the closest borehole to the proposed excavation, as shown in **Figure 2**). Groundwater level varied between 106.87m AOD (June 2023) and 107.38m AOD (April 2022).

Permeability Testing

During June 2023, three falling and three rising head tests were conducted at the historic SP-A borehole (see Figure 2) to determine the hydraulic conductivity of the superficial deposits within the vicinity of the proposed excavation. Calculated hydraulic conductivity values ranged between 7.93E-06 m/s and 2.37E-05 m/s, with a geometric mean of 1.35E-05 m/s. The calculation sheets and outputs are provided in **Appendix A**. The calculated values are consistent with those reported previously in the 2017 ground investigation report[1], in which hydraulic conductivity values were calculated between 2.0E-05 m/s and 2.6E-05 m/s (based on soakaway tests).

[2] https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.251720777.1137925435.1688545092-1614092277.1688545091 [accessed 04/07/2023]

GROUNDWATER FLOW DISCHARGE ASSESSMENT

Methodology

The equation utilised to calculate potential discharge from a cutting is based on an expansion of the Sichardt equation which incorporates volumetric flow and the length of the cut section. The cut section in this case is each side of the excavation which cuts below the water table. The equation is as follows:

$$Q = ((0.73 + (0.27 * P / H)) * (k * (x*4) * ((H^2) – (h^2))) / L)$$

Where:

P = Penetration below original water table (m)

H = Initial piezometric level (m)

k = Assigned permeability based on site information (m/s)

x = Linear length of cutting/side of excavation (m)

h = Piezometric level (drawn down) (m)

L = Distance of influence (m) (derived using Sichardt equation, with an empirical calibration factor of 2000)

The calculation assumptions and limitations are presented in **Appendix B**.

Input Parameters

Table 2 summarises the relevant input parameters used for the groundwater discharge calculation. There are several limitations in the available data. A full brief of limitations and assumptions can be found in **Appendix B**.

Table 2: Calculation Data Inputs and Sources

DESCRIPTION	VALUE	SOURCE
Cutting/excavation horizontal length (m)	17.2	Based on a 1:1.5 slope and an excavation depth of 8m bgl (taken from the outline methodology for the excavation in 'Ewenny Road Adit Intrusive Investigation: Outline Methodology CA APP-003129 / Adit Reference: 286190-003'). The calculation uses the maximum reported groundwater level at SP-A, which calculates the saturated slope length as being 4.32m. The number given is the total horizontal length of the sides of the excavation which are below the water table i.e., though which water can infiltrate.
Ground level (m AOD)	113	Based on topographic data for the site. Ground level is relatively flat along the excavation extent.
Groundwater level (m AOD)	107.38	Recorded groundwater level has varied widely at SP-A. The worst-case (i.e., highest recorded) groundwater level has been taken as a conservative measure.
Cutting base elevation (m AOD)	105	Based on the estimated depth (8 m bgl) of the buried mine adit.
Estimated total drawdown (m)	2.38	Groundwater level minus base elevation of the excavation.

Description	Value	Source
Aquifer base elevation (m AOD)	76.8 m AOD (96 m AOD - *20%)*	Taken as the maximum base of the superficial deposits as reported in the 2017 ground investigation[1]. Note that this approach has limitations in that the base elevation of the superficial deposits was not proven during the ground investigation and therefore 96m AOD is the minimum base elevation. Therefore, based on professional judgment, 20% has been subtracted from the site value to provide a conservative value. To account for the uncertainty, a less conservative flow rate has also been calculated using the original value.
Assigned permeability (m/s)	1.35E-05	Calculated geometric mean from falling and rising head test data (SP-A, June 2023)
Calculated radius of influence (m)	17.49	Derived from Sichardt equation, using an empirical calibration factor (C) of 2000.

Calculated Flow Rates

The calculated rates of flow are presented in **Table 3**. The full calculation spreadsheet is presented in **Appendix C**.

Table 3: Calculated Flow Discharge

Calculated Flow Rates (Q)	
l/s	0.5 to 1.4
m^3/s	0.000509 to 0.00140
m^3/d	44.0 to 121.1

Summary of dewatering assessment

To summarise, the calculated inflow rates for when the excavation is fully excavated are between 0.5 and 1.4 l/s. The calculated radius of influence (based on the maximum inflow rate estimate of 1.4 l/s) is 17.5 m.

Although a detailed, formal assessment of impacts to nearby groundwater receptors has not been undertaken, given this relatively short distance, it is considered unlikely that there will be any physical groundwater-related environmental impacts to nearby receptors due to the proposed dewatering works.

WATER QUALITY ASSESSMENT

Guidance

This section presents a preliminary generic Controlled Waters risk assessment. The assessment has been undertaken in accordance with:

- Environment Agency 2020 Land Contamination Risk Management (LCRM).
- The 'prevent and limit' approach of the Water Framework Directive 2015 (2000/60.EC).
- Environment Agency 2011 Annex J Groundwater guidance (technical annex to H1 Environmental Risk Assessment framework).
- Environment Agency 2006 Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination.

Groundwater Sample and Chemical Testing

A groundwater sample was obtained from SP-A during June 2023 and tested for petroleum hydrocarbons, polyaromatic hydrocarbons, polychlorinated biphenyls (PCB), phenols, volatile organic compounds (VOC), heavy metals, and several inorganic analytes. Testing was undertaken at an accredited laboratory, ALS UK Ltd. The laboratory certificates are provided in **Appendix D**. Groundwater Screening Sheets are presented in **Appendix E**.

- **Methodology and Conceptualisation**

The enclosed risk assessment compares directly measured groundwater concentrations from SP-A with standard assessment criteria, relevant to the identified Plausible Contaminant Linkages (PCL's) onsite. When considering the temporary groundwater discharge license, the following PCL's have been identified:

- PCL 1: Potential for contaminants to migrate vertically from the base of the proposed soakaway system and impact the underlying secondary A aquifers (alluvium and potentially also Middle Coal Measures, however the low permeability till provide is likely to providing some protection for this).
- PCL 2: Lateral migration of the contaminants through the saturated zone and into theLlynfi River.

Considering the above, the following assessment criteria have been used in the assessment:

- PCL 1: UK Drinking Water Standards (UK DWS) / World Health Organisation (WHO) guideline values.
- PCL 2: Environmental Quality Standards (EQS).

Assessment Results

Drinking Water Receptor (PCL 3)

Reported concentrations of three analytes exceed their respective DWS / WHO guideline values. These are presented and discussed in **Table 4**.

Table 4: Drinking Water: Reported Exceedances of DWS/WHO in SP-A Groundwater Sample (µg/l)

ANALYTE	DWS / WHO	GROUNDWATER CONCENTRATION	COMMENTS
Aromatic C16-C21	90 (WHO 2008)	440	Aromatic C16-C21 has a low mobility in groundwater (CL:AIRE 2017) so when considering contaminant travel times and degradation, this analyte does not need to be considered further in relation to risk to the Secondary Aquifers.

Analyte	DWS / WHO	Groundwater Concentration	Comments
Aromatic C21-C35	90 (WHO 2008)	4,530	Aromatic C21-C35 has a very low mobility in groundwater (CL:AIRE 2017) so when considering contaminant travel times and degradation, this analyte does not need to be considered further in relation to risk to the Secondary Aquifers.
Manganese	50 (UK DWS)	1,060	Giving the mining history of the site, the reported manganese concentration is likely to be representative of background concentrations and therefore does not need to be considered further.

Surface Water Receptor (PCL 2)

Reported concentrations of six analytes exceed their respective EQS. These are presented and discussed in **Table 5**.

Table 5: Surface Water: Reported Exceedances of EQS in SP-A Groundwater Sample (µg/l)

Analyte	EQS	Groundwater Concentration	Comments
Aromatic C16-C21	0.1 (CL:AIRE 2017)	440	Reported concentrations are orders of magnitude above their respective guideline values.
Aromatic C21-C35	0.0002 (CL:AIRE 2017)	4,530	
Manganese	123 (EQS 2015 – bioavailable)	1,060	Giving the mining history of the site, the reported manganese, nickel, and zinc concentration is likely to be representative of background concentrations and therefore does not need to be considered further.
Nickel	4 (EQS 2015 – bioavailable)	4.86	
Zinc	10.9 (EQS 2015 – bioavailable)	12.9	
Fluoranthene	0.006 (EQS 2015)	0.34	The reported concentration is orders of magnitude above the respective guideline values.

CONCLUSIONS

Groundwater Discharge

To conclude:

- The proposed excavation will partially cut into the superficial deposits (anticipated to comprise alluvium and glacial till).
- The maximum likely discharge during peak groundwater levels is calculated to be approximately between and 44 m^3/d and 121 m^3/d.
- The radius of influence from the discharge is estimated to be relatively small (approximately 17.5 m). No groundwater dependant receptors should be affected.

Water Quality

To conclude:

- Reported petroleum and polyaromatic hydrocarbons, as well as heavy metals concentrations have been reported above their respective EQS and DWS in the groundwater sample obtained at SP-A.
- The reported heavy metal concentrations (specifically manganese, nickel, and zinc) are indicative of mining conditions and have been considered as being reflective of background concentrations.
- It should be noted that these conclusions are based on one groundwater sample only and the following limitations apply:
- The borehole construction/slotted screen lengths and targeted layers/aquifers are not confirmed and are inferred, meaning it is not known with certainty which aquifer unit the water was drawn from; and,
- The groundwater sample only represents a 'snapshot' of time and cannot demonstrate longer-term contaminant trends.
-

RECOMMENDATIONS

It is recommended that further groundwater and surface water characterisation is undertaken. This should include:

- Obtaining an upstream, midstream and downgradient surface water sample from the Llynfi River and analysing the samples for heavy metals, hydrocarbons and miscellaneous inorganics (pH, dissolved organic carbon and dissolved calcium). This would allow assessment of the background water quality of the likely ultimate receiving waters. It would also be prudent to obtain sample descriptions and photographs of the river.
- Obtaining a further groundwater sample from SP-A (using low-flow techniques this time), and analysing the sample for the same chemical suite as previous. In-situ parameters (specifically dissolved oxygen, pH, oxidation reduction potential and suspended solids) and groundwater level data should be collected during sampling.
- A site walkover should be completed to find any other serviceable boreholes. If reasonably practicable, a groundwater sample should be obtained from identified locations and analysed for the same chemical suite as SP-A. In-situ parameters (specifically dissolved oxygen, pH, oxidation reduction potential and suspended solids) and groundwater level data should be collected during sampling.
- The results from the recommended investigation should be used to update this technical note and be shared with NRW to inform future works. A discussion between the Client and relevant regulators is considered prudent to assess groundwater disposal options.

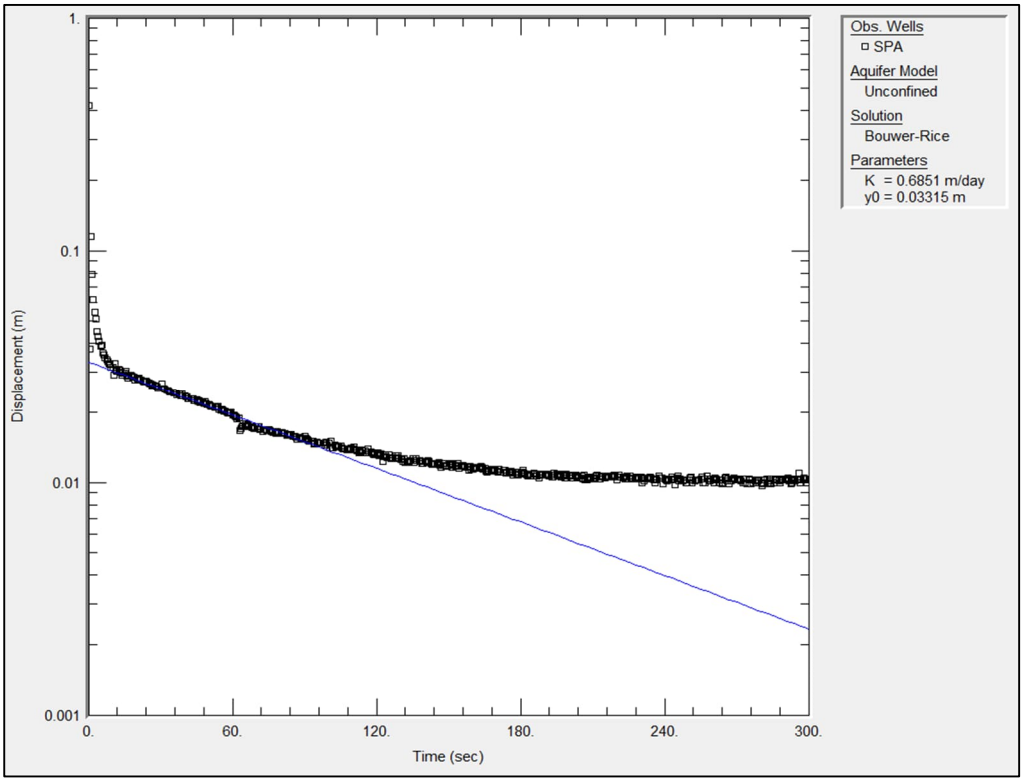
During the proposed excavation works it is recommended that:

- Human health risks to construction workers involved in the proposed excavation works should be readily mitigated by hazard and risk assessment, which will inform the identification of suitable work practices and personal protective equipment.
- If any unexpected contamination is encountered, works should be stopped immediately, and offsite disposal / treatment options should be discussed with the Client and relevant regulators.

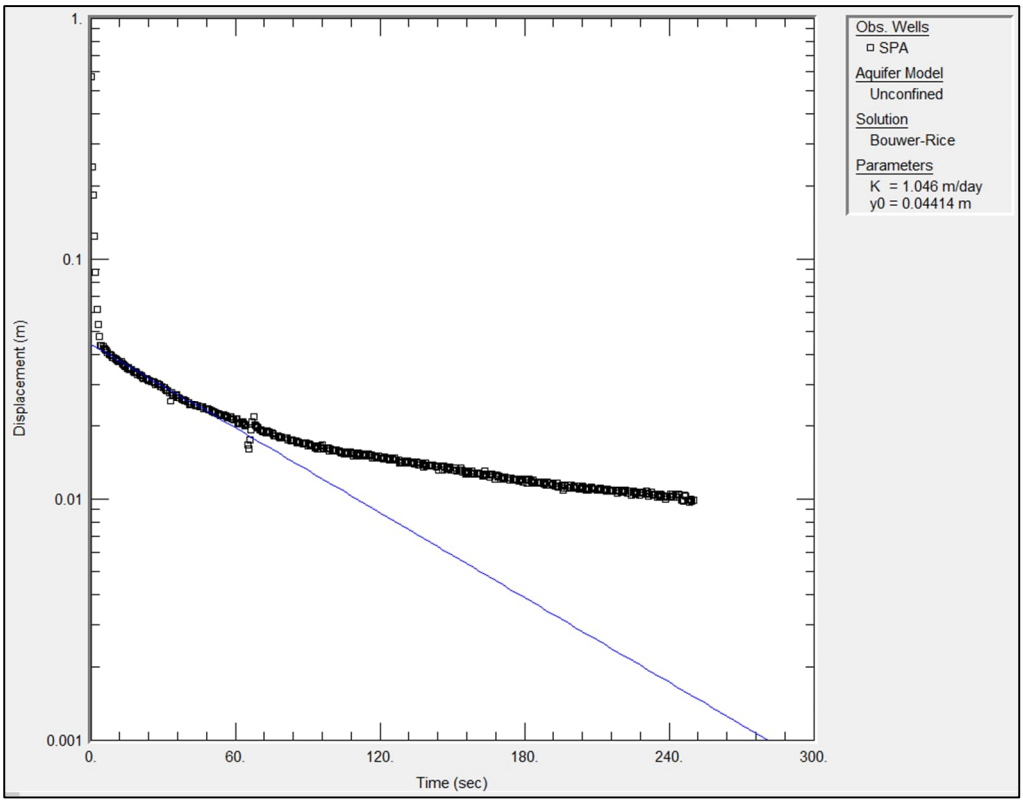
- Groundwater samples should be obtained during dewatering activities onsite to assess and confirm groundwater quality through the course of the works.
- Visual / olfactory observations from the groundwater should also be made during the dewatering activities.

APPENDIX A – FALLING AND RISING HEAD ANALYSIS

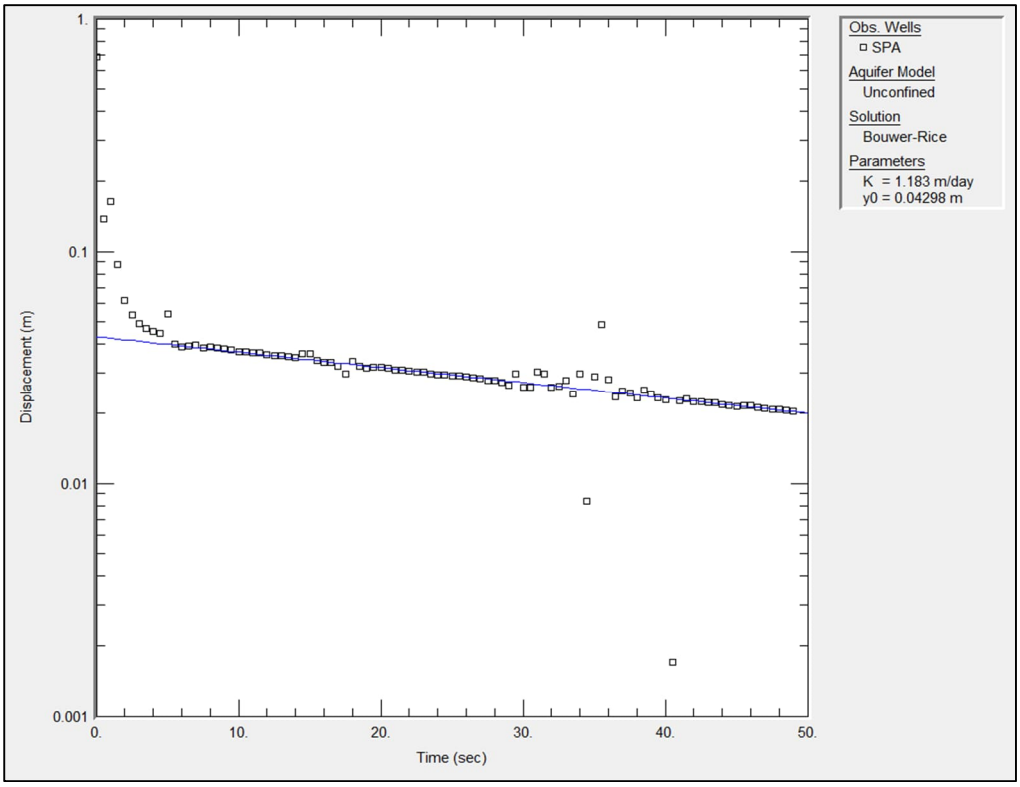
Falling Head Test 1



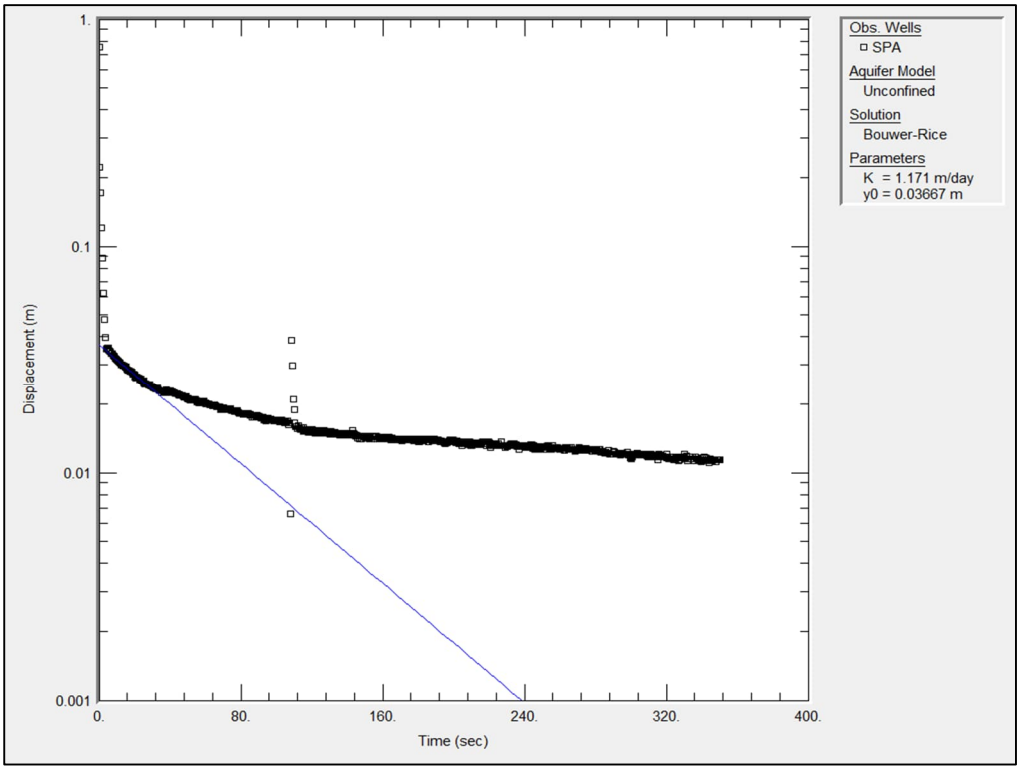
Rising Head Test 1



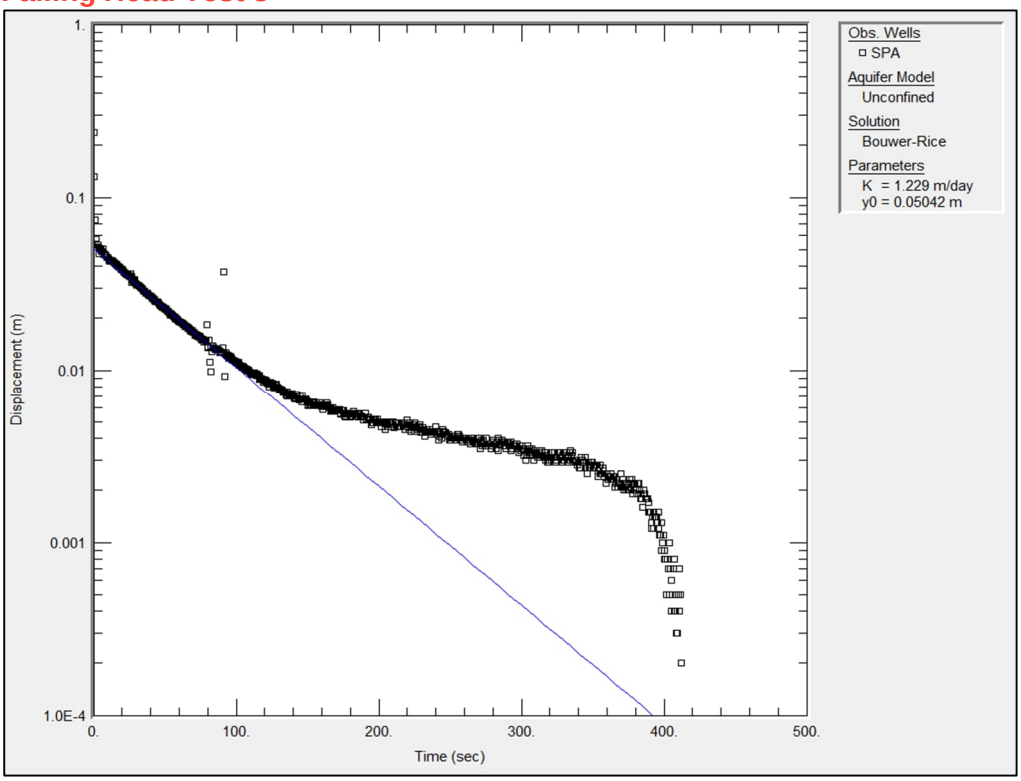
Falling Head Test 2



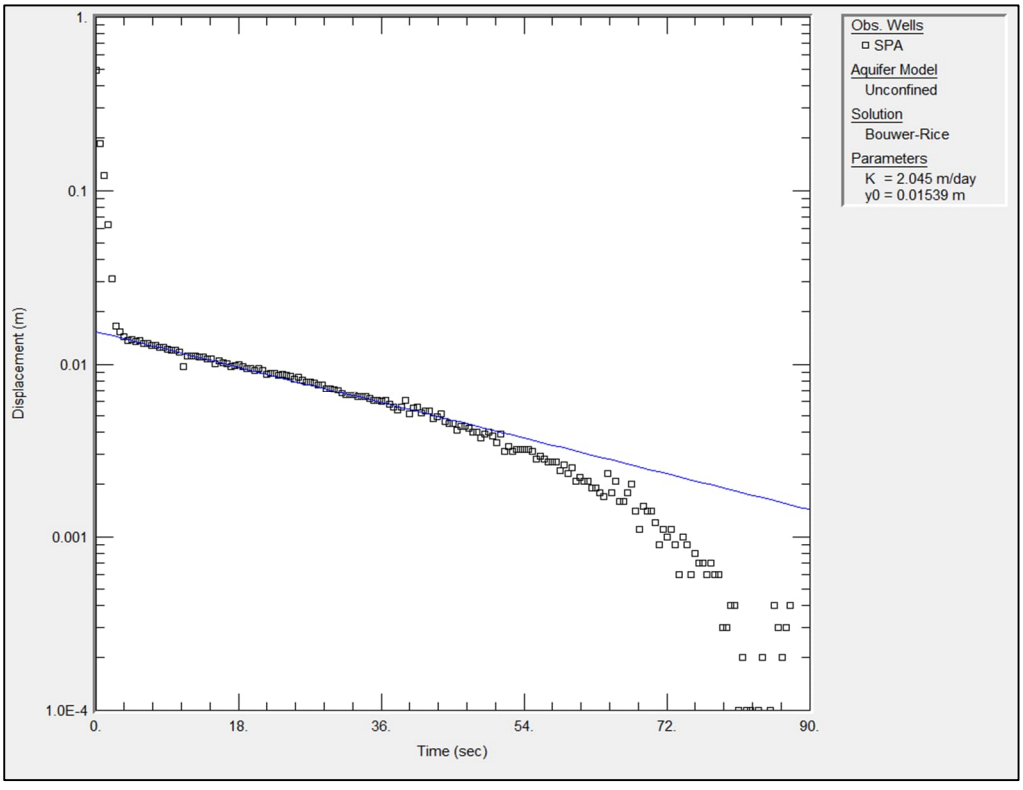
Rising Head Test 2



Falling Head Test 3



Rising Head Test 3



APPENDIX B – CALCULATION ASSUMPTIONS AND LIMITATIONS

The following assumptions apply to the Sichardt Equation (CIRIA 750) and calculations:

- Aquifer is unconfined.
- Aquifer has an infinite areal extent.
- Aquifer is homogenous, isotropic and of uniform thickness.
- Initial water table is homogenous.
- Lo is obtained using the Sichardt formula, taking C as between 1500 - 2000, the default value for C used in this spreadsheet is 2000. However, in high permeability soils where very large values of Lo are calculated, caution is needed. Chapmans equations were developed for ratios L0/H of <5 and may not be suitable for application where Lo is very large; flow rates may be significantly underestimated.
- The excavation is only partial penetrating the unconfined aquifer below the original water table.
- Aquifer thickness was not proven in the 2017 ground investigation. A value that best represents conditions on site, based on experience and judgement, has been applied.
- The equation assumes that the impact from dewatering affects the full aquifer thickness. In reality a minor excavation (i.e. 8m into a 20m+ thick aquifer) is unlikely to impact the full aquifer depth beneath the base of the excavation. In a deep or thick aquifer and for anisotropic conditions where Kv<Kh the influence of partial penetration on the yield of a well (or excavation) is likely to be significantly diminished. This is not considered in the equation adopted.
- Permeability may vary along the excavation i.e. variable lithologies and variations in measured values may occur and there may not be fully represented by available data or the simplified approach to estimate discharge.

APPENDIX C – GROUNDWATER DISCHARGE CALCULATION SHEET

CALCULATION SHEET
(Identifies changes to hard data for process of interpretation)

Project
Date Created
Author
Purpose

DATA SOURCES

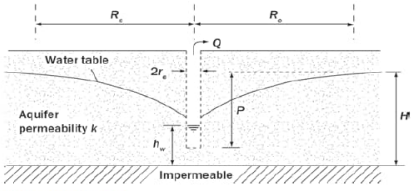
\\uk.wspgroup.com\central data\Projects\62240xxx\62240527 - A9 Dualling Tomatin to Moy\Groundwater\Discharge Assessments\2019 Assesments\Assessments\Calc sheet template

SHEET INFORMATION

Sichardt Eq.
C - empirical calibration factor
H - initial piezometric head (m)
h_w - drawdown head (m)
R_0- radius of influence
k - aquifer permeability (m/s)

Radial flow: $R_o = C(H - h_w)\sqrt{(k)}$

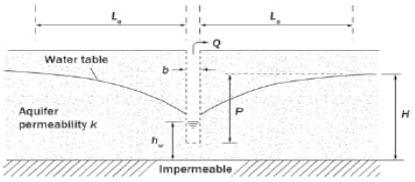
if H, h_w and k are in meters and m/s respectively, to obtain R_0 in meters C is usually taken as 3000



b) Unconfined aquifer

Dewatering Trench 2 sides (unconfined aquifer)
P - penetration below the original water table (m)
x - linear length of cut (m)
L_0 - distance of influence
(*L_0 can be obtained using Sichardts formula taking C as between 1500 - 2000)*

$$Q_{2P} = \left[0.73 + 0.27\frac{P}{H}\right]\frac{kx\left(H^2 - h_w^2\right)}{L_o}$$



b) Unconfined aquifer

ADDITIONAL COMMENTS

Following assumptions apply to the Sichardt Eq (CIRIA 750):
- aquifer is unconfined
- aquifer is infinite areal extent
- aquifer is homogenous, isotrophic and of uniform thickness

Following assumptions/limitations apply to the equation used to determine dewatering volume (trench 2 sides (UC) CIRIA 750):
- aquifer is unconfined
- initial water table is horizontal
- aquifer is homogenous, isotrophic and of uniform thickness
- L_o is obtained using Sichardts formula, taking C as between 1500 - 2000, the default value for C used in this spreadsheet is 2000. However, in high permeability soils where very large values of L_o are calculated, caution is needed. Chapmans equations were developed for ratios L_0/H of <5 and may not be suitable for application where L_o is very large; flow rates may be significantly underestimated (CIRIA 750 Box 6-1 Sensitivity and parametric analysis) could be used to demonstrate these uncertainties (see row 38 of flow rate calc tab) .
- cuttings are only partial penetrating the unconfined aquifer below the original water table
- calculation assumes the cut area is completely dewatered
- recorded groundwater level (for a GI location) is assumed to be the original water table
- Aquifer thickness may not have been proven in GI. If this is the case, a value that best represents conditions on site, based on experience and judgement, will be applied
- The equation assumes that the impact from dewatering impacts the full aquifer thickness when in reality a minor cut (i.e. 5m into a 30m thick aquifer) will not impact the saturation zone beneath the base of the cut. In a deep or thick aquifer and for anisotropic conditions where Kv<Kh the influence of partial penetration on the yield of a well (or cut) is likely to be significantly diminished. This is not considered in the equation adopted.
- Permeability may vary across the cut i.e. variable lithologies and variations in measured values may be because of limitations in test techniques undertaken during the GI and results may not reflect the properties of the ground across the cut. This is overcome by comparing the permeability results with approximate permeability values at alternate GI locations. Alternatively, discretised analyses could be performed to represent such variations along the length of the cut.

CREATED BY: Melanie Cross / John Chapman DATE: 01/11/2019 COMMENTS:

CHECKED BY: Angelo Papaioannou / Thomas Eckhardt DATE: 01/11/2019

Assesment Generated Cutting No.			
Road description (i.e. Main road, sliproad, side road)			
Comment			
Chainage FROM			
TO			
Cutting Length	x	(m)	17.28
Ground level		(mAOD)	113.00
Original Piezometric Elevation - maximum recorded	EH	(mAOD)	107.38
Original Piezometric Elevation (+1m)		(mAOD)	**108.38**
Original Piezometric Elevation (-1m)		(mAOD)	**106.38**
Original Piezometric Head	H	(m)	30.58
Assumed Piezometric Head (at borehole)	h_w	(m)	28.20
Approximate max cutting depth		(m)	8.00
Cutting Base Elevation		(mAOD)	105.00
Aquifer Base Elevation		(mAOD)	76.80
Strata (BGS mapping)			Superficial Deposits
Stata from GI boreholes			Superficial Deposits
Estimated Drawdown based on interpolated Dec 2016 water levels (m)	P	m	2.38
Sensitivity +1m drawdown	P	m	**3.38**
Sensitivity -1m drawdown	P	m	**1.38**
Assigned permeability (based on GI and BGS info)	k	(m/s)	
Tested permeability value (GI investigation) (m/s)			1.35E-05
Radius of influence (m) Sichardt, C=2000	2000		**17.49**
Assigned permeability (based on GI and BGS info)	k	m/s	1.35E-05
Tested permeability value (GI investigation) (m/s)			1.35E-05
Penetration below original water table	P	m	**2.38**
Penetration below original water table (sens +1m)	P	m	**3.38**
Penetration below original water table (sens -1m)	P	m	**1.38**
Linear length	x	m	17.28
Original Piezometric Head	H	m	30.6
Original Piezometric Head (sens +1m)	H	m	**31.6**
Original Piezometric Head (sens -1m)	H	m	**29.6**
Assumed Piezometric level	h_w	m	28.20
Distance of influence	L_0	m	17.5
Distance of Influence (sens +1m)	L_0	m	**24.8**
Distance of Influence (sens -1m)	L_0	m	**10.1**
Empirical calibratrion factor	C		2000
check L_0/H <5.0	L_0/H	<5.0	0.57
Flow rate (assumed 4 sides of excavation)	Q	m^3/s	**0.001401**
		m^3/d	**121.1**
		L/s	**1.4**
Flow rate (sens +1m)	Q	m^3/s	
Flow rate (sens -1m)	Q	m^3/s	**0.001**

APPENDIX D – LABORATORY CERTIFICATE

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

WSP UK Limited
8 First Street
Manchester
Lancashire
M15 4RP

Attention: Zac Krips

CERTIFICATE OF ANALYSIS

Date of report Generation:	27 June 2023
Customer:	WSP UK Limited
Sample Delivery Group (SDG):	230617-60
Your Reference:	70090113-702
Location:	Ewenny Road
Report No:	693934
Order Number:	70090113-703

This report has been revised and directly supersedes 693654 in its entirety.

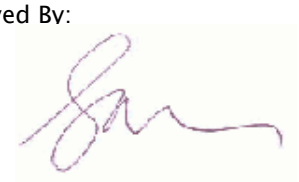
We received 1 sample on Friday June 16, 2023 and 1 of these samples were scheduled for analysis which was completed on Tuesday June 27, 2023. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

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

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

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

Approved By:



Sonia McWhan
Operations Manager

1291

CERTIFICATE OF ANALYSIS

SDG: 230617-60 **Report Number:** 693934 **Superseded Report:** 693654
Client Ref.: 70090113-702 **Location:** Ewenny Road

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
28170910	SPA	EW	0.00 - 0.00	14/06/2023

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

Validated

CERTIFICATE OF ANALYSIS

SDG: 230617-60 **Report Number:** 693934 **Superseded Report:** 693654
Client Ref.: 70090113-702 **Location:** Ewenny Road

Results Legend
X Test
N No Determination Possible

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

Lab Sample No(s)			28170910							
Customer Sample Reference			SPA							
AGS Reference			EW							
Depth (m)			0.00 - 0.00							
Container			0.5l glass bottle (ALE227)	250ml Amber Gl. PTFE/PE	330ml plastic bottle (ALE503)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)
Sample Type			GW	GW	GW	GW	GW	GW	GW
Anions by Kone (w)	All	NDPs: 0 Tests: 1			X				
Cyanide Comp/Free/Total/Thiocyanate	All	NDPs: 0 Tests: 1						X	
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 1					X		
EPH CWG (Aliphatic) Aqueous GC (W)	All	NDPs: 0 Tests: 1		X					
EPH CWG (Aromatic) Aqueous GC (W)	All	NDPs: 0 Tests: 1		X					
Ferric Iron	All	NDPs: 0 Tests: 1			X				
Ferrous Iron	All	NDPs: 0 Tests: 1			X				
GRO by GC-FID (W)	All	NDPs: 0 Tests: 1							X
Mercury Dissolved	All	NDPs: 0 Tests: 1					X		
PAH Spec MS - Aqueous (W)	All	NDPs: 0 Tests: 1		X					
PCB Congeners - Aqueous (W)	All	NDPs: 0 Tests: 1		X					
pH Value	All	NDPs: 0 Tests: 1			X				
Phenols by HPLC (W)	All	NDPs: 0 Tests: 1				X			
Total Metals by ICP-MS	All	NDPs: 0 Tests: 1			X				
TPH CWG (W)	All	NDPs: 0 Tests: 1	X						

Validated

CERTIFICATE OF ANALYSIS

SDG: 230617-60 **Report Number:** 693934 **Superseded Report:** 693654
Client Ref.: 70090113-702 **Location:** Ewenny Road

Results Legend

X Test

N No Determination Possible

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

	Lab Sample No(s)		28170910						
	Customer Sample Reference		SPA						
	AGS Reference		EW						
	Depth (m)		0.00 - 0.00						
	Container		0.5l glass bottle (ALE227)	250ml Amber Gl. PTFE/PE	330ml plastic bottle (ALE503)	H2SO4 (ALE244)	HNO3 Filtered (ALE204)	NaOH (ALE245)	Vial (ALE297)
	Sample Type		GW	GW	GW	GW	GW	GW	GW
VOC MS (W)	All	NDPs: 0 Tests: 1							X

CERTIFICATE OF ANALYSIS

SDG: 230617-60 **Report Number:** 693934 **Superseded Report:** 693654
Client Ref.: 70090113-702 **Location:** Ewenny Road

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

Component	LOD/Units	Method	Customer Sample Ref.					
			Depth (m)					
			Sample Type					
			Date Sampled					
			Sampled Time					
			Date Received					
			SDG Ref					
			Lab Sample No.(s)					
			AGS Reference					

11:57:11 27/06/2023

			SPA 0.00 - 0.00 Ground Water (GW) 14/06/2023 . 16/06/2023 230617-60 28170910 EW
Iron, Ferric	<50 µg/l	TM125	<50
Iron, Ferrous	<100 µg/l	TM125	<100 2 #
Arsenic (diss.filt)	<0.5 µg/l	TM152	<0.5 #
Boron (diss.filt)	<10 µg/l	TM152	32.4 #
Cadmium (diss.filt)	<0.08 µg/l	TM152	<0.08 #
Chromium (diss.filt)	<1 µg/l	TM152	<1 #
Copper (diss.filt)	<0.3 µg/l	TM152	<0.3 #
Manganese (tot.unfilt)	<1 µg/l	TM152	16400 2 #
Lead (diss.filt)	<0.2 µg/l	TM152	<0.2 #
Manganese (diss.filt)	<3 µg/l	TM152	1060 #
Nickel (diss.filt)	<0.4 µg/l	TM152	4.86 #
Selenium (diss.filt)	<1 µg/l	TM152	<1 #
Zinc (diss.filt)	<1 µg/l	TM152	12.9 #
Iron (Dis.Filt)	<19 µg/l	TM152	<19 #
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01 #
Sulphate	<2000 µg/l	TM184	29600 #
PCB congener 28	<0.015 µg/l	TM197	<0.075
PCB congener 52	<0.015 µg/l	TM197	<0.075
PCB congener 101	<0.015 µg/l	TM197	<0.075
PCB congener 118	<0.015 µg/l	TM197	<0.075
PCB congener 138	<0.015 µg/l	TM197	<0.075
PCB congener 153	<0.015 µg/l	TM197	<0.075
PCB congener 180	<0.015 µg/l	TM197	<0.075
Sum of detected EC7 PCB's	<0.105 µg/l	TM197	<0.525
PCB congener 77	<0.015 µg/l	TM197	<0.075
PCB congener 81	<0.015 µg/l	TM197	<0.075
PCB congener 105	<0.015 µg/l	TM197	<0.075
PCB congener 114	<0.015 µg/l	TM197	<0.075
PCB congener 123	<0.015 µg/l	TM197	<0.075
PCB congener 126	<0.015 µg/l	TM197	<0.075
PCB congener 156	<0.015 µg/l	TM197	<0.075
PCB congener 157	<0.015 µg/l	TM197	<0.075

			SPA 0.00 - 0.00 Ground Water (GW) 14/06/2023 . 16/06/2023 230617-60 28170910 EW
PCB congener 167	<0.015 µg/l	TM197	<0.075
PCB congener 169	<0.015 µg/l	TM197	<0.075
PCB congener 189	<0.015 µg/l	TM197	<0.075
Cyanide, Total	<50 µg/l	TM227	<50 #
pH	<1 pH Units	TM256	6.49 #
Alkalinity, Bicarbonate as CaCO3	<3000 µg/l	TM256	150000
Phenol	<2 µg/l	TM259	<2 #
Cresols	<6 µg/l	TM259	<6 #
Xylenols	<8 µg/l	TM259	<8 #
Phenols, Total Detected monohydric	<16 µg/l	TM259	<16 #

PAH Spec MS - Aqueous (W)

CERTIFICATE OF ANALYSIS

SDG: 230617-60 **Report Number:** 693934 **Superseded Report:** 693654
Client Ref.: 70090113-702 **Location:** Ewenny Road

PAH Spec MS - Aqueous (W)

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

Component	LOD/Units	Method	Customer Sample Ref.					
			Depth (m)					
			Sample Type					
			Date Sampled					
			Sampled Time					
			Date Received					
			SDG Ref					
			Lab Sample No.(s)					
			AGS Reference					

PAH Spec MS - Aqueous (W)

			SPA 0.00 - 0.00 Ground Water (GW) 14/06/2023 . 16/06/2023 230617-60 28170910 EW
Naphthalene (aq)	<0.01 µg/l	TM178	0.267 #
Acenaphthene (aq)	<0.005 µg/l	TM178	<0.025 #
Acenaphthylene (aq)	<0.005 µg/l	TM178	<0.025 #
Fluoranthene (aq)	<0.005 µg/l	TM178	0.34 #
Anthracene (aq)	<0.005 µg/l	TM178	<0.025 #
Phenanthrene (aq)	<0.005 µg/l	TM178	0.98 #
Fluorene (aq)	<0.005 µg/l	TM178	0.147 #
Chrysene (aq)	<0.005 µg/l	TM178	0.362 #
Pyrene (aq)	<0.005 µg/l	TM178	0.515 #
Benzo(a)anthracene (aq)	<0.005 µg/l	TM178	0.0586 #
Benzo(b)fluoranthene (aq)	<0.005 µg/l	TM178	<0.025 #
Benzo(k)fluoranthene (aq)	<0.005 µg/l	TM178	<0.025 #
Benzo(a)pyrene (aq)	<0.002 µg/l	TM178	<0.01 #
Dibenzo(a,h)anthracene (aq)	<0.005 µg/l	TM178	<0.025 #
Benzo(g,h,i)perylene (aq)	<0.005 µg/l	TM178	<0.025 #
Indeno(1,2,3-cd)pyrene (aq)	<0.005 µg/l	TM178	<0.025 #
PAH, Total Detected USEPA 16 (aq)	<0.082 µg/l	TM178	2.67 #

TPH CWG (W)

CERTIFICATE OF ANALYSIS

SDG: 230617-60 **Report Number:** 693934 **Superseded Report:** 693654
Client Ref.: 70090113-702 **Location:** Ewenny Road

TPH CWG (W)

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

Component	LOD/Units	Method	Customer Sample Ref.					
			Depth (m)					
			Sample Type					
			Date Sampled					
			Sampled Time					
			Date Received					
			SDG Ref					
			Lab Sample No.(s)					
			AGS Reference					

TPH CWG (W)

			SPA 0.00 - 0.00 Ground Water (GW) 14/06/2023 . 16/06/2023 230617-60 28170910 EW
GRO Surrogate % recovery**	% 	TM245	73
GRO >C5-C12	<50 µg/l	TM245	<50 #
Aliphatics >C5-C6	<10 µg/l	TM245	<10
Aliphatics >C6-C8	<10 µg/l	TM245	<10
Aliphatics >C8-C10	<10 µg/l	TM245	<10
Aliphatics >C10-C12	<10 µg/l	TM245	<10
Aliphatics >C12-C16 (aq)	<10 µg/l	TM174	272
Aliphatics >C16-C21 (aq)	<10 µg/l	TM174	2310
Aliphatics >C21-C35 (aq)	<10 µg/l	TM174	23100
Total Aliphatics >C12-C35 (aq)	<10 µg/l	TM174	25700
Aromatics >EC5-EC7	<10 µg/l	TM245	<10
Aromatics >EC7-EC8	<10 µg/l	TM245	<10
Aromatics >EC8-EC10	<10 µg/l	TM245	<10
Aromatics >EC10-EC12	<10 µg/l	TM245	<10
Aromatics >EC12-EC16 (aq)	<10 µg/l	TM174	<50
Aromatics >EC16-EC21 (aq)	<10 µg/l	TM174	440
Aromatics >EC21-EC35 (aq)	<10 µg/l	TM174	4530
Total Aromatics >EC12-EC35 (aq)	<10 µg/l	TM174	4970
Total Aliphatics & Aromatics >C5-35 (aq)	<10 µg/l	TM174	30700
Aliphatics >C16-C35 Aqueous	<10 µg/l	TM174	25400

VOC MS (W)

CERTIFICATE OF ANALYSIS

SDG: 230617-60 **Report Number:** 693934 **Superseded Report:** 693654
Client Ref.: 70090113-702 **Location:** Ewenny Road

VOC MS (W)

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

Component	LOD/Units	Method	Customer Sample Ref.					
			Depth (m)					
			Sample Type					
			Date Sampled					
			Sampled Time					
			Date Received					
			SDG Ref					
			Lab Sample No.(s)					
			AGS Reference					

VOC MS (W)

			SPA 0.00 - 0.00 Ground Water (GW) 14/06/2023 . 16/06/2023 230617-60 28170910 EW
Dibromofluoromethane**	%	TM208	111
Toluene-d8**	%	TM208	105
4-Bromofluorobenzene**	%	TM208	92.9
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 #

			SPA 0.00 - 0.00 Ground Water (GW) 14/06/2023 . 16/06/2023 230617-60 28170910 EW
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 #

			SPA 0.00 - 0.00 Ground Water (GW) 14/06/2023 . 16/06/2023 230617-60 28170910 EW
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1 #
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1
Sum of detected Xylenes	<2 µg/l	TM208	<2
Sum of BTEX	<5 µg/l	TM208	<5

Table of Results - Appendix

Method No	Description
TM125	Determination of Total/Ferrous Iron
TM178	Determination of Polynuclear Aromatic Hydrocarbons (PAH) by GC-MS in Waters
TM197	Determination of WHO12 and EC7 Polychlorinated Biphenyl Congeners by GC-MS in Waters
TM259	Determination of Phenols in Waters and Leachates by HPLC
TM152	Analysis of Aqueous Samples by ICP-MS
TM208	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM227	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate
TM256	Determination of pH, EC, TDS and Alkalinity in Aqueous samples
TM174	Determination of Speciated Extractable Petroleum Hydrocarbons in Waters by GC-FID
TM183	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM245	Determination of GRO by Headspace in waters

NA = not applicable.

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

CERTIFICATE OF ANALYSIS

SDG: 230617-60 **Report Number:** 693934 **Superseded Report:** 693654
Client Ref.: 70090113-702 **Location:** Ewenny Road

Test Completion Dates

Lab Sample No(s)	28170910
Customer Sample Ref.	SPA
AGS Ref.	EW
Depth	0.00 - 0.00
Type	Ground Water
Anions by Kone (w)	23-Jun-2023
Cyanide Comp/Free/Total/Thiocyanate	23-Jun-2023
Dissolved Metals by ICP-MS	23-Jun-2023
EPH CWG (Aliphatic) Aqueous GC (W)	23-Jun-2023
EPH CWG (Aromatic) Aqueous GC (W)	23-Jun-2023
Ferric Iron	24-Jun-2023
Ferrous Iron	24-Jun-2023
GRO by GC-FID (W)	19-Jun-2023
Mercury Dissolved	23-Jun-2023
PAH Spec MS - Aqueous (W)	23-Jun-2023
PCB Congeners - Aqueous (W)	23-Jun-2023
pH Value	27-Jun-2023
Phenols by HPLC (W)	23-Jun-2023
Total Metals by ICP-MS	27-Jun-2023
TPH CWG (W)	23-Jun-2023
VOC MS (W)	21-Jun-2023

CERTIFICATE OF ANALYSIS

SDG: 230617-60 **Report Number:** 693934 **Superseded Report:** 693654
Client Ref.: 70090113-702 **Location:** Ewenny Road

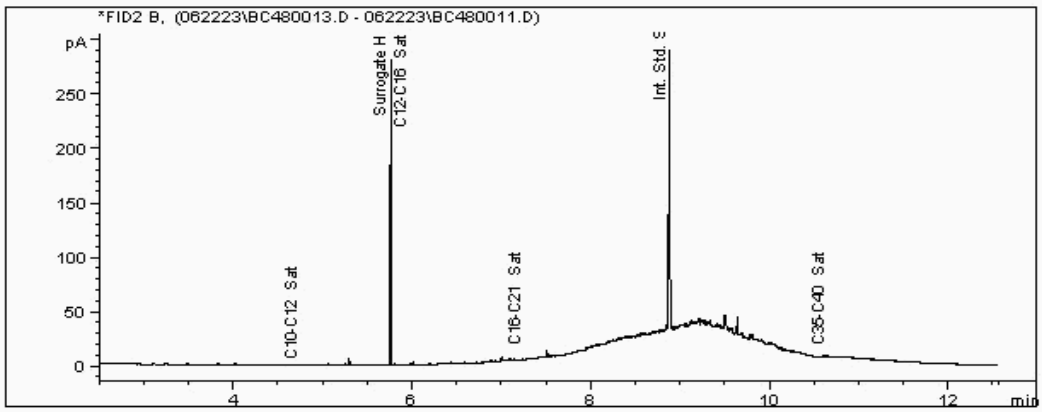
Chromatogram

Analysis: EPH CWG (Aliphatic) Aqueous GC (W) **Sample No :** 28195430 **Depth :** 0.00 - 0.00
Sample ID : SPA

Speciated TPH - SATS (C12 - C40)

Sample Identity: 26207333-
Date Acquired : 22/06/2023 22:11:20 PM
Units : ppb
Dilution :
CF : 1
Multiplier : 0.125

#	Compound Name	Main Peak Area	Amount
1	C10-C12 Sat	0.0	0.000
2	Surrogate H	189.2	1.089
3	C12-C16 Sat	51.6	0.272
4	C16-C21 Sat	441.3	2.312
5	Int. Std. S	204.1	1.250
6	C21-C35 Sat	3867.3	23.119
7	C35-C40 Sat	414.6	3.063
	Total Peak Area	5168.1	



CERTIFICATE OF ANALYSIS

SDG: 230617-60 **Report Number:** 693934 **Superseded Report:** 693654
Client Ref.: 70090113-702 **Location:** Ewenny Road

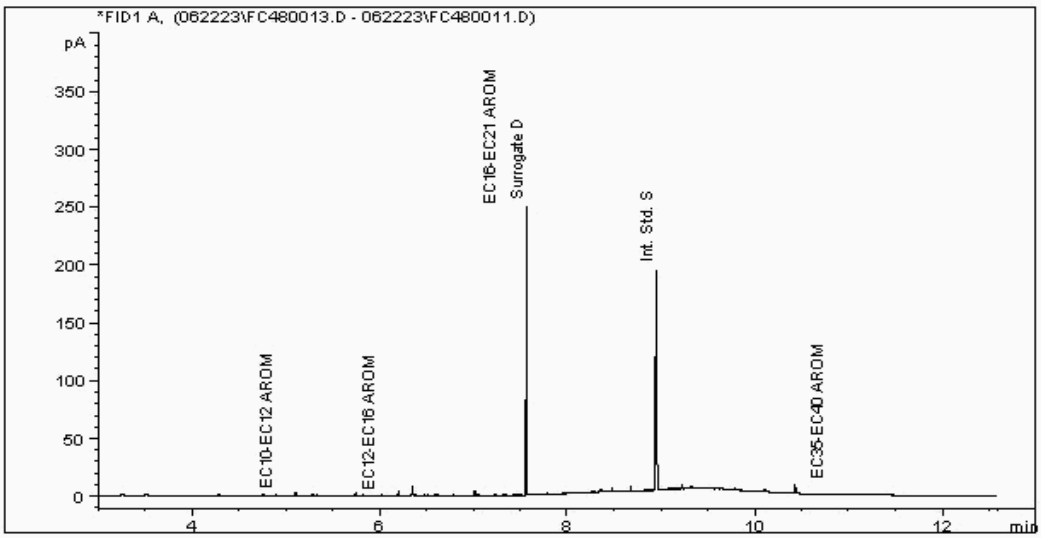
Chromatogram

Analysis: EPH CWG (Aromatic) Aqueous GC (W) **Sample No :** 28195430 **Depth :** 0.00 - 0.00
Sample ID : SPA

Speciated TPH - AROM (C12 - C40)

Sample Identity: 26207334-
Date Acquired : 22/06/2023 22:11:20 PM
Units : ppb
Dilution:

#	Compound Name	Main Peak Area	Amount
1	EC10-EC12 AROM	0.0	0.000
2	EC12-EC16 AROM	0.0	0.000
3	EC16-EC21 AROM	60.7	0.440
4	Surrogate D	150.8	1.114
5	Int. Std. S	161.1	1.250
6	EC21-EC35 AROM	702.1	4.530
7	EC35-EC40 AROM	100.7	0.650
	Total Peak Area	1175.4	

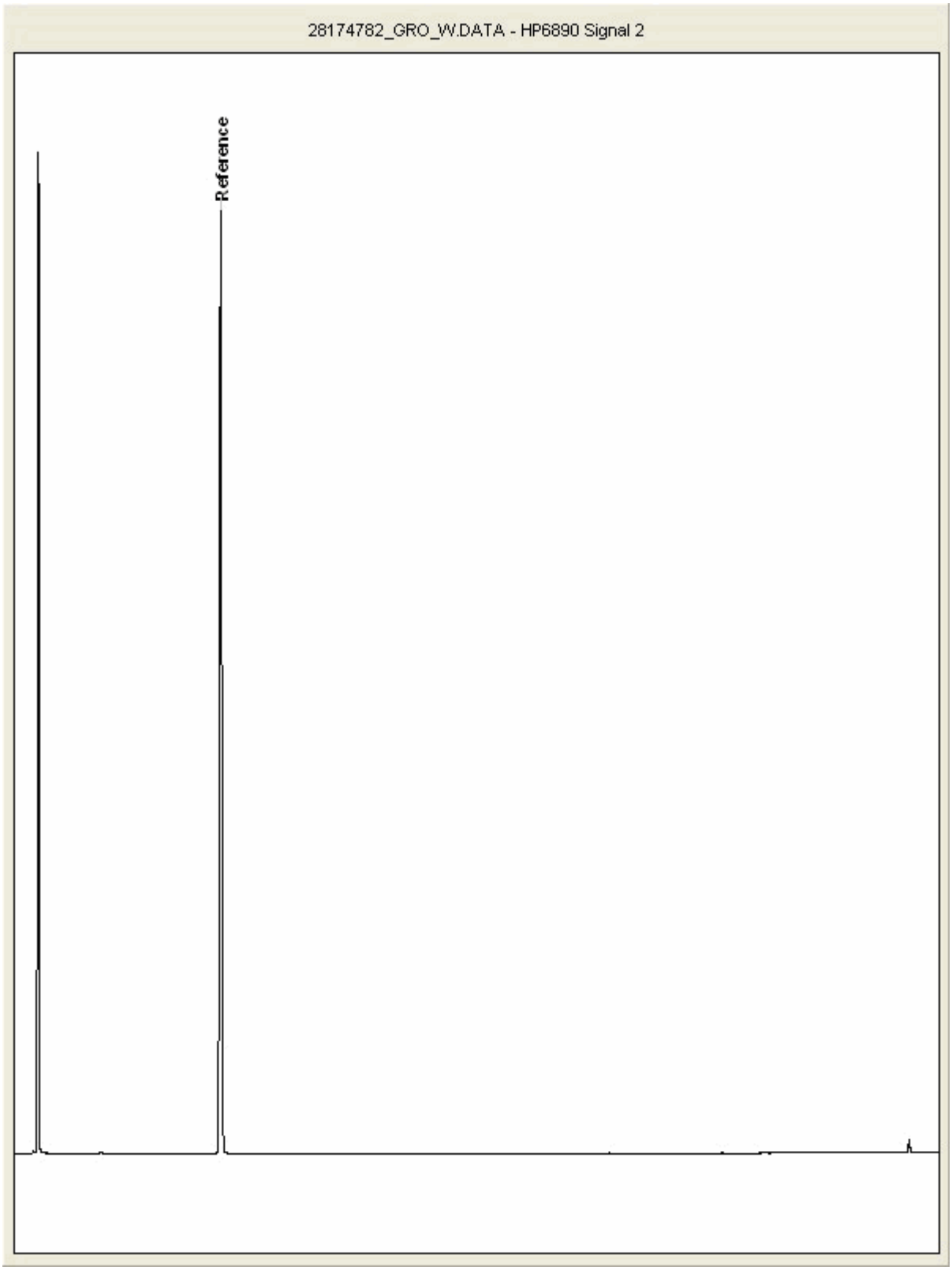


CERTIFICATE OF ANALYSIS

SDG: 230617-60 **Report Number:** 693934 **Superseded Report:** 693654
Client Ref.: 70090113-702 **Location:** Ewenny Road

Chromatogram

Analysis: GRO by GC-FID (W) **Sample No :** 28174782 **Depth :** 0.00 - 0.00
Sample ID : SPA



Appendix

General

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

2. If sufficient sample is received a sub sample will be retained free of charge for 15 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

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

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

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

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

7. Results relate only to the items tested.

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

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

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

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

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

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

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

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

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

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

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

19. **Sample Deviations**

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

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

20. **Asbestos**

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

Identification of Asbestos in Bulk Materials & Soils

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

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

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

Visual Estimation Of Fibre Content

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

Respirable Fibres

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

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

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

APPENDIX E – GROUNDWATER SCREENING SHEETS

Sample Matrix: WATER

Site Area(s) Selected: Whole site
Event(s) Selected: June2023

Aliphatics and Aromatics — Aquifer: 0 — Current event: June2023

Analyte	Min	Mean*	Max	Assessment Criteria (AC)	Assessment Criteria Source	Units	No. Locations Sampled	No. Samples > LOD	No. Locations > AC	Location(s) Failing Screening
Aliphatic C05-C06	10.00	5.00	10.00	-		ug/l	1	0	0	
Aliphatic C06-C08	10.00	5.00	10.00	-		ug/l	1	0	0	
Aliphatic C08-C10	10.00	5.00	10.00	-		ug/l	1	0	0	
Aliphatic C10-C12	10.00	5.00	10.00	-		ug/l	1	0	0	
Aliphatic C12-C16	272	272	272	-		ug/l	1	1	0	
Aliphatic C16-C21	2310	2310	2310	-		ug/l	1	1	0	
Aliphatic C16-C35	25400	25400	25400	-		ug/l	1	1	0	
Aliphatic C21-C35	23100	23100	23100	-		ug/l	1	1	0	
Aliphatics C12-C35	25700	25700	25700	-		ug/l	1	1	0	
Aromatic C06-C07	10.00	5.00	10.00	10.0	CL:AIRE 2017	ug/l	1	0	0	
Aromatic C07-C08	10.00	5.00	10.00	74.0	CL:AIRE 2017	ug/l	1	0	0	
Aromatic C08-C10	10.00	5.00	10.00	20.0	CL:AIRE 2017	ug/l	1	0	0	
Aromatic C10-C12	10.00	5.00	10.00	2.00	CL:AIRE 2017	ug/l	1	0	0	
Aromatic C12-C16	50.0	25.0	50.0	2.00	CL:AIRE 2017	ug/l	1	0	0	
Aromatic C12-C35	4970	4970	4970	-		ug/l	1	1	0	
Aromatic C16-C21	440	440	440	0.10	CL:AIRE 2017	ug/l	1	1	1	SPA
Aromatic C21-C35	4530	4530	4530	0.0002	CL:AIRE 2017	ug/l	1	1	1	SPA
Total Aliphatics and Aromatics (C05-C35)	30700	30700	30700	-		ug/l	1	1	0	

BTEX and Fuel Additives — Aquifer: 0 — Current event: June2023

Analyte	Min	Mean*	Max	Assessment Criteria (AC)	Assessment Criteria Source	Units	No. Locations Sampled	No. Samples > LOD	No. Locations > AC	Location(s) Failing Screening
1,2,4-Trimethylbenzene	1.00	0.50	1.00	-		ug/l	1	0	0	
1,3,5-Trimethylbenzene	1.00	0.50	1.00	-		ug/l	1	0	0	
Benzene	1.00	0.50	1.00	10.0	EQS 2015	ug/l	1	0	0	
BTEX	5.00	2.50	5.00	-		ug/l	1	0	0	
Ethylbenzene	1.00	0.50	1.00	20.0	Proposed EQS	ug/l	1	0	0	
Methyl t-butylether (MTBE)	1.00	0.50	1.00	-		ug/l	1	0	0	
TAME	1.00	0.50	1.00	-		ug/l	1	0	0	
Toluene	1.00	0.50	1.00	74.0	EQS 2015	ug/l	1	0	0	
Xylene	2.00	1.00	2.00	30.0	CL:AIRE 2017	ug/l	1	0	0	
Xylene - Total (Summed)	1.00	1.00	1.00	-		ug/l	1	1	0	
Xylene-m & p	1.00	0.50	1.00	-		ug/l	1	0	0	
Xylene-o	1.00	0.50	1.00	-		ug/l	1	0	0	

Sample Matrix: WATER

Site Area(s) Selected: Whole site
Event(s) Selected: June2023

Chlorinated Aliphatics — Aquifer: 0 — Current event: June2023

Analyte	Min	Mean*	Max	Assessment Criteria (AC)	Assessment Criteria Source	Units	No. Locations Sampled	No. Samples > LOD	No. Locations > AC	Location(s) Failing Screening
1,1,1,2-Tetrachloroethane	1.00	0.50	1.00	-		ug/l	1	0	0	
1,1,1-Trichloroethane	1.00	0.50	1.00	-		ug/l	1	0	0	
1,1,2,2-Tetrachloroethane	1.00	0.50	1.00	-		ug/l	1	0	0	
1,1,2-Trichloroethane	1.00	0.50	1.00	-		ug/l	1	0	0	
1,1-Dichloroethane	1.00	0.50	1.00	-		ug/l	1	0	0	
1,1-Dichloroethene	1.00	0.50	1.00	-		ug/l	1	0	0	
1,1-Dichloropropene	1.00	0.50	1.00	-		ug/l	1	0	0	
1,2,3-Trichloropropane	1.00	0.50	1.00	-		ug/l	1	0	0	
1,2-Dichloroethane	1.00	0.50	1.00	10.0	EQS 2015	ug/l	1	0	0	
1,2-Dichloropropane	1.00	0.50	1.00	-		ug/l	1	0	0	
1,3-Dichloropropane	1.00	0.50	1.00	-		ug/l	1	0	0	
2,2-Dichloropropane	1.00	0.50	1.00	-		ug/l	1	0	0	
Carbon tetrachloride	1.00	0.50	1.00	12.0	EQS 2015	ug/l	1	0	0	
Chloroethane	1.00	0.50	1.00	-		ug/l	1	0	0	
Chloroform	1.00	0.50	1.00	2.50	EQS 2015	ug/l	1	0	0	
Chloromethane	1.00	0.50	1.00	-		ug/l	1	0	0	
Cis 1,2-Dichloroethene	1.00	0.50	1.00	-		ug/l	1	0	0	
Cis 1,3-Dichloropropene	1.00	0.50	1.00	-		ug/l	1	0	0	
Dichloromethane	3.00	1.50	3.00	20.0	EQS 2015	ug/l	1	0	0	
Hexachlorobutadiene	1.00	0.50	1.00	0.60	EQS 2015 MAC	ug/l	1	0	0	
PCE	1.00	0.50	1.00	10.0	EQS 2015	ug/l	1	0	0	
Trans-1,2-Dichloroethene	1.00	0.50	1.00	-		ug/l	1	0	0	
Trans-1,3-Dichloropropene	1.00	0.50	1.00	-		ug/l	1	0	0	
Trichloroethene (TCE)	1.00	0.50	1.00	10.0	EQS 2015	ug/l	1	0	0	
Vinyl chloride	1.00	0.50	1.00	-		ug/l	1	0	0	

Chlorinated Aromatics — Aquifer: 0 — Current event: June2023

Analyte	Min	Mean*	Max	Assessment Criteria (AC)	Assessment Criteria Source	Units	No. Locations Sampled	No. Samples > LOD	No. Locations > AC	Location(s) Failing Screening
1,2,3-Trichlorobenzene	1.00	0.50	1.00	-		ug/l	1	0	0	
1,2,4-Trichlorobenzene	1.00	0.50	1.00	-		ug/l	1	0	0	
1,2-Dichlorobenzene	1.00	0.50	1.00	-		ug/l	1	0	0	
1,3,5-Trichlorobenzene	1.00	0.50	1.00	-		ug/l	1	0	0	
1,3-Dichlorobenzene	1.00	0.50	1.00	-		ug/l	1	0	0	
1,4-Dichlorobenzene	1.00	0.50	1.00	-		ug/l	1	0	0	
2-Chlorotoluene	1.00	0.50	1.00	-		ug/l	1	0	0	
4-Chlorotoluene	1.00	0.50	1.00	-		ug/l	1	0	0	
Chlorobenzene	1.00	0.50	1.00	-		ug/l	1	0	0	

General Chemistry — Aquifer: 0 — Current event: June2023

Analyte	Min	Mean*	Max	Assessment Criteria (AC)	Assessment Criteria Source	Units	No. Locations Sampled	No. Samples > LOD	No. Locations > AC	Location(s) Failing Screening
pH	6.49	6.49	6.49	6.00/9.00	EQS 2015	pH units	1	1	0	

Sample Matrix: WATER

Site Area(s) Selected: Whole site
Event(s) Selected: June2023

Halogonated Hydrocarbons — Aquifer: 0 — Current event: June2023

Analyte	Min	Mean*	Max	Assessment Criteria (AC)	Assessment Criteria Source	Units	No. Locations Sampled	No. Samples > LOD	No. Locations > AC	Location(s) Failing Screening
1,2-Dibromo-3-Chloropropane	1.00	0.50	1.00	-		ug/l	1	0	0	
1,2-Dibromoethane	1.00	0.50	1.00	-		ug/l	1	0	0	
Bromobenzene	1.00	0.50	1.00	-		ug/l	1	0	0	
Bromochloromethane	1.00	0.50	1.00	-		ug/l	1	0	0	
Bromodichloromethane	1.00	0.50	1.00	-		ug/l	1	0	0	
Bromoform	1.00	0.50	1.00	-		ug/l	1	0	0	
Bromomethane	1.00	0.50	1.00	-		ug/l	1	0	0	
Dibromochloromethane	1.00	0.50	1.00	-		ug/l	1	0	0	
Dibromomethane	1.00	0.50	1.00	-		ug/l	1	0	0	
Dichlorodifluoromethane	1.00	0.50	1.00	-		ug/l	1	0	0	
Trichlorofluoromethane	1.00	0.50	1.00	-		ug/l	1	0	0	

Inorganics — Aquifer: 0 — Current event: June2023

Analyte	Min	Mean*	Max	Assessment Criteria (AC)	Assessment Criteria Source	Units	No. Locations Sampled	No. Samples > LOD	No. Locations > AC	Location(s) Failing Screening
Cyanide (Total)	50.0	25.0	50.0	1.00	EQS 2015 - Assumes Free Cyanide	ug/l	1	0	0	
Sulphate as SO4	29600	29600	29600	-		ug/l	1	1	0	

Metals — Aquifer: 0 — Current event: June2023

Analyte	Min	Mean*	Max	Assessment Criteria (AC)	Assessment Criteria Source	Units	No. Locations Sampled	No. Samples > LOD	No. Locations > AC	Location(s) Failing Screening
Arsenic	0.50	0.25	0.50	50.0	EQS 2015	ug/l	1	0	0	
Boron	32.4	32.4	32.4	-		ug/l	1	1	0	
Cadmium	0.080	0.040	0.080	-		ug/l	1	0	0	
Chromium	1.00	0.50	1.00	4.70	EQS 2015	ug/l	1	0	0	
Copper	0.30	0.15	0.30	1.00	EQS 2015 - Bioavailable	ug/l	1	0	0	
Ferric Iron	50.0	25.0	50.0	-		ug/l	1	0	0	
Ferrous Iron	100.0	50.0	100.0	-		ug/l	1	0	0	
Iron	19.00	9.50	19.00	1,000	EQS 2015	ug/l	1	0	0	
Lead	0.20	0.10	0.20	1.20	EQS 2015 - Bioavailable	ug/l	1	0	0	
Manganese	1060	1060	1060	123	EQS 2015 - Bioavailable	ug/l	1	1	1	SPA
Mercury	0.010	0.005	0.010	0.070	EQS 2015 MAC	ug/l	1	0	0	
Nickel	4.86	4.86	4.86	4.00	EQS 2015 - Bioavailable	ug/l	1	1	1	SPA
Selenium	1.00	0.50	1.00	-		ug/l	1	0	0	
Zinc	12.9	12.9	12.9	10.9	EQS 2015 - Bioavailable	ug/l	1	1	1	SPA

Other — Aquifer: 0 — Current event: June2023

Analyte	Min	Mean*	Max	Assessment Criteria (AC)	Assessment Criteria Source	Units	No. Locations Sampled	No. Samples > LOD	No. Locations > AC	Location(s) Failing Screening
Carbon Disulphide	1.00	0.50	1.00	-		ug/l	1	0	0	
Styrene	1.00	0.50	1.00	-		ug/l	1	0	0	

Sample Matrix: WATER

Site Area(s) Selected: Whole site
Event(s) Selected: June2023

PAHs — Aquifer: 0 — Current event: June2023

Analyte	Min	Mean*	Max	Assessment Criteria (AC)	Assessment Criteria Source	Units	No. Locations Sampled	No. Samples > LOD	No. Locations > AC	Location(s) Failing Screening
Acenaphthene	0.025	0.013	0.025	-		ug/l	1	0	0	
Acenaphthylene	0.025	0.013	0.025	-		ug/l	1	0	0	
Anthracene	0.025	0.013	0.025	0.10	EQS 2015	ug/l	1	0	0	
Benzo (a) anthracene	0.059	0.059	0.059	-		ug/l	1	1	0	
Benzo (a) pyrene	0.010	0.005	0.010	0.0002	EQS 2015	ug/l	1	0	0	
Benzo (b) fluoranthene	0.025	0.013	0.025	-		ug/l	1	0	0	
Benzo (ghi) perylene	0.025	0.013	0.025	-		ug/l	1	0	0	
Benzo (k) fluoranthene	0.025	0.013	0.025	-		ug/l	1	0	0	
Chrysene	0.36	0.36	0.36	-		ug/l	1	1	0	
Dibenzo (ah) anthracene	0.025	0.013	0.025	-		ug/l	1	0	0	
Fluoranthene	0.34	0.34	0.34	0.006	EQS 2015	ug/l	1	1	1	SPA
Fluorene	0.15	0.15	0.15	-		ug/l	1	1	0	
Indeno (1,2,3-cd) pyrene	0.025	0.013	0.025	-		ug/l	1	0	0	
Naphthalene	0.27	0.27	0.27	2.00	EQS 2015	ug/l	1	1	0	
PAH (Total)	2.67	2.67	2.67	-		ug/l	1	1	0	
Phenanthrene	0.98	0.98	0.98	-		ug/l	1	1	0	
Pyrene	0.52	0.52	0.52	-		ug/l	1	1	0	

PCBs — Aquifer: 0 — Current event: June2023

Analyte	Min	Mean*	Max	Assessment Criteria (AC)	Assessment Criteria Source	Units	No. Locations Sampled	No. Samples > LOD	No. Locations > AC	Location(s) Failing Screening
PCB101	0.075	0.038	0.075	-		ug/l	1	0	0	
PCB105	0.075	0.038	0.075	-		ug/l	1	0	0	
PCB114	0.075	0.038	0.075	-		ug/l	1	0	0	
PCB118	0.075	0.038	0.075	-		ug/l	1	0	0	
PCB123	0.075	0.038	0.075	-		ug/l	1	0	0	
PCB126	0.075	0.038	0.075	-		ug/l	1	0	0	
PCB138	0.075	0.038	0.075	-		ug/l	1	0	0	
PCB153	0.075	0.038	0.075	-		ug/l	1	0	0	
PCB156	0.075	0.038	0.075	-		ug/l	1	0	0	
PCB157	0.075	0.038	0.075	-		ug/l	1	0	0	
PCB167	0.075	0.038	0.075	-		ug/l	1	0	0	
PCB169	0.075	0.038	0.075	-		ug/l	1	0	0	
PCB180	0.075	0.038	0.075	-		ug/l	1	0	0	
PCB189	0.075	0.038	0.075	-		ug/l	1	0	0	
PCB28	0.075	0.038	0.075	-		ug/l	1	0	0	
PCB52	0.075	0.038	0.075	-		ug/l	1	0	0	
PCB77	0.075	0.038	0.075	-		ug/l	1	0	0	
PCB81	0.075	0.038	0.075	-		ug/l	1	0	0	
Total PCB Congeners ICES 7	0.53	0.26	0.53	-		ug/l	1	0	0	

Phenols — Aquifer: 0 — Current event: June2023

Analyte	Min	Mean*	Max	Assessment Criteria (AC)	Assessment Criteria Source	Units	No. Locations Sampled	No. Samples > LOD	No. Locations > AC	Location(s) Failing Screening
Cresols	6.00	3.00	6.00	-		ug/l	1	0	0	
Phenol	2.00	1.00	2.00	7.70	EQS 2015	ug/l	1	0	0	
Phenol (Monohydric)	16.00	8.00	16.00	-		ug/l	1	0	0	
Xylenols	8.00	4.00	8.00	-		ug/l	1	0	0	

Sample Matrix: WATER

Site Area(s) Selected: Whole site
Event(s) Selected: June2023

QA Standard — Aquifer: 0 — Current event: June2023

Analyte	Min	Mean*	Max	Assessment Criteria (AC)	Assessment Criteria Source	Units	No. Locations Sampled	No. Samples > LOD	No. Locations > AC	Location(s) Failing Screening
4-Bromofluorobenzene	92.9	92.9	92.9	-		%	1	1	0	
Dibromofluoromethane	111	111	111	-		%	1	1	0	
Toluene-d8 Surrogate	105	105	105	-		%	1	1	0	

TPH/EPH — Aquifer: 0 — Current event: June2023

Analyte	Min	Mean*	Max	Assessment Criteria (AC)	Assessment Criteria Source	Units	No. Locations Sampled	No. Samples > LOD	No. Locations > AC	Location(s) Failing Screening
GRO Surrogate	73.0	73.0	73.0	-		%	1	1	0	
PRO (C5-C12)	50.0	25.0	50.0	-		ug/l	1	0	0	

VOCs — Aquifer: 0 — Current event: June2023

Analyte	Min	Mean*	Max	Assessment Criteria (AC)	Assessment Criteria Source	Units	No. Locations Sampled	No. Samples > LOD	No. Locations > AC	Location(s) Failing Screening
4-Isopropyltoluene	1.00	0.50	1.00	-		ug/l	1	0	0	
iso-Propylbenzene	1.00	0.50	1.00	-		ug/l	1	0	0	
n-Butylbenzene	1.00	0.50	1.00	-		ug/l	1	0	0	
n-Propylbenzene	1.00	0.50	1.00	-		ug/l	1	0	0	
Sec-Butylbenzene	1.00	0.50	1.00	-		ug/l	1	0	0	
Tert-Butylbenzene	1.00	0.50	1.00	-		ug/l	1	0	0	

EXCEEDANCES OF THRESHOLDS

Sample matrix: WATER

Aliphatics and Aromatics

Analyte	Point ID	Response Zone Depth (m bgl)	Sample Date	Event Name	Result	Criteria Source	Threshold	Units	Stratum
Aromatic C16-C21	SPA	2.00	14/06/2023	June2023	440	CL:AIRE 2017	0.1	ug/l	
Aromatic C21-C35	SPA	2.00	14/06/2023	June2023	4530	CL:AIRE 2017	0.00017	ug/l	

Metals

Analyte	Point ID	Response Zone Depth (m bgl)	Sample Date	Event Name	Result	Criteria Source	Threshold	Units	Stratum
Manganese	SPA	2.00	14/06/2023	June2023	1060	EQS 2015 - Bioavailable	123	ug/l	
Nickel	SPA	2.00	14/06/2023	June2023	4.86	EQS 2015 - Bioavailable	4	ug/l	
Zinc	SPA	2.00	14/06/2023	June2023	12.9	EQS 2015 - Bioavailable	10.9	ug/l	

PAHs

Analyte	Point ID	Response Zone Depth (m bgl)	Sample Date	Event Name	Result	Criteria Source	Threshold	Units	Stratum
Fluoranthene	SPA	2.00	14/06/2023	June2023	0.34	EQS 2015	0.0063	ug/l	

WATER

Site Area(s) selected:Whole site
Event(s) selected:June2023

Aliphatics and Aromatics | Aquifer: 0 | Current event: June2023

Result > Assessment Criteria

Limit of detection > Assessment Criteria

Analyte	Units	LOD	Reference	GAC	PointID: SPA	Response Zone Depth (m bgl): 2.0	Sample Date: 14/06/23
Aliphatic C05-C06	ug/l	10.0	WHO 2008	15,000	<10		
Aliphatic C06-C08	ug/l	10.0	WHO 2008	15,000	<10		
Aliphatic C08-C10	ug/l	10.0	WHO 2008	300	<10		
Aliphatic C10-C12	ug/l	10.0	WHO 2008	300	<10		
Aliphatic C12-C16	ug/l	50.0	WHO 2008	300	272		
Aliphatic C16-C21	ug/l	50.0			2310		
Aliphatic C16-C35	ug/l	50.0			25400		
Aliphatic C21-C35	ug/l	50.0			23100		
Aliphatics C12-C35	ug/l	50.0			25700		
Aromatic C06-C07	ug/l	10.0			<10		
Aromatic C07-C08	ug/l	10.0			<10		
Aromatic C08-C10	ug/l	10.0	WHO 2008	300	<10		
Aromatic C10-C12	ug/l	10.0	WHO 2008	90.0	<10		
Aromatic C12-C16	ug/l	50.0	WHO 2008	90.0	<50		
Aromatic C12-C35	ug/l	50.0			4970		
Aromatic C16-C21	ug/l	50.0	WHO 2008	90.0	440		
Aromatic C21-C35	ug/l	50.0	WHO 2008	90.0	4530		
Total Aliphatics and Aromatics (C05-C35)	ug/l	50.0			30700		

WATER

Site Area(s) selected:Whole site
Event(s) selected:June2023

BTEX and Fuel Additives — Aquifer: 0 — Current event: June2023

Result > Assessment Criteria

Limit of detection > Assessment Criteria

Analyte	Units	LOD	Reference	GAC	PointID: SPA	Response Zone Depth (m bgl): 2.0	Sample Date: 14/06/23
1,2,4-Trimethylbenzene	ug/l	1.00			<1		
1,3,5-Trimethylbenzene	ug/l	1.00			<1		
Benzene	ug/l	1.00	UK DWS	1.00	<1		
BTEX	ug/l	5.00			<5		
Ethylbenzene	ug/l	1.00	WHO 2017	300	<1		
Methyl t-butylether (MTBE)	ug/l	1.00	WHO 2017	15.0	<1		
TAME	ug/l	1.00			<1		
Toluene	ug/l	1.00	WHO 2017	700	<1		
Xylene	ug/l	2.00	WHO 2017	500	<2		
Xylene - Total (Summed)	ug/l	-999			1		
Xylene-m & p	ug/l	1.00			<1		
Xylene-o	ug/l	1.00			<1		

WATER

Site Area(s) selected:Whole site
Event(s) selected:June2023

Chlorinated Aliphatics | Aquifer: 0 | Current event: June2023

Result > Assessment Criteria

Limit of detection > Assessment Criteria

Analyte	Units	LOD	Reference	GAC	PointID: SPA	Response Zone Depth (m bgl): 2.0	Sample Date: 14/06/23
1,1,1,2-Tetrachloroethane	ug/l	1.00			<1		
1,1,1-Trichloroethane	ug/l	1.00	WHO 2017	2,000	<1		
1,1,2,2-Tetrachloroethane	ug/l	1.00			<1		
1,1,2-Trichloroethane	ug/l	1.00			<1		
1,1-Dichloroethane	ug/l	1.00			<1		
1,1-Dichloroethene	ug/l	1.00	WHO 2017	140	<1		
1,1-Dichloropropene	ug/l	1.00	WHO 2017	20.0	<1		
1,2,3-Trichloropropane	ug/l	1.00			<1		
1,2-Dichloroethane	ug/l	1.00	UK DWS	3.00	<1		
1,2-Dichloropropane	ug/l	1.00	WHO 2017	40.0	<1		
1,3-Dichloropropane	ug/l	1.00			<1		
2,2-Dichloropropane	ug/l	1.00			<1		
Carbon tetrachloride	ug/l	1.00	UK DWS	3.00	<1		
Chloroethane	ug/l	1.00			<1		
Chloroform	ug/l	1.00			<1		
Chloromethane	ug/l	1.00			<1		
Cis 1,2-Dichloroethene	ug/l	1.00	WHO 2017	50.0	<1		
Cis 1,3-Dichloropropene	ug/l	1.00			<1		
Dichloromethane	ug/l	3.00	WHO 2017	20.0	<3		
Hexachlorobutadiene	ug/l	1.00	WHO 2017	0.60	<1		

WATER

Site Area(s) selected:Whole site
Event(s) selected:June2023

Chlorinated Aliphatics | **Aquifer: 0** | **Current event: June2023**

Result > Assessment Criteria

Limit of detection > Assessment Criteria

Analyte	Units	LOD	Reference	GAC	PointID: SPA	Response Zone Depth (m bgl): 2.0	Sample Date: 14/06/23
PCE	ug/l	1.00			<1		
Trans-1,2-Dichloroethene	ug/l	1.00	WHO 2017	50.0	<1		
Trans-1,3-Dichloropropene	ug/l	1.00			<1		
Trichloroethene (TCE)	ug/l	1.00			<1		
Vinyl chloride	ug/l	1.00	UK DWS	0.50	<1		

WATER

Site Area(s) selected:Whole site
Event(s) selected:June2023

Chlorinated Aromatics — Aquifer: 0 — Current event: June2023

Result > Assessment Criteria

Limit of detection > Assessment Criteria

Analyte	Units	LOD	Reference	GAC	PointID: SPA	Response Zone Depth (m bgl): 2.0	Sample Date: 14/06/23
1,2,3-Trichlorobenzene	ug/l	1.00			<1		
1,2,4-Trichlorobenzene	ug/l	1.00			<1		
1,2-Dichlorobenzene	ug/l	1.00	WHO 2017	1,000	<1		
1,3,5-Trichlorobenzene	ug/l	1.00			<1		
1,3-Dichlorobenzene	ug/l	1.00			<1		
1,4-Dichlorobenzene	ug/l	1.00	WHO 2017	300	<1		
2-Chlorotoluene	ug/l	1.00			<1		
4-Chlorotoluene	ug/l	1.00			<1		
Chlorobenzene	ug/l	1.00	WHO 2017	300	<1		

WATER

Site Area(s) selected:Whole site
Event(s) selected:June2023

General Chemistry — Aquifer: 0 — Current event: June2023

Result > Assessment Criteria

Limit of detection > Assessment Criteria

Analyte	Units	LOD	Reference	GAC	PointID	SPA
					Response Zone Depth (m bgl)	2.0
					Sample Date	14/06/23
pH	pH units	1.00	UK DWS	6.50 / 10.0		6.49

WATER

Site Area(s) selected:Whole site
Event(s) selected:June2023

Halogonated Hydrocarbons — Aquifer: 0 — Current event: June2023

Result > Assessment Criteria

Limit of detection > Assessment Criteria

Analyte	Units	LOD	Reference	GAC	PointID: SPA	Response Zone Depth (m bgl): 2.0	Sample Date: 14/06/23
1,2-Dibromo-3-Chloropropane	ug/l	1.00	WHO 2017	1.00	<1		
1,2-Dibromoethane	ug/l	1.00	WHO 2017	0.40	<1		
Bromobenzene	ug/l	1.00			<1		
Bromochloromethane	ug/l	1.00			<1		
Bromodichloromethane	ug/l	1.00			<1		
Bromoform	ug/l	1.00			<1		
Bromomethane	ug/l	1.00			<1		
Dibromochloromethane	ug/l	1.00	WHO 2017	100	<1		
Dibromomethane	ug/l	1.00			<1		
Dichlorodifluoromethane	ug/l	1.00			<1		
Trichlorofluoromethane	ug/l	1.00			<1		

WATER

Site Area(s) selected:Whole site
Event(s) selected:June2023

Inorganics — Aquifer: 0 — Current event: June2023

Result > Assessment Criteria

Limit of detection > Assessment Criteria

Analyte	Units	LOD	Reference	GAC	PointID	SPA
					Response Zone Depth (m bgl)	2.0
					Sample Date	14/06/23
Cyanide (Total)	ug/l	50.0	UK DWS	50.0		<50
Sulphate as SO4	ug/l	2,000	UK DWS	250,000		29600

WATER

Site Area(s) selected:Whole site
Event(s) selected:June2023

Metals | **Aquifer: 0** | **Current event: June2023**

Result > Assessment Criteria

Limit of detection > Assessment Criteria

Analyte	Units	LOD	Reference	GAC	PointID: SPA
					Response Zone Depth (m bgl): 2.0
					Sample Date: 14/06/23
Arsenic	ug/l	0.50	UK DWS	10.0	<0.5
Boron	ug/l	10.0	UK DWS	1,000	32.4
Cadmium	ug/l	0.080	UK DWS	5.00	<0.08
Chromium	ug/l	1.00	UK DWS	50.0	<1
Copper	ug/l	0.30	UK DWS	2,000	<0.3
Ferric Iron	ug/l	50.0			<50
Ferrous Iron	ug/l	100			<100
Iron	ug/l	19.0	UK DWS	200	<19
Lead	ug/l	0.20	UK DWS	10.0	<0.2
Manganese	ug/l	3.00	UK DWS	50.0	1060
Mercury	ug/l	0.010	UK DWS	1.00	<0.01
Nickel	ug/l	0.40	UK DWS	20.0	4.86
Selenium	ug/l	1.00	UK DWS	10.0	<1
Zinc	ug/l	1.00			12.9

WATER

Site Area(s) selected:Whole site
Event(s) selected:June2023

Other | **Aquifer: 0** | **Current event: June2023**

Result > Assessment Criteria

Limit of detection > Assessment Criteria

Analyte	Units	LOD	Reference	GAC	PointID: SPA	Response Zone Depth (m bgl): 2.0	Sample Date: 14/06/23
Carbon Disulphide	ug/l	1.00			<1		
Styrene	ug/l	1.00	WHO 2017	20.0	<1		

WATER

Site Area(s) selected:Whole site
Event(s) selected:June2023

PAHs — Aquifer: 0 — Current event: June2023

Result > Assessment Criteria

Limit of detection > Assessment Criteria

Analyte	Units	LOD	Reference	GAC	PointID: SPA	Response Zone Depth (m bgl): 2.0	Sample Date: 14/06/23
Acenaphthene	ug/l	0.025			<0.025		
Acenaphthylene	ug/l	0.025			<0.025		
Anthracene	ug/l	0.025			<0.025		
Benzo (a) anthracene	ug/l	0.025			0.0586		
Benzo (a) pyrene	ug/l	0.010	UK DWS	0.010	<0.01		
Benzo (b) fluoranthene	ug/l	0.025			<0.025		
Benzo (ghi) perylene	ug/l	0.025			<0.025		
Benzo (k) fluoranthene	ug/l	0.025			<0.025		
Chrysene	ug/l	0.025			0.362		
Dibenzo (ah) anthracene	ug/l	0.025			<0.025		
Fluoranthene	ug/l	0.025			0.34		
Fluorene	ug/l	0.025			0.147		
Indeno (1,2,3-cd) pyrene	ug/l	0.025			<0.025		
Naphthalene	ug/l	0.050			0.267		
PAH (Total)	ug/l	0.41			2.67		
Phenanthrene	ug/l	0.025			0.98		
Pyrene	ug/l	0.025			0.515		

WATER

Site Area(s) selected:Whole site
Event(s) selected:June2023

PCBs — Aquifer: 0 — Current event: June2023

Result > Assessment Criteria

Limit of detection > Assessment Criteria

Analyte	Units	LOD	Reference	GAC	PointID: SPA	Response Zone Depth (m bgl): 2.0	Sample Date: 14/06/23
PCB101	ug/l	0.075			<0.075		
PCB105	ug/l	0.075			<0.075		
PCB114	ug/l	0.075			<0.075		
PCB118	ug/l	0.075			<0.075		
PCB123	ug/l	0.075			<0.075		
PCB126	ug/l	0.075			<0.075		
PCB138	ug/l	0.075			<0.075		
PCB153	ug/l	0.075			<0.075		
PCB156	ug/l	0.075			<0.075		
PCB157	ug/l	0.075			<0.075		
PCB167	ug/l	0.075			<0.075		
PCB169	ug/l	0.075			<0.075		
PCB180	ug/l	0.075			<0.075		
PCB189	ug/l	0.075			<0.075		
PCB28	ug/l	0.075			<0.075		
PCB52	ug/l	0.075			<0.075		
PCB77	ug/l	0.075			<0.075		
PCB81	ug/l	0.075			<0.075		
Total PCB Congeners ICES 7	ug/l	0.53			<0.525		

WATER

Site Area(s) selected:Whole site
Event(s) selected:June2023

Phenols — Aquifer: 0 — Current event: June2023

Result > Assessment Criteria

Limit of detection > Assessment Criteria

Analyte	Units	LOD	Reference	GAC	PointID: SPA	Response Zone Depth (m bgl): 2.0	Sample Date: 14/06/23
Cresols	ug/l	6.00			<6		
Phenol	ug/l	2.00			<2		
Phenol (Monohydric)	ug/l	16.0			<16		
Xylenols	ug/l	8.00			<8		

WATER

Site Area(s) selected:Whole site
Event(s) selected:June2023

QA Standard | **Aquifer: 0** | **Current event: June2023**

Result > Assessment Criteria

Limit of detection > Assessment Criteria

Analyte	Units	LOD	Reference	GAC	PointID: SPA	Response Zone Depth (m bgl): 2.0	Sample Date: 14/06/23
4-Bromofluorobenzene	%				92.9		
Dibromofluoromethane	%				111		
Toluene-d8 Surrogate	%				105		

WATER

Site Area(s) selected:Whole site
Event(s) selected:June2023

TPH/EPH — Aquifer: 0 — Current event: June2023

Result > Assessment Criteria

Limit of detection > Assessment Criteria

Analyte	Units	LOD	Reference	GAC	PointID: SPA	Response Zone Depth (m bgl): 2.0	Sample Date: 14/06/23
GRO Surrogate	%				73		
PRO (C5-C12)	ug/l	50.0			<50		

WATER

Site Area(s) selected:Whole site
Event(s) selected:June2023

VOCs — Aquifer: 0 — Current event: June2023

Result > Assessment Criteria

Limit of detection > Assessment Criteria

Analyte	Units	LOD	Reference	GAC	PointID: SPA	Response Zone Depth (m bgl): 2.0	Sample Date: 14/06/23
4-Isopropyltoluene	ug/l	1.00			<1		
iso-Propylbenzene	ug/l	1.00			<1		
n-Butylbenzene	ug/l	1.00			<1		
n-Propylbenzene	ug/l	1.00			<1		
Sec-Butylbenzene	ug/l	1.00			<1		
Tert-Butylbenzene	ug/l	1.00			<1		