Garnswllt WwTW

Hydrogeological Impact Assessment

Contract Name:	Garnswllt WwTW
Client Name:	Mott MacDonald
Groundwater Specialist:	Stuart Wells Limited (SWL)
Report No:	SWL23-112-01-HIA-01
Location:	Garnswllt, Ammanford, SA182RH

Revision	Date	Description	Prepared By (SWL)	Checked By (SWL)
01	10 August 2023	Submission	Arun Thomas	Mark Pickett

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1. Introduction

At a site known as the Garnswllt Wastewater Treatment Works (WwTW), a number of new constructions are to be undertaken. The first area that requires dewatering is around two existing structures, Final Settlement Tank 1 (FST 1) and Final Settlement Tank 2 (FST2), Area 1a and Area 1b, respectively. The second area that requires dewatering is understood to consist of the draining of an existing pond prior to the construction of a Feed Pumping Station (FPS) and Primary Settlement Tank (PST) (Area 2). The site is located at Lon-y-Felin, Mawr, Garnswllt, Swansea, Wales, SA18 2RH. The approximate location of the site is shown in an aerial photograph, Figure 1, and schematic layout, Figure 2.

The existing ground level is 16.6 mAOD with the proposed basement excavations extending to a formation level of 11.3 to 8.6 mAOD (5.3 to 6.0 m depth). Excavations are to be constructed within a sheet piled cofferdam, the details of the sheet pile walls are to be finalised.

The Environmental Agency (EA) publish a Scientific Report 'Hydrogeological Impact Appraisal for Dewatering Abstractions' (EA, 2007), which provides a methodology describing how to complete a Hydrogeological Impact Assessment.

This report presents a Hydrogeological Impact Assessment (HIA) of a temporary dewatering system to be utilised to lower and control the groundwater level in the granular Superficial Deposits. The HIA is largely based on the methodology as advised by the aforementioned EA document.

In summary, it outlines a conceptual hydrogeological model of the site, summarises the findings of a Water Features Survey (SWL, 2023a) and dewatering design (2023b). It then goes on to consider the impacts on nearby sensitive environmental receptors, and mitigation measures, and details the monitoring strategy.

2. Regional Water Resource Status

The site is located within the Carmarthen Bay Catchment Abstraction Management Strategy (CAMS) area. The Carmarthen Bay Abstraction Licensing Strategy (NRW, 2014) identifies that this CAMS area includes the catchments of the rivers Loughor, Lliedi, Lliw, Tywi, Taf, Gwendraeths, and Pennard Pill on the Gower.

The CAMS rea falls largely within the local authority areas pf Carmarthenshire and the City and County of Swansea. All of the rivers in this CAMS area support important fisheries and conservation interests. The CAMS area is predominantly rural with some areas of urban and industrial development.

The site is located in an area identified as *'water available for licensing'*, which defines that groundwater unit balance shows groundwater available for licensing. New licences can be considered depending on impacts on other abstractors and on surface water (NRW, 2014).

Figure 1: The location of the Garnswllt WwTW site (red outline).

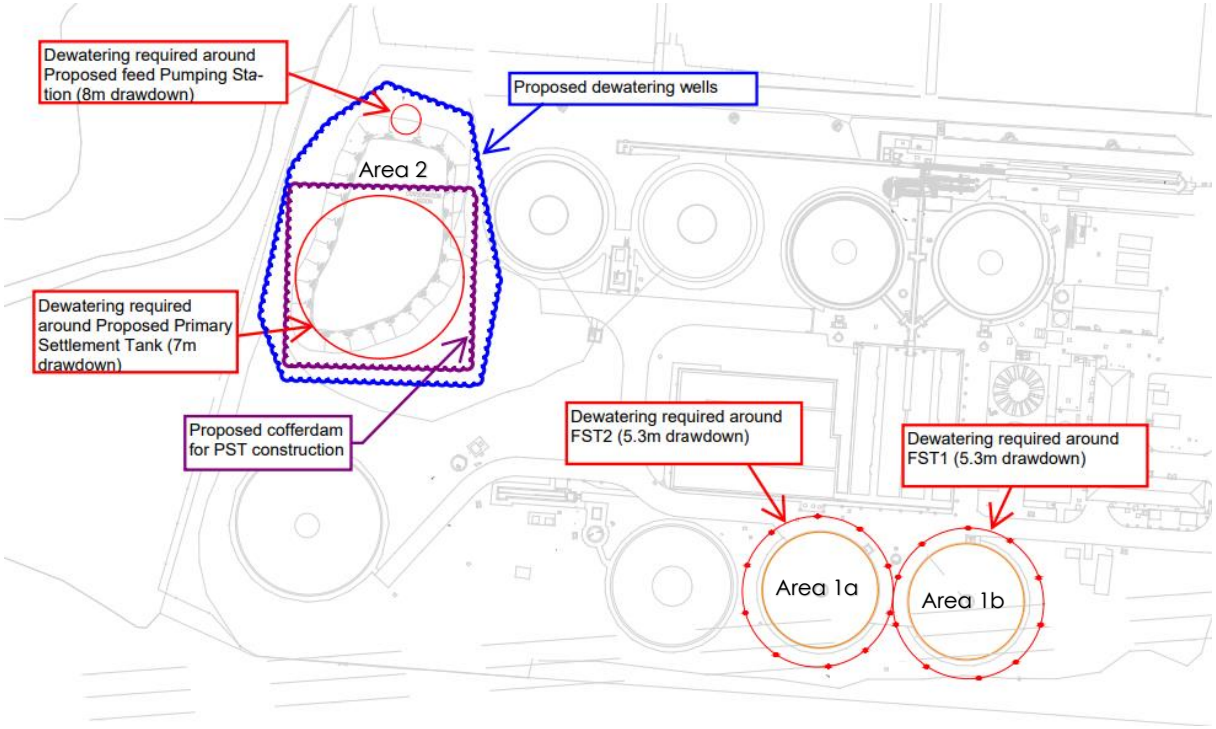


Figure 2: The location of the dewatering works at Garnswllt WwTW (taken from MMB drawing (MMB, 2023a)).

3. Conceptual Model

3.1. Ground Conditions

Published geology indicates a general sequence that comprises of Made Ground overlying Alluvium with bedrock consisting of the South Wales Upper Coal Measures (mudstone, sandstone, siltstone and coal) at depth.

The desk study, in particular Groundsure Report (pp. 66 to 77) (Appendix A) indicates that the site is underlain by Superficial Deposits that comprise of variable Alluvium (SAND and GRAVEL) along the northeast boundary. Whilst, the remainder of the site consists of variable Alluvium (Clay, Silt, SAND and GRAVEL). Along the north western boundary Superficial Deposits are underlain by bedrock of the Llynfi Member- Sandstone. Whilst, the remainder of the site is underlain by South Wales Upper Coal Measures Formation- Mudstone, Siltstone, and Sandstone.

Whilst, a Ground Investigation Factual Report (QGL, 2023), reported geology underlying the site to consist of Made Ground overlying Superficial Deposits of Alluvium, Glacial Sand and Gravel, and Glacial Till, underlain by bedrock of the South Wales Upper Coal Measures.

Several cable percussive and rotary boreholes were drilled across the site. The following table (Table 1) summarises the ground conditions reported, and therefore anticipated to be encountered during works and associated dewatering.

Table 1: Summary of Ground Conditions

Geotechnical Unit	Depth to base		Description
	(mBGL)	(mAOD)	
Made Ground	0.35 to 6.00	10.57 to 16.66	Generally consisting of slightly clayey sandy gravel with subordinate clay strata[*1] [*2]
Alluvium/ Glacial Sand and Gravel/ Glacial Till	>25 m[*3]	> -8.39[*3]	Generally granular strata consisting of clayey gravelly SAND, slightly silty slightly sandy GRAVEL or slightly silty or clayey sandy GRAVEL with a low to medium cobble content. Subordinate sandy slightly gravelly CLAY and sandy SILT strata noted.

Notes:
(1) BH02: Sandstone boulder encountered at 1.0 m bgl (15.6 mAOD).
(2) BH-SD-02: Possible hydrocarbon contamination at 5.6 to 6.0 m bgl (10.6 to 11.0 mAOD).
(3) Base not proven, encountered to 25.0 m bgl (-8.39 mAOD) at BH-SD-01.

3.2. Hydrogeology

Desk study information, in particular the Groundsure Report (Section 5 Hydrogeology (pp. 30 to 38)) (Appendix A) identifies that the Superficial Aquifer is designated a Secondary A Aquifer, and the Bedrock Aquifer is also designated a Secondary A Aquifer.

A Secondary A Aquifer is described as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases form an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.

3.3. Hydrology

Onsite observations during the Water Features Survey (SWL, 2023a) and the desk study (Appendix A; Groundsure Report Section 6 – Hydrology (pp. 39 to pp. 45)) identifies the River Loughor approximately 77m NW of the site with a general alignment NW to SW. It is described as a watercourse, which contains water year-round (in normal circumstances). Varying depth was observed at River Loughor. The width varied between approximately 5.0m and 15.0 m. River Loughor is identified as an inland river not influenced by normal tidal action. It also contains water all year round (in normal circumstances).

In addition, the River Cathan is located approximately 350 m N of the site, with a general alignment W to SE. Varying depth was observed at River Cathan. The width varied between approximately 2.0m and 8.0 m.

3.4. Temporary Dewatering Design

A dewatering strategy has been developed based upon information sourced from the Ground Investigation (QGL, 2023), accepted industry best-practices for groundwater control (CIRIA Report C750 (2016) and Cashman and Preene, 2021)).

During the works, there is a requirement to control and lower groundwater within the target aquifer, granular Superficial Deposits. A cofferdam is proposed to surround the Feed Pumping Station and Primary Settlement Tank. Although, the details of the sheet piled walls are to be finalised, we have assumed that, whilst they would restrict horizontal groundwater flow, they would not provide a cut-off to vertical groundwater flow, and as a result would not act as a groundwater cut-off.

We propose to install a number of dewatering systems comprising a series of vertical deepwells to the specification detailed in Table 2 and shown in Figure 3.

Table 2: Summary of dewatering systems

Item	Area 1a	Area 1b	Area 2
Installation Level:	Existing Ground Level 16.6 mAOD		
No. of dewatering wells:	10 no.	10 no.	14 no.
Well depth:	12.0 m (4.6 mAOD)	12.0 m (4.6 mAOD)	15.0 m (1.6 mAOD)
Well spacing:	~ 8.0 m	~ 8.0 m	~ 10.0 m
Finish drilling diameter:	nom. 300 mm	nom. 300 mm	nom. 300 mm
Well liner diameter:	nom. 200 mm	nom. 200 mm	nom. 200 mm

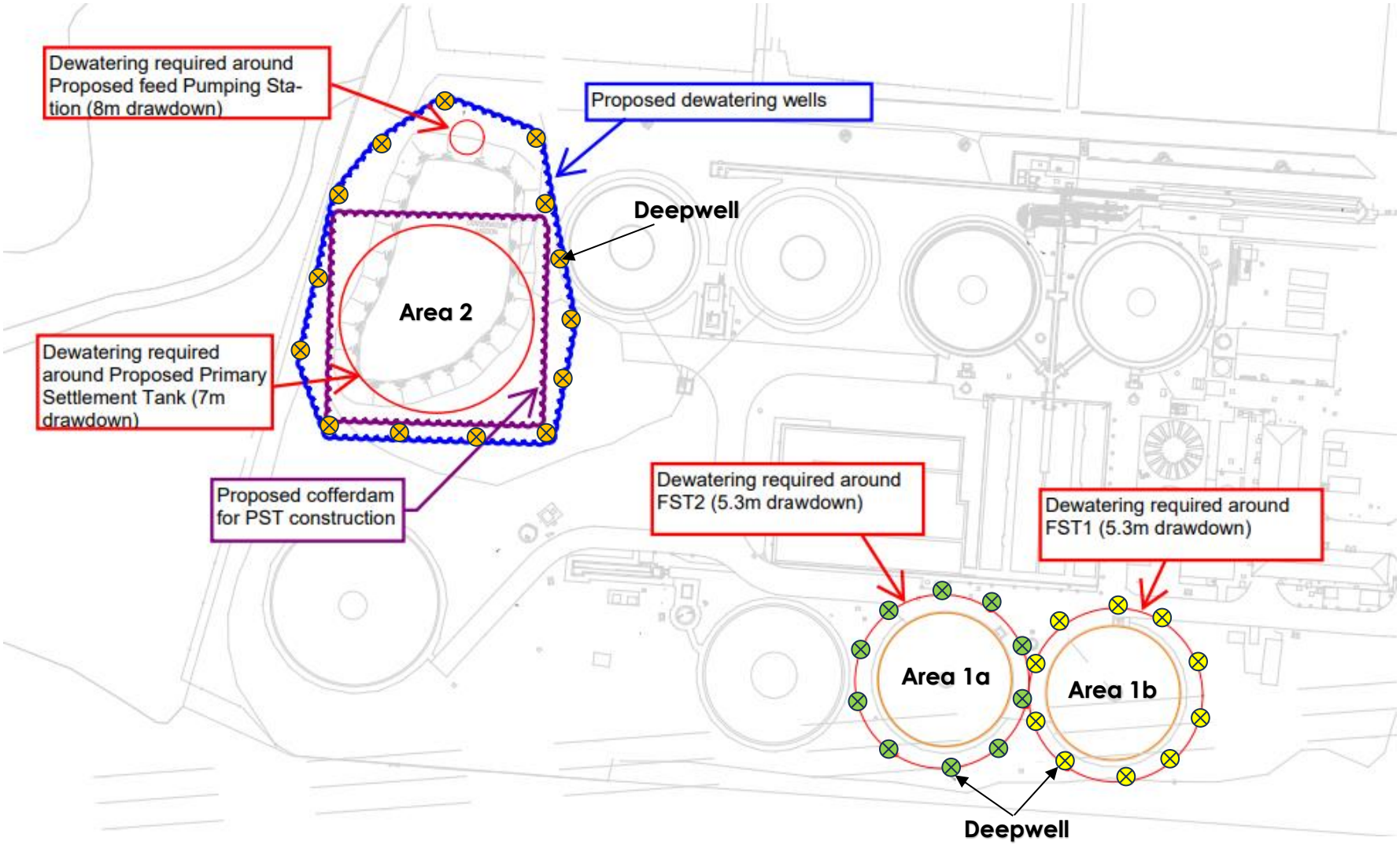


Figure 3: Indicative Deepwell Dewatering Systems Layout at Garnswllt WwTW (base map taken from MMB drawing (MMB, 2023a)).

4. Potential Receptors Susceptible to Flow Impacts

In order to evaluate the impact of the proposed temporary abstraction (dewatering) on the surrounding water environment; sensitive water receptors and abstractions have been identified. Desk Study information was supplemented with a site walk over. This information was included in a Water Features Survey (SWL, 2023a).

Details of points of interest identified for an area of 1.0 km from the site boundary are summarised in Table 3, and the Desk Study information is included in Appendix A.

Table 3: Summary of Water Features Survey

Feature(s)	Notes
Surface Water Features	As previously discussed, River Loughor is approximately 77m NW of the site and River Cathan is located approximately 350 m N of the site.
Groundwater Abstractions	There are 3 no. licensed groundwater abstractions located within 2 km of the site, of which all are historical. The nearest historical groundwater abstraction was recorded onsite (E 262112 N 209855) (licence no. WA/059/0002/0015) and expired 01 Sept 2022. The abstraction point was not observed during our site walkover, and onsite personnel confirmed it had been decommissioned.
Surface Water Abstractions	There is 1 no. historical licensed surface water abstraction located within 2 km of the site. It was located approximately 383m NE of the site (E262370 N210270). It was not observed during the site walkover due to limited access along the River Cathan.
Potable Water Abstractions	There are 3 no. potable water abstractions within 2 km of the site, all of which are historical. None of them are within 500 m. The nearest is located approximately 1,617 m NE from the site (E383820 N399190). It is a historical licence (no. 2569004023).
Source Protection Zones	There are no source protection zones within 500 m of the site.

5. Likely Flow Impacts to the Water Features

The amount of information currently available on the hydrogeological properties of the target aquifer is limited; Variable Head Tests (VHTs) (3 no.), and Particle Size Distribution (PSD) Tests (13 no.).

Information derived from the Ground Investigation (QGL, 2023) has been used to produce a set of engineering calculations. A summary of our dewatering engineering calculations is presented in Table 4.

Our current understanding from the engineering calculations indicate is that the distance of influence is between 100 m and greater than 1,000 m. However, it is unlikely that the distance of influence would be as large as this given the proximity of the River Loughor, and River Cathan, and that the aquifer is in fact bounded.

As a result, the River Loughor and River Cathan have the potential to be impacted by the proposed temporary dewatering activity.

6. Mitigation Effects of Discharges

The water abstracted from the temporary deepwell dewatering systems are proposed to be discharged directly back to the River Loughor. Abstracted water would be transferred from each dewatering well to the discharge location via a common pipeline. There would be no intervening use of the abstracted groundwater prior to its discharge. As a result, all of the groundwater that is naturally draining towards the River Loughor through the aquifer would continue to reach its original destination.

Furthermore, it is likely that the River Cathan is at a suitable distance beyond where significant drawdown would be realised, and are confident that there would not be any adverse environmental impacts.

7. Water Quality Impacts

Groundwater samples were collected during the Ground Investigation (QGL, 2023) and analysed for common contaminants. The results are included in Appendix B.

Table 4: Summary of Engineering Dewatering Design Calculations

Item	Units	Final Settlement Tanks	Feed Pumping Station and Primary Settlement Tank	Notes
		Area 1a and Area 1b[*1]	Area 2	
Plan length, a	m	20.0	40.0	
Plan width, b	m	20.0	30.0	
Perimeter	m	80.0	140.0	
Working Platform level	mOD	16.60	16.60	
Groundwater level	mOD	15.07	15.07	Peak GWL at BH-SD-01
Formation level	mOD	11.30	8.60 to 9.60	
Target drawdown level	mOD	10.80	8.10	0.5 m below formation level.
Base of aquifer	mOD	-8.39	-8.39	As proven to at BH-SD-01
Aquifer				
Permeability, k	m/s	1.0E-03 to 5.0E-05	1.0E-03 to 5.0E-05	As inferred from relevant onsite and laboratory testing.
Equation parameters				
r = (a + b) / pi	m	12.73	22.28	
Depth of aquifer, H	m	23.46	23.46	
Residual depth, h	m	19.19	16.49	
Drawdown, H - h	m	4.27	6.97	
Distance of influence				
R_0 = 3,000 (H -h) rt k	m	90.58 to 905.80	147.86 to 1,478.56	
R_0 = re 3,000 (H -h) rt k	m	103.31 to 918.54	170.14 to 1,500.84	
Chosen R_0 value	m	103.31 to 918.54	170.14 to 1,500.84	
Estimated Calculated Flow	l/s	5.19 to 62.28	10.33 to 122.65	Using Radial Unconfined calculation: $Q = pi\ k\ (H^2 - h^2) / \ln R/r$, and Partial Penetration factor applied.
	m^3/hour	18.69 to 224.20	37.18 to 441.55	
	m^3/day	448.61 to 5,380.92	892.32 to 10,597.08	

Notes:

(1) Engineering calculations presented are for one dewatering area only.

8. Monitoring Strategy

During the main works dewatering, as a means to ensure that the dewatering system is not having an adverse impact on the surrounding natural environment, a groundwater monitoring programme is to be implemented. The Dewatering Monitoring Programme (DMP) would comprise of the monitoring of groundwater levels in and around the site, monitoring of the discharge location and groundwater sampling and analysis.

It is proposed that groundwater levels are monitored throughout the main works dewatering. Manual water level and flow meter readings will be taken during the normal working day, however during out of hour timings, all water level readings will be recorded by data-loggers. A water level data-logger would record water levels in the monitoring wells and a barometric data-logger to record the ambient temperature and pressure to allow compensation of the water level data-logger data for the atmospheric pressure once downloaded.

The location and number of monitoring wells are to be agreed with the EA. However, the intervals proposed for groundwater levels is summarised in Table 5. Data would be presented in hydrographs and submitted to the EA weekly.

Table 5: Groundwater Monitoring Frequency

Period	Frequency	
	Manual Dips	Telemetry
First Week	Hourly	daily download
Second to fourth week	Daily	weekly download
second month	Daily	weekly download
third month onwards	weekly	monthly download

It is proposed that groundwater samples are obtained from the v-notch tank during the main works dewatering. The samples are to be taken to a UKAS accredited laboratory and analysed for the groundwater analysis suite shown in Table 6. Groundwater samples are to be obtained at the frequency detailed in Table 7.

Table 6: Groundwater Analysis Suite

pH	Dissolved Oxygen	Antimony	Lead (dissolved)	Total dissolved solids
Conductivity	Sulphate	Arsenic	Magnesium	Total suspended solids
Alkalinity	Chloride	Barium	Manganese	Iron (dissolved)
Hardness	Nitrate	Boron	Molybdenum	Zinc
BOD	Nitrite	Cadmium	Nickel	TPH/PAH
COD	Phosphate	Chromium	Selenium	Sodium
Ammoniacal Nitrogen	Copper			

Groundwater analysis results would be provided to the EA within 48 hours from when they are issued from the laboratory.

Table 7: Groundwater Sampling Frequency

Period	Frequency
First Week	1 hour, 24 hours, 72 hours, 168 hours
Second to fourth week	1 no. sample per week
second month	1 no. sample per fortnight
third month onwards	1 no. sample per month

Groundwater flows are to be recorded via a mechanical flowmeter located at the discharge location.

9. Conclusions and recommendations

As part of the project located at Garnswllt WwTW, a number of new structures may require temporary dewatering during construction. Engineering calculations indicate dewatering is likely to involve significant abstractions volumes and a corresponding distance of influence.

However, since all abstracted groundwater is proposed to be discharged directly to the River Loughor, no groundwater is permanently removed from the environment and the water balance maintained. This would limit the environmental impact of dewatering.

Although, a relative lack of site-specific data on aquifer conditions, leads to uncertainty in dewatering flow rate, well yields and distance of influence. As a result, we highly recommend undertaking a pumping test. The pumping test would further inform the dewatering design, allow more accurate estimation of the abstraction flow rates and distance of influence.

Furthermore, the pumping test would afford the opportunity to obtain additional samples of groundwater for analysis at a UKAS accredited laboratory.

It is highly likely that pumping test data and results of groundwater analysis would be required when applying for environmental permits.

It is possible to offset the initial additional costs of undertaking a pumping test through location of the investigation wells in positions where they may be incorporated into the main works dewatering system.

10. References

Environment Agency, 2007. Hydrogeological Impact Appraisal for Dewatering Abstractions. Science Report – SC040020/SR1.

Natural Resources Wales (NRW), 2014. The Carmarthen Bay Abstraction Licensing Strategy.

Preene, M., Roberts, T.O.L., and Powrie, W. 2016. *Groundwater control: design and practice, second edition*. Construction Industry Research and Information Association, CIRIA Report C750.

Cashman, P.M. and Preene, M. 2021. *Groundwater Lowering in Construction: A Practical Guide to Dewatering, third edition*. CRC Press.

Quantum Geotech Limited (QGL, 2023). *Garnswllt WwTW Ground Investigation Factual Report*. Report no. Q1031/FR.01 dated June 2023.

Stuart Wells Limited (2023a). *Garnswllt WwTW - Water Features Survey*. Report no. SWL23-112-01-WFS-01 dated July 2023.

Stuart Wells Limited (2023b). *Garnswllt WwTW -Dewatering Design Note*. Report no. SWL23-112-01-DN-01 dated August 2023.

APPENDIX A:

Groundsure Desk Study Information

Groundsure
LOCATION INTELLIGENCE

Enviro+Geo Insight

LAND AT GARNSWLLT WWTW, LON Y FELIN, GARNSWLLT, AMMANFORD, SA18 2RH

Order Details

Date: 12/06/2023

Your ref: SWL23-112_Garnswllt_WwTW

Our Ref: GS-FP6-H5J-XLR-AM2

Site Details

Location: 262116 209870

Area: 1.99 ha

Authority: Abertawe - Swansea City and Borough Council ↗

Contact us with any questions at:
info@groundsure.com ↗
01273 257 755

Summary of findings

Page	Section	Past land use >	On site	0-50m	50-250m	250-500m	500-2000m
14 >	1.1 >	Historical industrial land uses >	2	6	7	6	-
15 >	1.2 >	Historical tanks >	0	0	3	0	-
16 >	1.3 >	Historical energy features >	0	0	0	0	-
16 >	1.4 >	Historical petrol stations >	0	0	0	0	-
16 >	1.5 >	Historical garages >	0	0	0	0	-
17 >	1.6 >	Historical military land >	0	0	0	0	-
Page	Section	Past land use - un-grouped >	On site	0-50m	50-250m	250-500m	500-2000m
18 >	2.1 >	Historical industrial land uses >	3	7	8	7	-
19 >	2.2 >	Historical tanks >	0	0	3	0	-
20 >	2.3 >	Historical energy features >	0	0	0	0	-
20 >	2.4 >	Historical petrol stations >	0	0	0	0	-
20 >	2.5 >	Historical garages >	0	0	0	0	-
Page	Section	Waste and landfill >	On site	0-50m	50-250m	250-500m	500-2000m
21 >	3.1 >	Active or recent landfill >	0	0	0	0	-
21 >	3.2 >	Historical landfill (BGS records) >	0	0	0	0	-
21 >	3.3 >	Historical landfill (LA/mapping records) >	0	0	0	0	-
21 >	3.4 >	Historical landfill (EA/NRW records) >	0	0	0	0	-
21 >	3.5 >	Historical waste sites >	0	0	0	0	-
22 >	3.6 >	Licensed waste sites >	0	0	0	0	-
22 >	3.7 >	Waste exemptions >	0	0	0	0	-
Page	Section	Current industrial land use >	On site	0-50m	50-250m	250-500m	500-2000m
23 >	4.1 >	Recent industrial land uses >	1	2	2	-	-
24 >	4.2 >	Current or recent petrol stations >	0	0	0	0	-
24 >	4.3 >	Electricity cables >	0	0	0	0	-
24 >	4.4 >	Gas pipelines >	0	0	0	0	-
24 >	4.5 >	Sites determined as Contaminated Land >	0	0	0	0	-

25 >	4.6 >	Control of Major Accident Hazards (COMAH) >	0	0	0	0	-
25 >	4.7 >	Regulated explosive sites >	0	0	0	0	-
25 >	4.8 >	Hazardous substance storage/usage >	0	0	0	0	-
25 >	4.9 >	Historical licensed industrial activities (IPC) >	0	0	0	0	-
25 >	4.10 >	Licensed industrial activities (Part A(1)) >	0	0	0	0	-
26 >	4.11 >	Licensed pollutant release (Part A(2)/B) >	0	0	0	1	-
26 >	4.12 >	Radioactive Substance Authorisations >	0	0	0	0	-
26 >	4.13 >	Licensed Discharges to controlled waters >	1	0	2	5	-
28 >	4.14 >	Pollutant release to surface waters (Red List) >	0	0	0	0	-
28 >	4.15 >	Pollutant release to public sewer >	0	0	0	0	-
28 >	4.16 >	List 1 Dangerous Substances >	0	0	0	0	-
28 >	4.17 >	List 2 Dangerous Substances >	0	0	1	0	-
28 >	4.18 >	Pollution Incidents (EA/NRW) >	0	0	1	1	-
29 >	4.19 >	Pollution inventory substances >	0	0	0	0	-
29 >	4.20 >	Pollution inventory waste transfers >	0	0	0	0	-
29 >	4.21 >	Pollution inventory radioactive waste >	0	0	0	0	-

Page	Section	Hydrogeology >	On site	0-50m	50-250m	250-500m	500-2000m
30 >	5.1 >	Superficial aquifer >	Identified (within 500m)				
32 >	5.2 >	Bedrock aquifer >	Identified (within 500m)				
34 >	5.3 >	Groundwater vulnerability >	Identified (within 50m)				
35 >	5.4 >	Groundwater vulnerability- soluble rock risk >	None (within 0m)				
35 >	5.5 >	Groundwater vulnerability- local information >	None (within 0m)				
36 >	5.6 >	Groundwater abstractions >	1	0	0	0	2
37 >	5.7 >	Surface water abstractions >	0	0	0	1	0
38 >	5.8 >	Potable abstractions >	0	0	0	0	0
38 >	5.9 >	Source Protection Zones >	0	0	0	0	-
38 >	5.10 >	Source Protection Zones (confined aquifer) >	0	0	0	0	-

Page	Section	Hydrology >	On site	0-50m	50-250m	250-500m	500-2000m
39 >	6.1 >	Water Network (OS MasterMap) >	0	0	9	-	-

40 >	6.2 >	Surface water features >	1	0	5	-	-
41 >	6.3 >	WFD Surface water body catchments >	1	-	-	-	-
41 >	6.4 >	WFD Surface water bodies >	0	0	1	-	-
41 >	6.5 >	WFD Groundwater bodies >	1	-	-	-	-
Page	Section	**River and coastal flooding >**	On site	0-50m	50-250m	250-500m	500-2000m
43 >	7.1 >	Risk of flooding from rivers and the sea >	High (within 50m)				
44 >	7.2 >	Historical Flood Events >	1	0	0	-	-
44 >	7.3 >	Flood Defences >	0	0	0	-	-
44 >	7.4 >	Areas Benefiting from Flood Defences >	1	0	5	-	-
45 >	7.5 >	Flood Storage Areas >	0	0	0	-	-
46 >	7.6 >	Flood Zone 2 >	Identified (within 50m)				
47 >	7.7 >	Flood Zone 3 >	Identified (within 50m)				
Page	Section	**Surface water flooding >**					
48 >	8.1 >	Surface water flooding >	1 in 30 year, Greater than 1.0m (within 50m)				
Page	Section	**Groundwater flooding >**					
50 >	9.1 >	Groundwater flooding >	Low (within 50m)				
Page	Section	**Environmental designations >**	On site	0-50m	50-250m	250-500m	500-2000m
51 >	10.1 >	Sites of Special Scientific Interest (SSSI) >	0	0	0	0	1
52 >	10.2 >	Conserved wetland sites (Ramsar sites) >	0	0	0	0	0
52 >	10.3 >	Special Areas of Conservation (SAC) >	0	0	0	0	0
52 >	10.4 >	Special Protection Areas (SPA) >	0	0	0	0	0
52 >	10.5 >	National Nature Reserves (NNR) >	0	0	0	0	0
53 >	10.6 >	Local Nature Reserves (LNR) >	0	0	0	0	0
53 >	10.7 >	Designated Ancient Woodland >	0	0	2	0	50
55 >	10.8 >	Biosphere Reserves >	0	0	0	0	0
55 >	10.9 >	Forest Parks >	0	0	0	0	0
55 >	10.10 >	Marine Conservation Zones >	0	0	0	0	0
56 >	10.11 >	Green Belt >	0	0	0	0	0
56 >	10.12 >	Proposed Ramsar sites >	0	0	0	0	0

56 >	10.13 >	Possible Special Areas of Conservation (pSAC) >	0	0	0	0	0
56 >	10.14 >	Potential Special Protection Areas (pSPA) >	0	0	0	0	0
56 >	10.15 >	Nitrate Sensitive Areas >	0	0	0	0	0
57 >	10.16 >	Nitrate Vulnerable Zones >	0	0	0	0	0
58 >	10.17 >	SSSI Impact Risk Zones >	0	-	-	-	-
58 >	10.18 >	SSSI Units >	0	0	0	0	0
Page	Section	**Visual and cultural designations >**	On site	0-50m	50-250m	250-500m	500-2000m
59 >	11.1 >	World Heritage Sites >	0	0	0	-	-
59 >	11.2 >	Area of Outstanding Natural Beauty >	0	0	0	-	-
59 >	11.3 >	National Parks >	0	0	0	-	-
59 >	11.4 >	Listed Buildings >	0	0	0	-	-
60 >	11.5 >	Conservation Areas >	0	0	0	-	-
60 >	11.6 >	Scheduled Ancient Monuments >	0	0	0	-	-
60 >	11.7 >	Registered Parks and Gardens >	0	0	0	-	-
Page	Section	**Agricultural designations >**	On site	0-50m	50-250m	250-500m	500-2000m
61 >	12.1 >	Agricultural Land Classification >	Grade 3b (within 250m)				
62 >	12.2 >	Open Access Land >	0	0	0	-	-
62 >	12.3 >	Tree Felling Licences >	0	0	0	-	-
62 >	12.4 >	Environmental Stewardship Schemes >	0	0	0	-	-
62 >	12.5 >	Countryside Stewardship Schemes >	0	0	0	-	-
Page	Section	**Habitat designations >**	On site	0-50m	50-250m	250-500m	500-2000m
63 >	13.1 >	Priority Habitat Inventory >	0	0	0	-	-
63 >	13.2 >	Habitat Networks >	0	0	0	-	-
63 >	13.3 >	Open Mosaic Habitat >	0	0	0	-	-
63 >	13.4 >	Limestone Pavement Orders >	0	0	0	-	-
Page	Section	**Geology 1:10,000 scale >**	On site	0-50m	50-250m	250-500m	500-2000m
64 >	14.1 >	10k Availability >	Identified (within 500m)				
65 >	14.2 >	Artificial and made ground (10k) >	0	0	0	0	-
66 >	14.3 >	Superficial geology (10k) >	2	0	4	5	-

90 >	18.6 >	Non-coal mining >	1	0	1	0	0
91 >	18.7 >	Mining cavities >	0	0	0	0	0
91 >	18.8 >	JPB mining areas >	None (within 0m)				
91 >	18.9 >	Coal mining >	Identified (within 0m)				
92 >	18.10 >	Brine areas >	None (within 0m)				
92 >	18.11 >	Gypsum areas >	None (within 0m)				
92 >	18.12 >	Tin mining >	None (within 0m)				
92 >	18.13 >	Clay mining >	None (within 0m)				
Page	Section	Radon >					
93 >	19.1 >	Radon >	Between 10% and 30% (within 0m)				
Page	Section	Soil chemistry >	On site	0-50m	50-250m	250-500m	500-2000m
95 >	20.1 >	BGS Estimated Background Soil Chemistry >	3	7	-	-	-
96 >	20.2 >	BGS Estimated Urban Soil Chemistry >	0	0	-	-	-
96 >	20.3 >	BGS Measured Urban Soil Chemistry >	0	0	-	-	-
Page	Section	Railway infrastructure and projects >	On site	0-50m	50-250m	250-500m	500-2000m
97 >	21.1 >	Underground railways (London) >	0	0	0	-	-
97 >	21.2 >	Underground railways (Non-London) >	0	0	0	-	-
98 >	21.3 >	Railway tunnels >	0	0	0	-	-
98 >	21.4 >	Historical railway and tunnel features >	0	2	2	-	-
98 >	21.5 >	Royal Mail tunnels >	0	0	0	-	-
99 >	21.6 >	Historical railways >	0	0	0	-	-
99 >	21.7 >	Railways >	0	3	2	-	-
99 >	21.8 >	Crossrail 1 >	0	0	0	0	-
99 >	21.9 >	Crossrail 2 >	0	0	0	0	-
100 >	21.10 >	HS2 >	0	0	0	0	-

Recent aerial photograph

Capture Date: 13/04/2020

Site Area: 1.99ha

Recent site history - 2017 aerial photograph

Capture Date: 17/06/2017

Site Area: 1.99ha

Recent site history - 2013 aerial photograph

Capture Date: 14/07/2013

Site Area: 1.99ha

Recent site history - 2008 aerial photograph

Capture Date: 12/05/2008

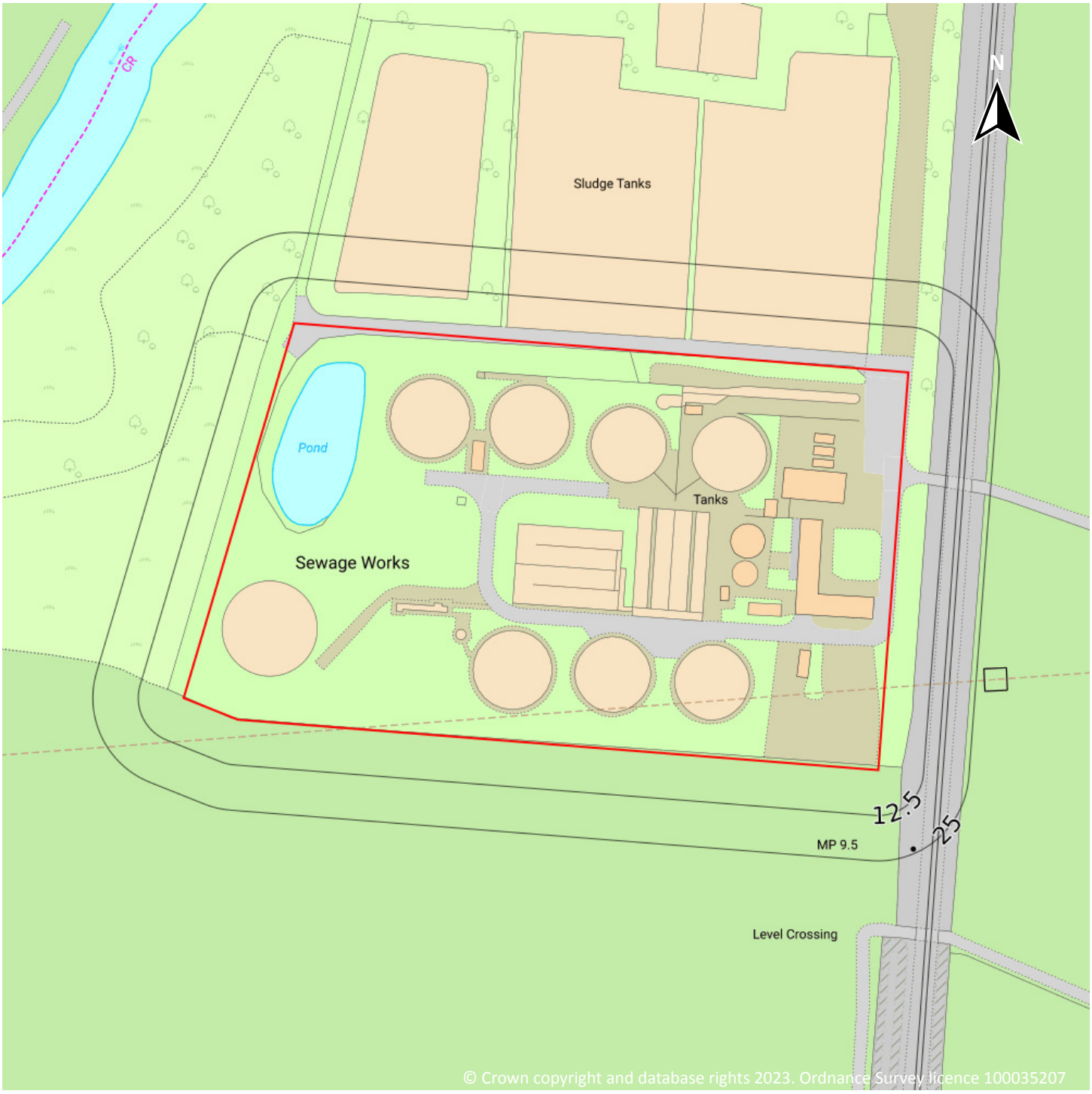
Site Area: 1.99ha

Recent site history - 2000 aerial photograph

Capture Date: 22/07/2000

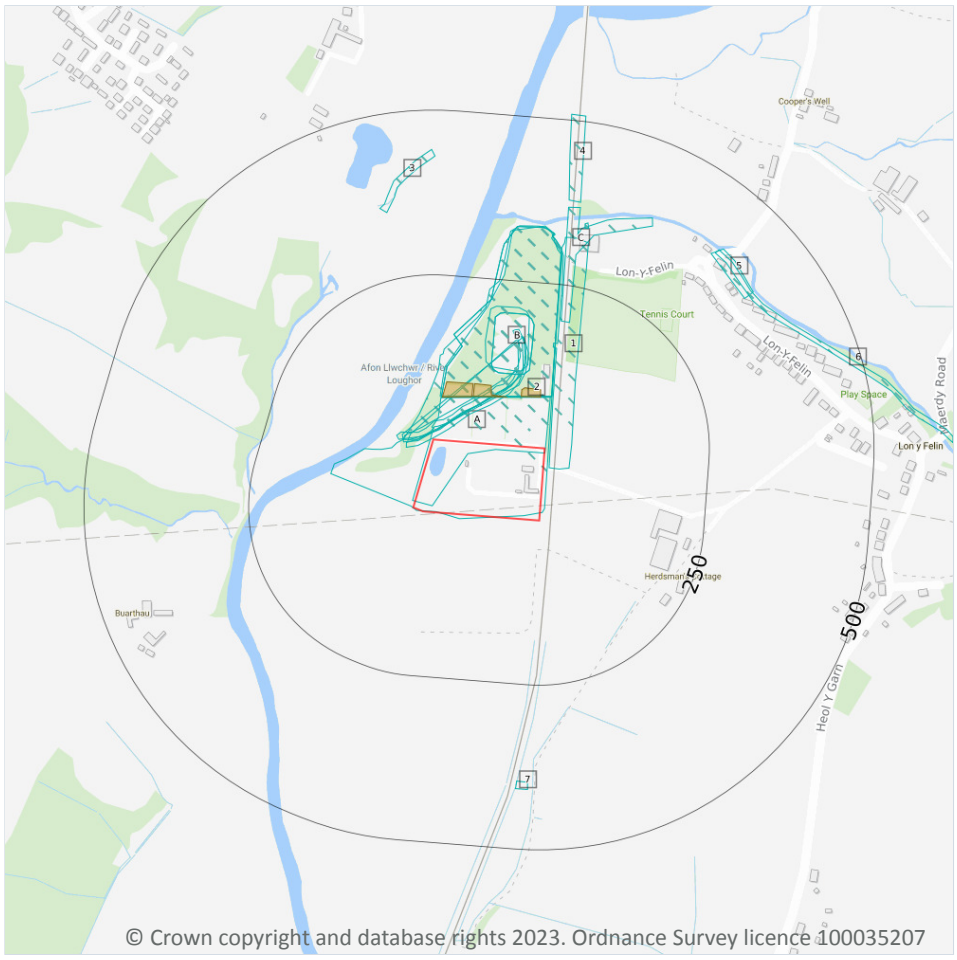
Site Area: 1.99ha

OS MasterMap site plan



Site Area: 1.99ha

1 Past land use



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

1.1 Historical industrial land uses

Records within 500m	21

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14 >**

ID	Location	Land use	Dates present	Group ID
A	**On site**	**Unspecified Works**	**1965 - 1988**	**298143**

ID	Location	Land use	Dates present	Group ID
A	**On site**	**Sewage Works**	**1948**	**317072**
A	2m NW	Unspecified Ground Workings	1938	279936
1	8m NE	Railway Sidings	1905	307167
A	10m NW	Unspecified Pit	1905	278572
A	11m NW	Unspecified Pit	1948	296695
A	11m NW	Unspecified Pit	1938	272163
A	13m NW	Unspecified Ground Workings	1901	286503
B	65m NW	Unspecified Works	1965	253380
B	65m NW	Sewage Works	1979	271830
B	67m NW	Sewage Works	1992	309458
B	109m N	Unspecified Tanks	1992	274220
B	109m N	Unspecified Tanks	1965 - 1979	276431
B	114m N	Unspecified Tanks	1948	312008
C	195m NE	Railway Sidings	1876 - 1878	306541
C	340m N	Smithy	1876	265900
3	352m N	Unspecified Ground Workings	1901	266574
4	378m N	Railway Sidings	1905	269577
5	379m NE	Tramway Sidings	1938	271512
6	387m NE	Tramway Sidings	1913	303303
7	397m S	Unspecified Heap	1948	259496

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	**3**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 14 >**

ID	Location	Land use	Dates present	Group ID
A	65m NW	Settling Tank	1984	34513
A	70m N	Settling Tank	1984	34514
2	76m NE	Settling Tank	1984	34515

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	0

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

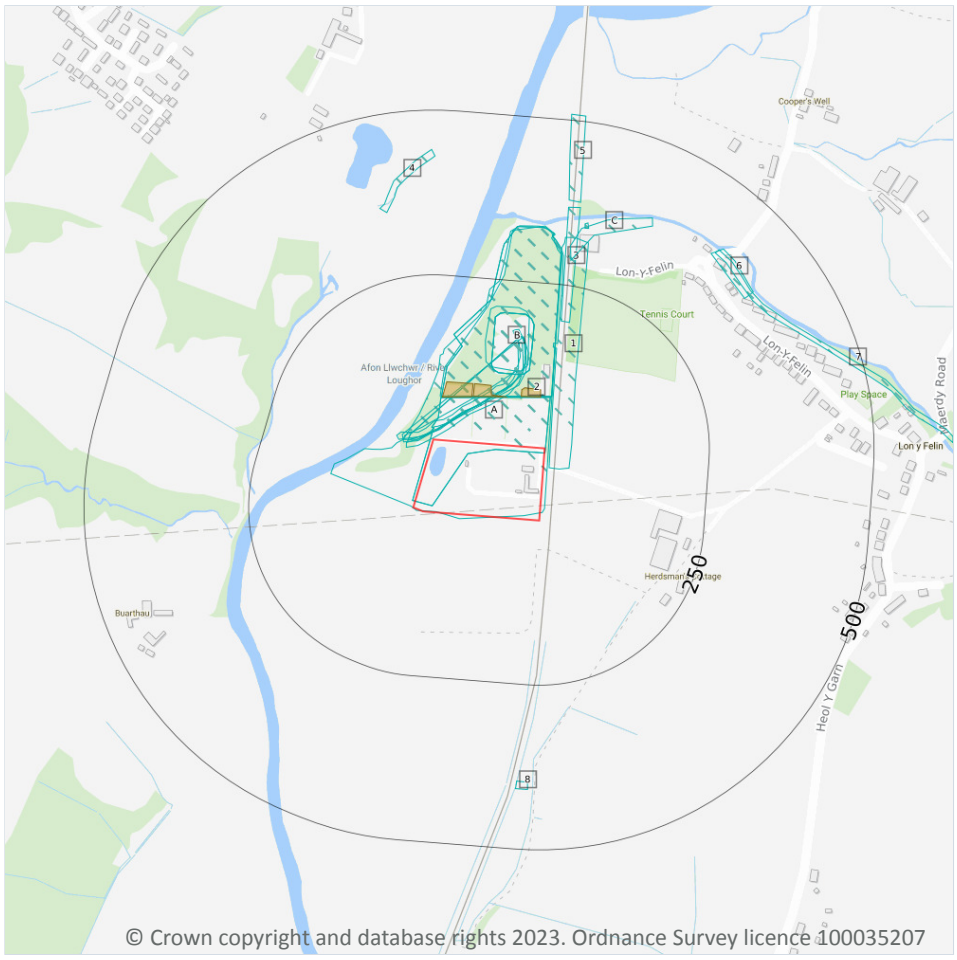
1.6 Historical military land

Records within 500m	0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped



2.1 Historical industrial land uses

Records within 500m	25

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 18 >**

ID	Location	Land Use	Date	Group ID
A	**On site**	**Sewage Works**	**1948**	**317072**
A	**On site**	**Unspecified Works**	**1988**	**298143**
A	**On site**	**Unspecified Works**	**1965**	**298143**

ID	Location	Land Use	Date	Group ID
A	2m NW	Unspecified Ground Workings	1938	279936
1	8m NE	Railway Sidings	1905	307167
A	10m NW	Unspecified Pit	1905	278572
A	11m NW	Unspecified Pit	1948	296695
A	11m NW	Unspecified Pit	1938	272163
A	11m NW	Unspecified Pit	1938	272163
A	13m NW	Unspecified Ground Workings	1901	286503
B	65m NW	Unspecified Works	1965	253380
B	65m NW	Sewage Works	1979	271830
B	67m NW	Sewage Works	1992	309458
B	109m N	Unspecified Tanks	1965	276431
B	109m N	Unspecified Tanks	1979	276431
B	109m N	Unspecified Tanks	1992	274220
B	114m N	Unspecified Tanks	1948	312008
3	195m NE	Railway Sidings	1876	306541
C	288m N	Railway Sidings	1878	306541
C	340m N	Smithy	1876	265900
4	352m N	Unspecified Ground Workings	1901	266574
5	378m N	Railway Sidings	1905	269577
6	379m NE	Tramway Sidings	1938	271512
7	387m NE	Tramway Sidings	1913	303303
8	397m S	Unspecified Heap	1948	259496

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	3

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 18 >**

ID	Location	Land Use	Date	Group ID
A	65m NW	Settling Tank	1984	34513
A	70m N	Settling Tank	1984	34514
2	76m NE	Settling Tank	1984	34515

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	0

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m	0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill

3.1 Active or recent landfill

Records within 500m	0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	0

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	0

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	0

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

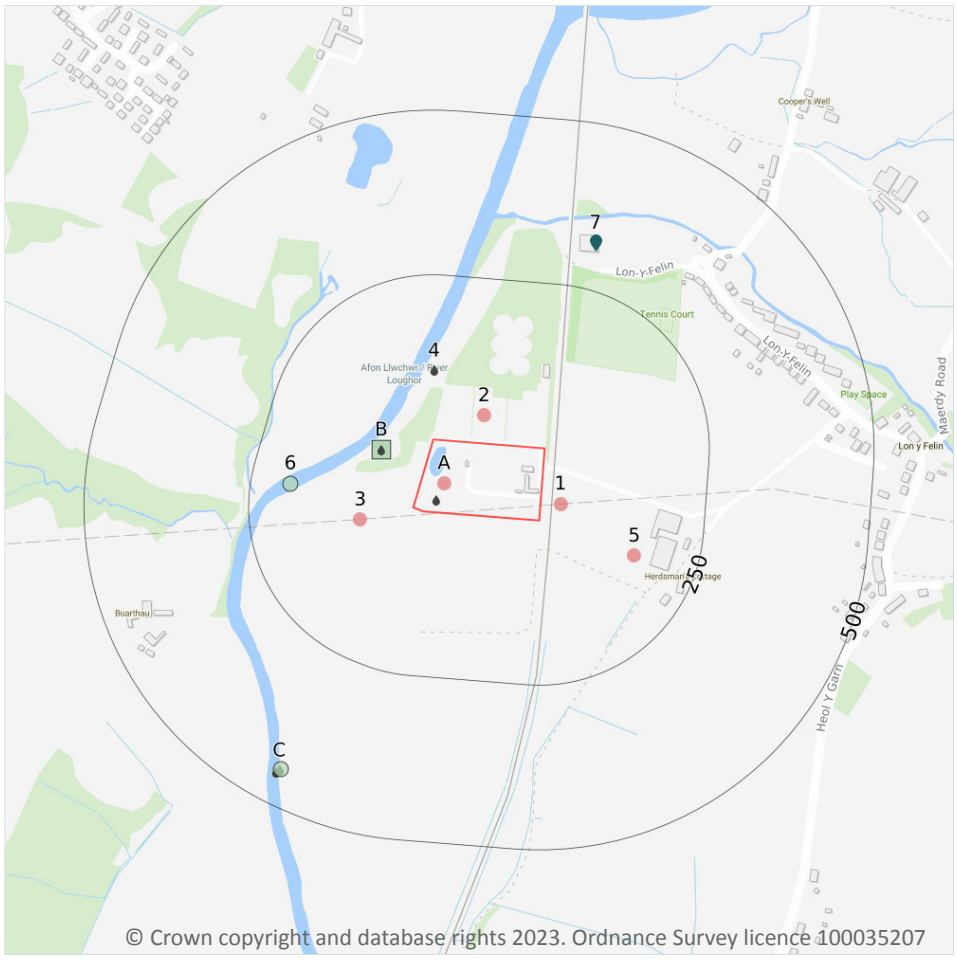
3.7 Waste exemptions

Records within 500m	0

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



4.1 Recent industrial land uses

Records within 250m	5

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 23 >**

ID	Location	Company	Address	Activity	Category
A	**On site**	**Sewage Works**	**West Glamorgan, SA18**	**Waste Storage, Processing and Disposal**	**Infrastructure and Facilities**
1	30m E	Pylon	West Glamorgan, SA18	Electrical Features	Infrastructure and Facilities
2	42m N	Sludge Tanks	West Glamorgan, SA18	Waste Storage, Processing and Disposal	Infrastructure and Facilities

ID	Location	Company	Address	Activity	Category
3	83m W	Pylon	West Glamorgan, SA18	Electrical Features	Infrastructure and Facilities
5	154m SE	Slurry Bed	West Glamorgan, SA18	Waste Storage, Processing and Disposal	Infrastructure and Facilities

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	0

Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	0

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	0

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m	1

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 23 >**

ID	Location	Address	Details	
7	321m NE	Roberts Concrete, Lon y Felin, Garnswllt, Swansea, SA18 2RG	Process: Batching, blending and loading of Bulk Cement Status: Historical Permit Permit Type: Part B	Enforcement: Enforcement Notified Date of enforcement: 19/02/2008 Comment: Enforcement Notified

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m	8

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 23 >**

ID	Location	Address	Details	
A	**On site**	**Garnswllt STW Longelin Ammanford Settled Storm, Nr Coal Rd, Ammanford, Carmarrthenshire, SA18 2RH**	**Effluent Type: SEWAGE DISCHARGES - STW STORM OVERFLOW/STORM TANK - WATER COMPANY** **Permit Number: BW1404301** **Permit Version: 0** **Receiving Water: River Loughor**	**Status: Effective** **Issue date: 27/05/2020** **Effective Date: 27/05/2020** **Revocation Date: -**
B	71m W	GARNSWLLT STW LONGELIN NR AMMANFOR, GARNSWLLT STW, LONGELIN, NR AMMANFORD, SWANSEA CBCD	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: BC0006801 Permit Version: 1 Receiving Water: RIVER LOUGHOR	Status: REVOKED - UNSPECIFIED Issue date: 17/10/1981 Effective Date: 17/10/1981 Revocation Date: 29/04/1997

ID	Location	Address	Details	
4	104m NW	M'HOLE 4 GARNSWLLT STW EMERGE	Effluent Type: UNSPECIFIED Permit Number: BW1400301 Permit Version: 1 Receiving Water: RIVER LOUGHOR	Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV Issue date: 21/10/1974 Effective Date: 21/10/1974 Revocation Date: 31/03/2002
C	448m SW	GARNSWLLT STW LONGELIN AMMANFORD, GARNSWLLT SEWAGE TREATMENT WORKS, LONGELIN, AMMANFORD, SWANSEA	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: BC0006801 Permit Version: 0 Receiving Water: RIVER LOUGHOR	Status: Effective Issue date: 31/03/2010 Effective Date: 31/03/2010 Revocation Date: -
C	448m SW	GARNSWLLT STW LONGELIN AMMANFORD, GARNSWLLT SEWAGE TREATMENT WORKS, LONGELIN, AMMANFORD, Swansea	Effluent Type: SEWAGE DISCHARGES - STW STORM OVERFLOW/STORM TANK - WATER COMPANY Permit Number: BW1404301 Permit Version: 3 Receiving Water: RIVER LOUGHOR	Status: Effective Issue date: 31/03/2003 Effective Date: 01/04/2003 Revocation Date: -
C	453m SW	GARNSWLLT STW LONGELIN NR AMMANFOR, GARNSWLLT STW, LONGELIN, NR AMMANFORD, SWANSEA CBCD	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: BC0006801 Permit Version: 2 Receiving Water: RIVER LOUGHOR	Status: VARIED BY APPLICATION - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 24/04/1997 Effective Date: 30/04/1997 Revocation Date: 21/12/2000
C	453m SW	GARNSWLLT STW LONGELIN NR AMMANFOR, GARNSWLLT STW, LONGELIN, NR AMMANFORD, SWANSEA CBCD	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: BC0006801 Permit Version: 3 Receiving Water: RIVER LOUGHOR	Status: MODIFIED - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 21/12/2000 Effective Date: 22/12/2000 Revocation Date: 31/03/2003
C	453m SW	GARNSWLLT STW LONGELIN NR AMMANFOR, GARNSWLLT STW, LONGELIN, NR AMMANFORD, SWANSEA CBCD	Effluent Type: SEWAGE DISCHARGES - STW STORM OVERFLOW/STORM TANK - WATER COMPANY Permit Number: BW1404301 Permit Version: 2 Receiving Water: RIVER LOUGHOR	Status: VARIED BY APPLICATION - (WRA 91 SCHED 10 - AS AMENDED BY ENV ACT 1995) Issue date: 24/04/1997 Effective Date: 30/04/1997 Revocation Date: 31/03/2003

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m	0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m	1

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

Features are displayed on the Current industrial land use map on **page 23 >**

ID	Location	Name	Status	Receiving Water	Authorised Substances
B	71m W	Garnswllt Stw	Not Active	-	-

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m	2

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 23 >**

ID	Location	Details	
6	190m W	Incident Date: 19/07/2013 Incident Identification: 1135792 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Algae	Water Impact: Category 1 (Major) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
C	445m SW	Incident Date: 22/07/2015 Incident Identification: 1357564 Pollutant: Sewage Materials Pollutant Description: Final Effluent	Water Impact: - Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

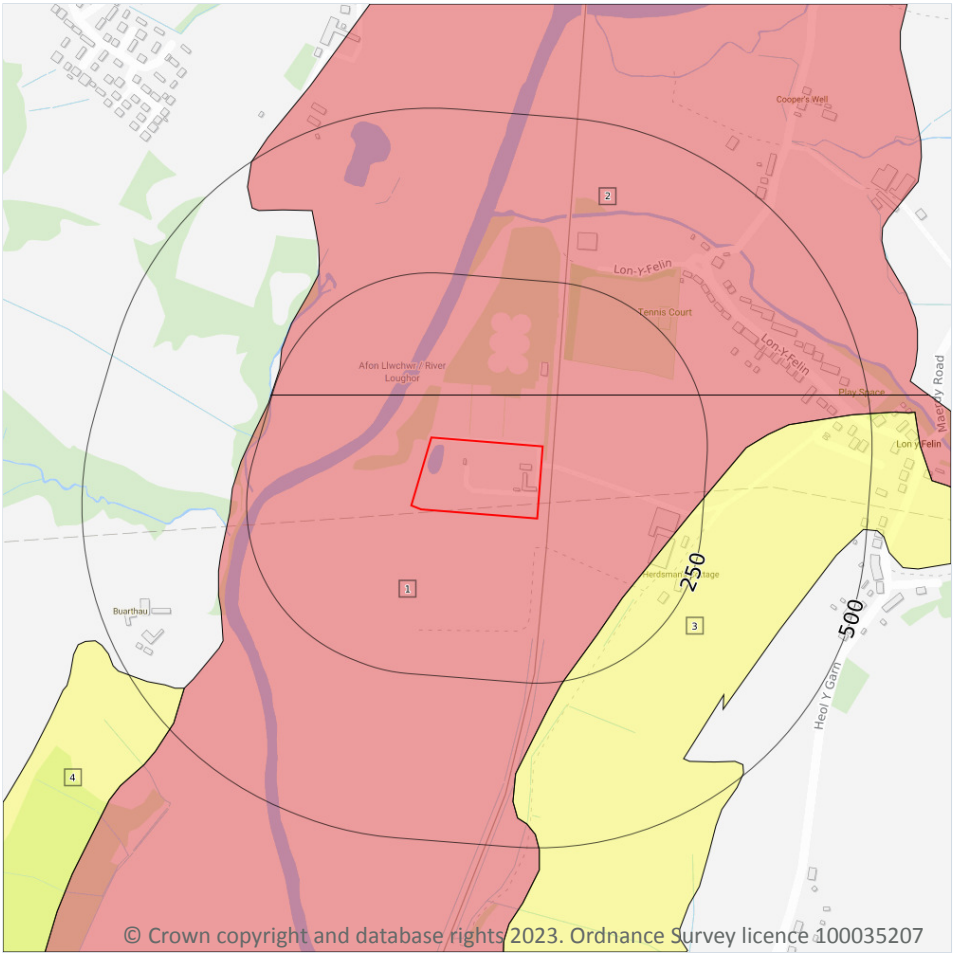
4.21 Pollution inventory radioactive waste

Records within 500m	0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive
- Unknown

5.1 Superficial aquifer

Records within 500m	4

Aquifer status of groundwater held within superficial geology.

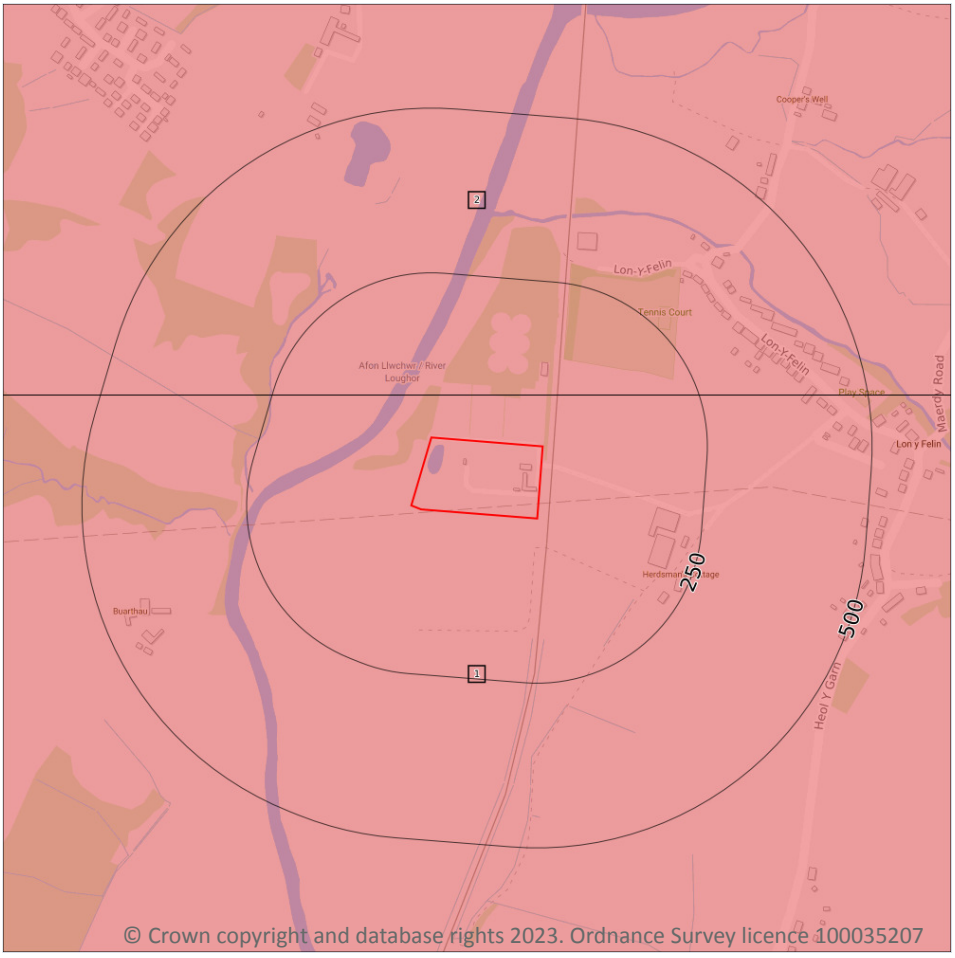
Features are displayed on the Hydrogeology map on **page 30 >**

ID	Location	Designation	Description
1	**On site**	**Secondary A**	**Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers**
2	64m NW	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

ID	Location	Designation	Description
3	176m SE	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
4	442m SW	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive

5.2 Bedrock aquifer

Records within 500m	2

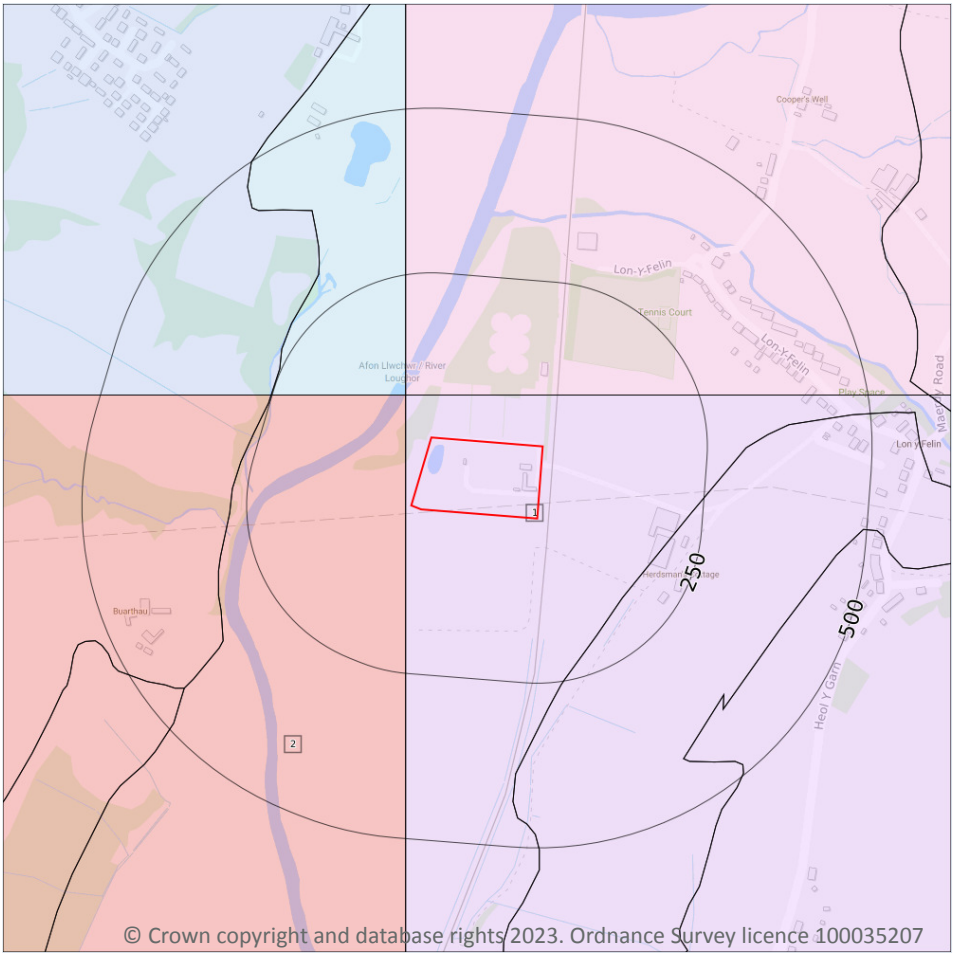
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 32 >**

ID	Location	Designation	Description
1	**On site**	**Secondary A**	**Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers**
2	64m NW	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



5.3 Groundwater vulnerability

Records within 50m	2

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 34 >**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	**On site**	**Summary Classification: Secondary bedrock aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer**	**Leaching class: Low Infiltration value: <40% Dilution value: >550mm/year**	**Vulnerability: Low Aquifer type: Secondary Thickness: <3m Patchiness value: <90% Recharge potential: No Data**	**Vulnerability: Medium Aquifer type: Secondary Flow mechanism: Well connected fractures**
2	8m W	Summary Classification: Secondary bedrock aquifer - High Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: High Infiltration value: 40-70% Dilution value: >550mm/year	Vulnerability: Medium Aquifer type: Secondary Thickness: <3m Patchiness value: <90% Recharge potential: Medium	Vulnerability: High Aquifer type: Secondary Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	**0**

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

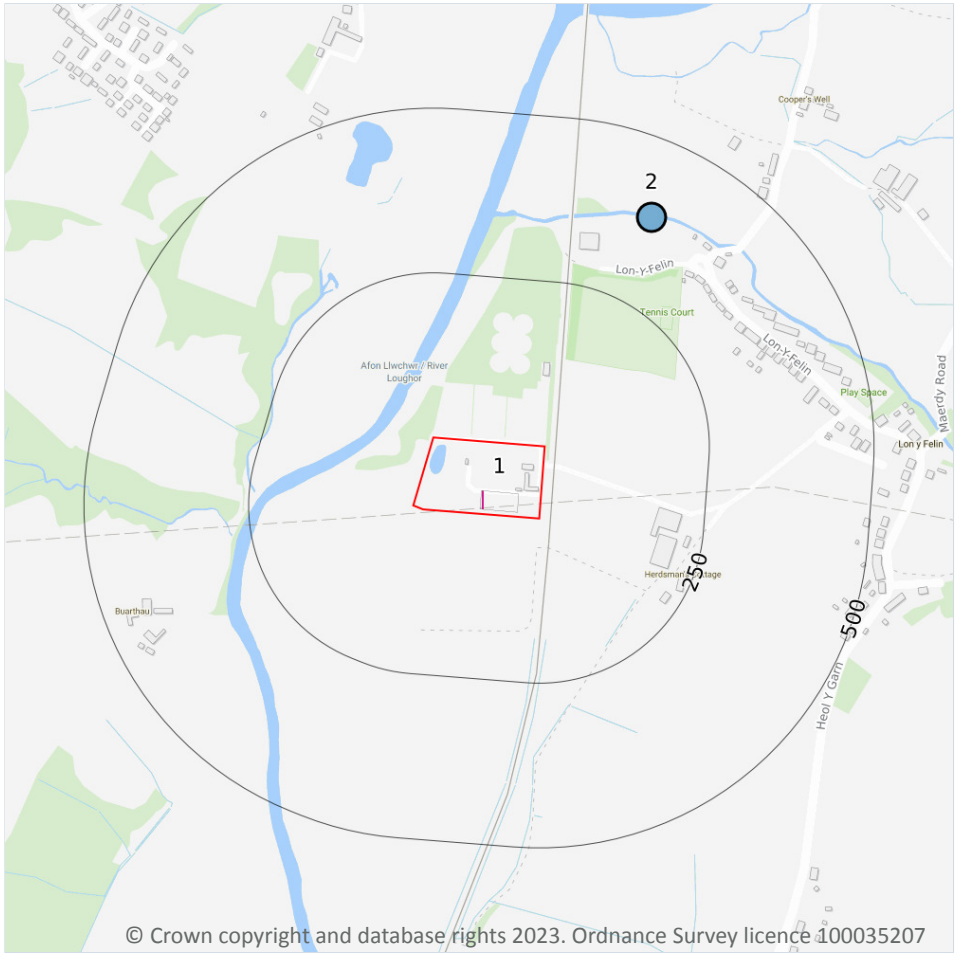
5.5 Groundwater vulnerability- local information

Records on site	**0**

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk ↗.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



Site Outline

Search buffers in metres (m)

- Source Protection Zone 1 — Inner catchment
- Source Protection Zone 2 — Outer catchment
- Source Protection Zone 3 — Total catchment
- Source Protection Zone 4 — Zone of Special Interest
- Source Protection Zone 1c — Inner catchment - confined aquifer
- Source Protection Zone 2c — Outer catchment - confined aquifer
- Source Protection Zone 3c — Total catchment - confined aquifer
- Drinking water abstraction licences
- Drinking water abstraction licences — Polygon features
- Drinking water abstraction licences — Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m	3

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 36 >**

ID	Location	Details	
1	**On site**	**Status: Historical** **Licence No: WA/059/0002/0015** **Details: Dewatering - Very Low** **Direct Source: Llynfi Member Bedrock** **Point: -** **Data Type: Poly4** **Name: -** **Easting: 262112** **Northing: 209855**	**Annual Volume (m^3): 44064** **Max Daily Volume (m^3): 734.40** **Original Application No: -** **Original Start Date: Nov 29 2021 12:00AM** **Expiry Date: Sep 1 2022 12:00AM** **Issue No: -** **Version Start Date: -** **Version End Date: -**
-	1367m SE	Status: Historical Licence No: 22/59/2/0037 Details: General Farming & Domestic Direct Source: EAW Groundwater Point: WELL AT YSTRADCATHEN FARM GARNSWLLT Data Type: Point Name: Davies Easting: 263300 Northing: 209000	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 28/02/1966 Version End Date: -
-	1674m N	Status: Historical Licence No: 22/59/2/0045 Details: General Farming & Domestic Direct Source: EAW Groundwater Point: WELL IN FIELD NO. 2772 AT TIRYDAIL DAIRY Data Type: Point Name: Griffiths Easting: 262230 Northing: 211600	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 30/03/1966 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m	**1**

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 36 >**

ID	Location	Details	
2	383m NE	Status: Historical Licence No: 22/59/2/0096 Details: Process water Direct Source: EAW Surface Water Point: RIVER CATHAN AT LON-Y-FELIN GARAGE OPEN YARD Data Type: Point Name: Roberts Easting: 262370 Northing: 210270	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 11/10/1988 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m	0

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	0

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

This data is sourced from the Environment Agency and Natural Resources Wales.

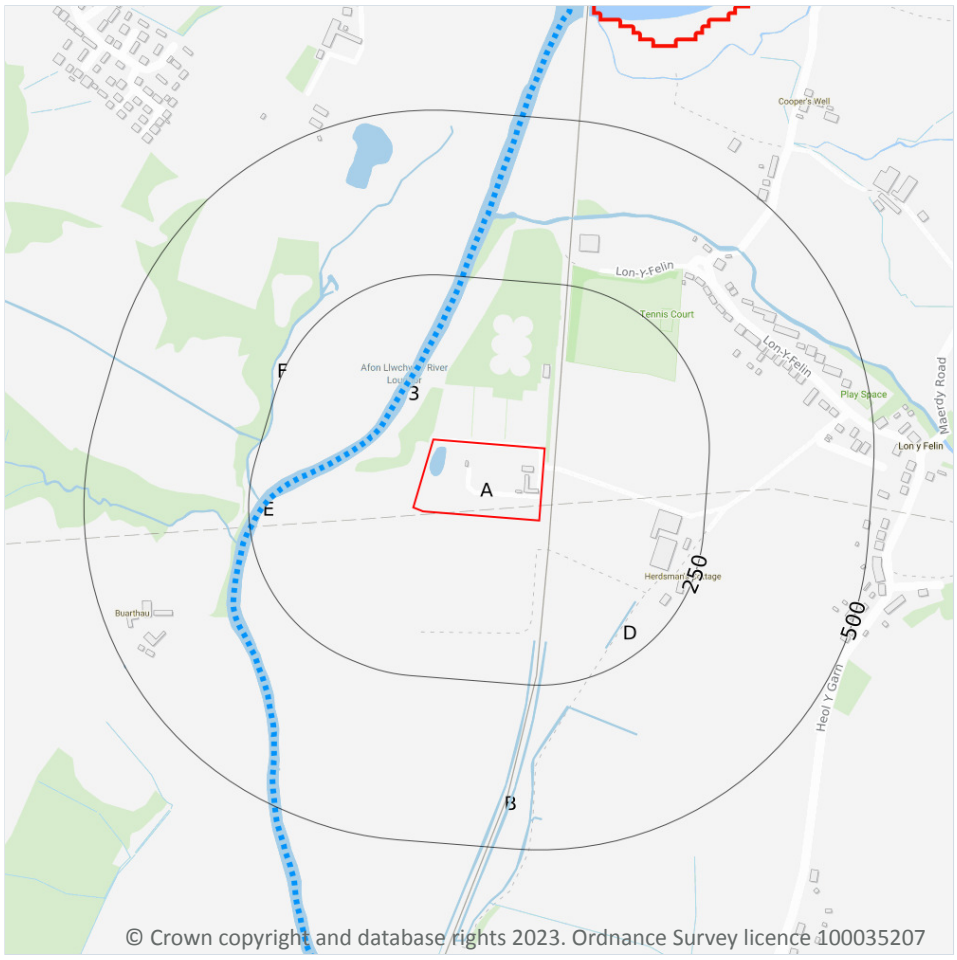
5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology



Site Outline

Search buffers in metres (m)

Water Network (OS MasterMap)

Surface water features (wider than 5m)

Surface water features (narrower than 5m)

WFD River, canal and surface water transfer water bodies

WFD Lake water bodies

WFD Transitional and coastal water bodies

WFD Surface water body catchments boundaries

WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	9

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 39 >**

ID	Location	Type of water feature	Ground level	Permanence	Name
3	77m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Afon Llwchwr

ID	Location	Type of water feature	Ground level	Permanence	Name
B	182m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	184m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	191m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
E	229m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
E	229m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Afon Llwchwr
E	234m W	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
E	241m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	243m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	**6**

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 39 >**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	1

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 39 >**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
A	**On site**	**River WB catchment**	**Loughor - confluence with Aman to tidal limit**	**GB110059032310**	**Loughor**	**Carmarthen Bay and the Gower**

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	1

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site.

Features are displayed on the Hydrology map on **page 39 >**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
4	78m NW	River	Loughor - confluence with Aman to tidal limit	GB110059032310	Moderate	Good	Moderate	2016

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	1

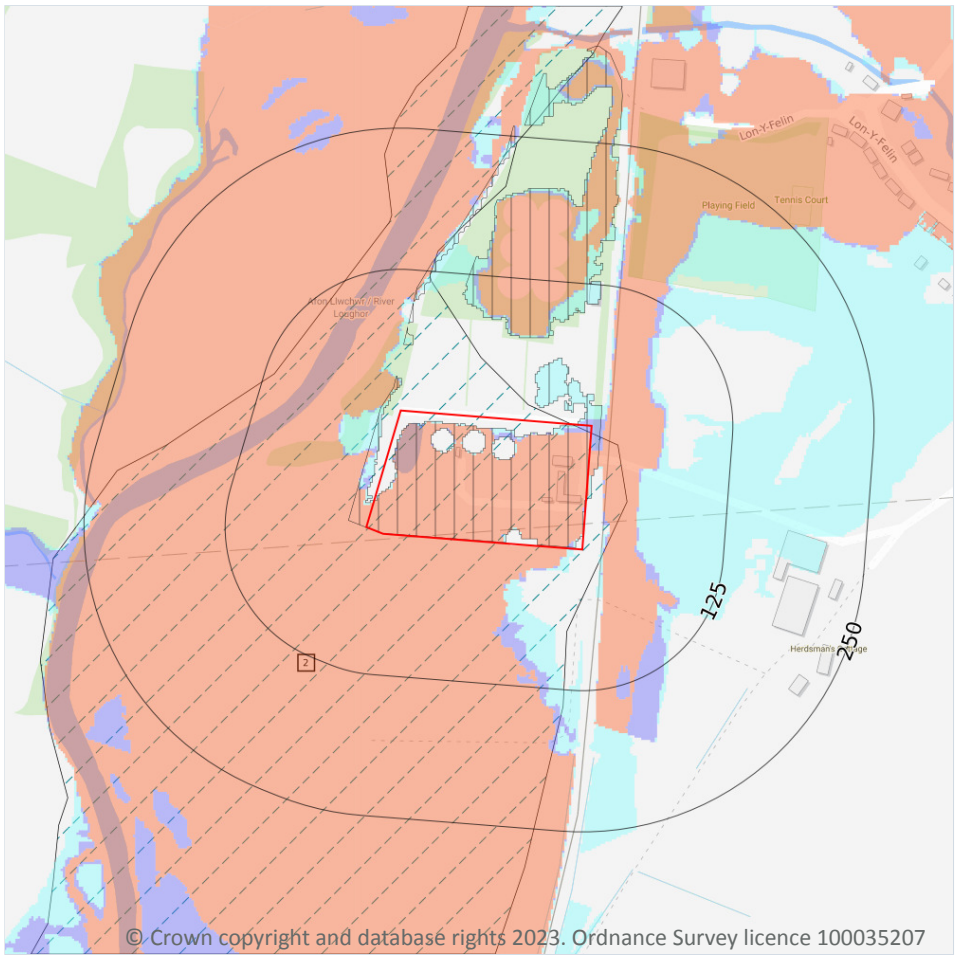
Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place.

Features are displayed on the Hydrology map on **page 39 >**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
A	**On site**	**Carmarthen Carboniferous Coal Measures**	**GB41002G200600**	**Poor**	**Poor**	**Good**	**2017**

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding



Site Outline

Search buffers in metres (m)

River and coastal flooding:

- High
- Medium
- Low
- Very Low
- Historical Flood Events
- Areas Used for Flood Storage
- Areas Benefiting from Flood Defences
- Flood Defences

7.1 Risk of flooding from rivers and the sea

Records within 50m	140

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

Features are displayed on the River and coastal flooding map on **page 43 >**

Distance	Flood risk category
On site	**High**
0 - 50m	High

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m	**1**

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

Features are displayed on the River and coastal flooding map on **page 43 >**

ID	Location	Event name	Date of flood	Flood source	Flood cause	Type of flood
2	**On site**	**Ammanford 1979**	**1979-12-27 1979-12-27**	**Main river**	**Channel capacity exceeded (no raised defences)**	**Fluvial**

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m	**0**

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m	**6**

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

Features are displayed on the River and coastal flooding map on **page 43 >**

ID	Location	
A	**On site**	**Area benefiting from flood defences**
A	59m NW	Area benefiting from flood defences
D	73m N	Area benefiting from flood defences
A	77m NW	Area benefiting from flood defences
D	97m N	Area benefiting from flood defences
D	223m N	Area benefiting from flood defences

This data is sourced from the Environment Agency and Natural Resources Wales.

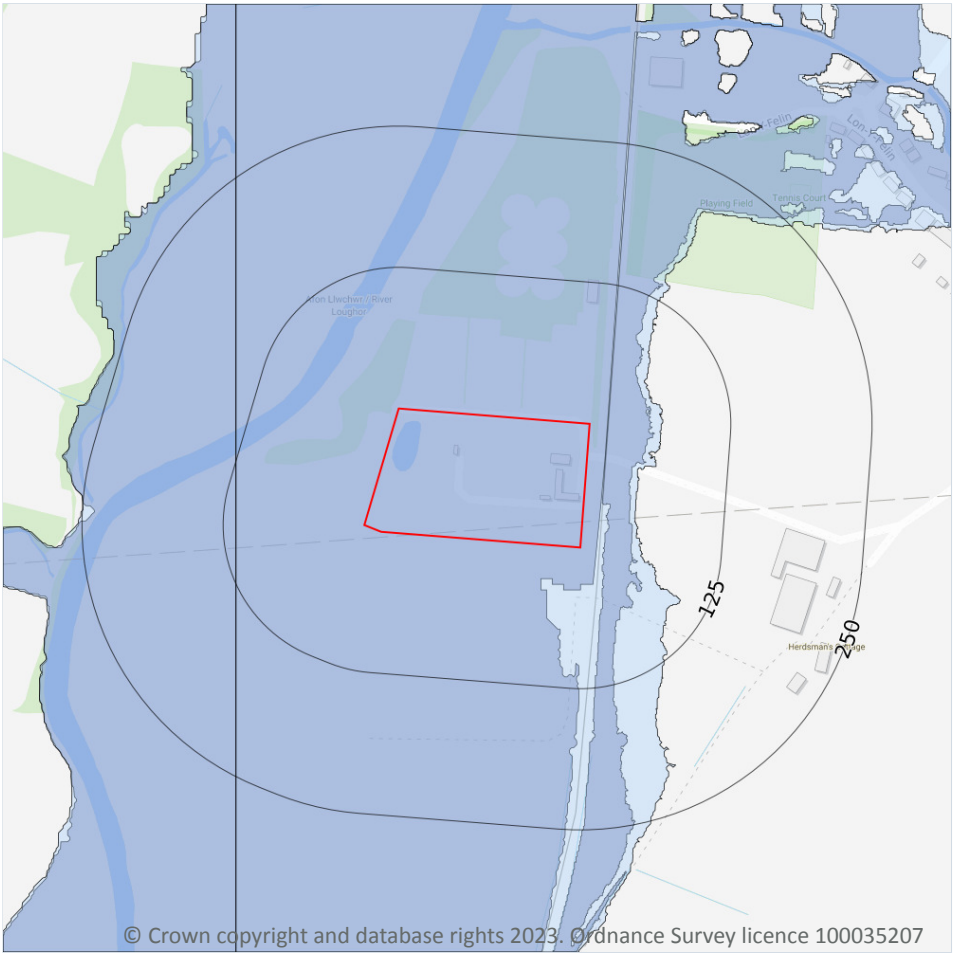
7.5 Flood Storage Areas

Records within 250m	**0**

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones



Site Outline

Search buffers in metres (m)

Flood zone 2

Flood zone 3

7.6 Flood Zone 2

Records within 50m	1

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

Features are displayed on the River and coastal flooding map on **page 43 >**

Location	Type
On site	**Zone 2 - (Fluvial /Tidal Models)**

This data is sourced from the Environment Agency and Natural Resources Wales.

7.7 Flood Zone 3

Records within 50m	1

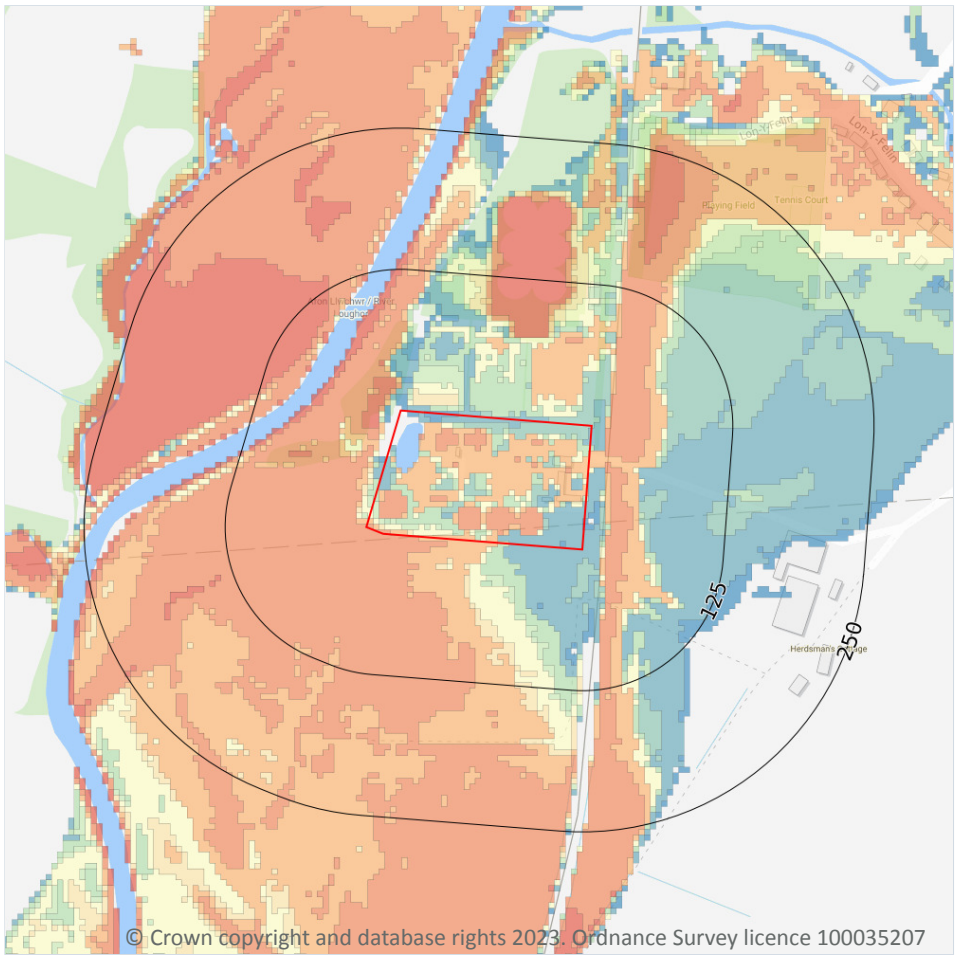
Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

Features are displayed on the River and coastal flooding map on **page 43 >**

Location	Type
On site	**Zone 3 - (Fluvial /Tidal Models)**

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding



Site Outline
Search buffers in metres (m)

1 in 1000 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

8.1 Surface water flooding

Highest risk on site	**1 in 30 year, 0.3m - 1.0m**
Highest risk within 50m	**1 in 30 year, Greater than 1.0m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 48 >**

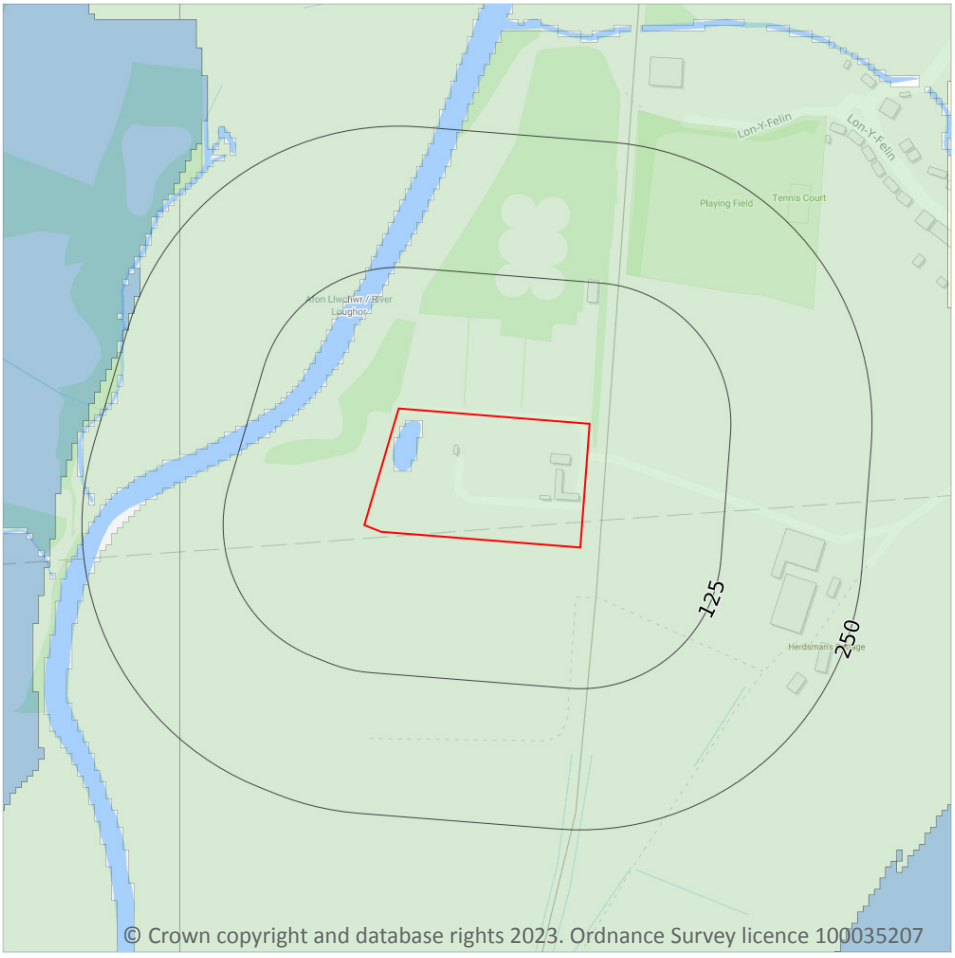
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Greater than 1.0m
1 in 250 year	Greater than 1.0m
1 in 100 year	Between 0.3m and 1.0m
1 in 30 year	Between 0.3m and 1.0m

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



Site Outline

Search buffers in metres (m)

High

Moderate - High

Moderate

Low

Negligible

9.1 Groundwater flooding

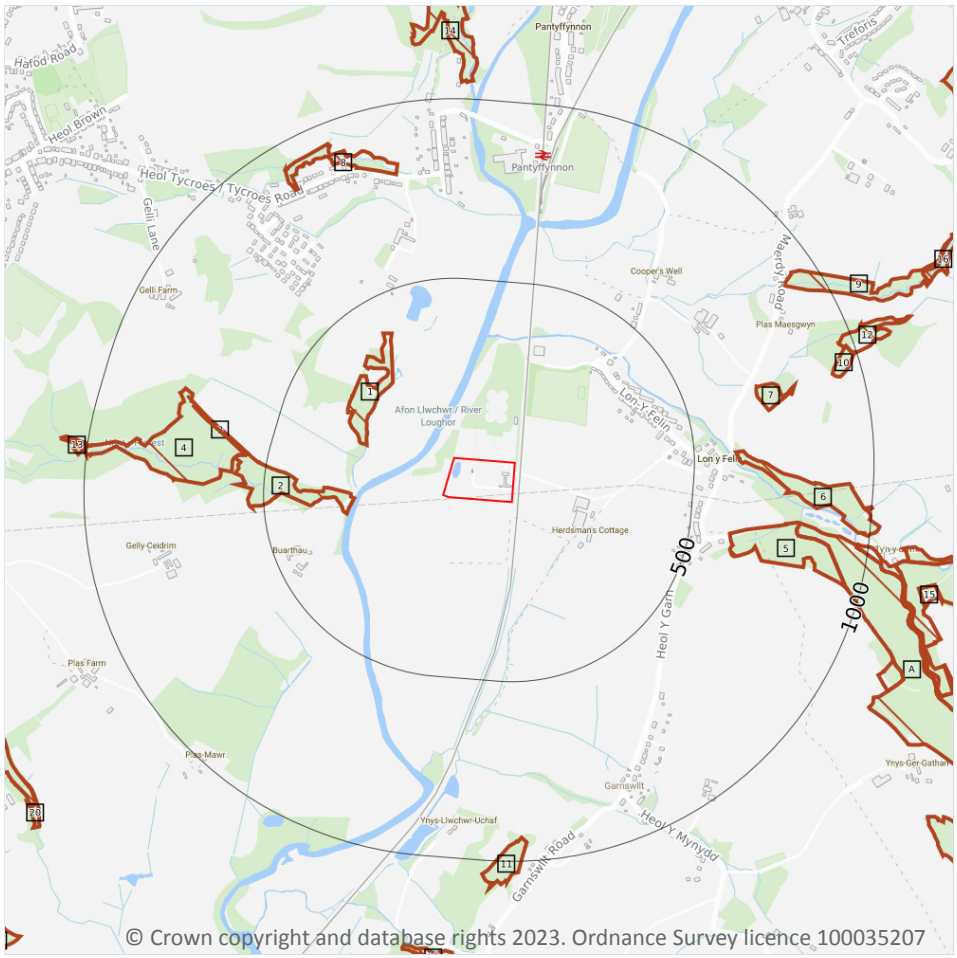
Highest risk on site	**Low**
Highest risk within 50m	**Low**

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 50 >**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations



Site Outline

Search buffers in metres (m)

Sites of Special Scientific Interest (SSSI)

Designated Ancient Woodland

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	1

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

Features are displayed on the Environmental designations map on **page 51 >**

ID	Location	Name	Data source
-	1610m SE	Graig Fawr, Pontardulais	Natural Resources Wales

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m	0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m	0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	52

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

Features are displayed on the Environmental designations map on **page 51 >**

ID	Location	Name	Woodland Type
1	243m W	Unknown	Ancient Semi Natural Woodland
2	248m W	Unknown	Ancient Semi Natural Woodland
3	557m W	Unknown	Ancient Semi Natural Woodland
4	561m W	Unknown	Restored Ancient Woodland Site
5	613m E	Unknown	Restored Ancient Woodland Site
6	616m E	Unknown	Ancient Semi Natural Woodland
7	700m E	Unknown	Ancient Semi Natural Woodland
A	797m E	Unknown	Restored Ancient Woodland Site
8	805m N	Unknown	Ancient Semi Natural Woodland
9	900m NE	Unknown	Ancient Semi Natural Woodland
10	918m E	Unknown	Ancient Semi Natural Woodland
11	934m S	Unknown	Ancient Semi Natural Woodland
12	960m E	Unknown	Ancient Semi Natural Woodland
A	965m E	Unknown	Restored Ancient Woodland Site
13	988m W	Unknown	Ancient Semi Natural Woodland
14	1046m N	Unknown	Ancient Semi Natural Woodland

ID	Location	Name	Woodland Type
B	1081m E	Unknown	Ancient Semi Natural Woodland
B	1096m E	Unknown	Ancient Semi Natural Woodland
A	1128m SE	Unknown	Restored Ancient Woodland Site
15	1158m E	Unknown	Ancient Semi Natural Woodland
16	1252m NE	Unknown	Ancient Semi Natural Woodland
17	1253m S	Unknown	Ancient Semi Natural Woodland
-	1302m S	Unknown	Restored Ancient Woodland Site
19	1399m SW	Unknown	Restored Ancient Woodland Site
20	1408m SW	Unknown	Restored Ancient Woodland Site
C	1451m SE	Unknown	Ancient Semi Natural Woodland
-	1479m E	Unknown	Ancient Semi Natural Woodland
-	1512m SE	Unknown	Ancient Semi Natural Woodland
-	1571m SE	Unknown	Ancient Semi Natural Woodland
-	1574m E	Unknown	Ancient Semi Natural Woodland
24	1597m NE	Unknown	Ancient Semi Natural Woodland
-	1630m E	Unknown	Ancient Semi Natural Woodland
-	1650m E	Unknown	Ancient Semi Natural Woodland
-	1657m S	Unknown	Ancient Semi Natural Woodland
-	1667m NW	Unknown	Ancient Semi Natural Woodland
-	1675m SE	Unknown	Ancient Semi Natural Woodland
29	1702m SW	Unknown	Ancient Semi Natural Woodland
-	1717m E	Unknown	Ancient Semi Natural Woodland
-	1761m E	Unknown	Ancient Semi Natural Woodland
-	1775m SE	Unknown	Restored Ancient Woodland Site
-	1829m E	Unknown	Ancient Semi Natural Woodland
-	1872m E	Unknown	Ancient Semi Natural Woodland
-	1896m N	Unknown	Ancient Semi Natural Woodland
-	1897m SE	Unknown	Ancient Semi Natural Woodland

ID	Location	Name	Woodland Type
-	1936m E	Unknown	Ancient Semi Natural Woodland
-	1936m NE	Unknown	Ancient Semi Natural Woodland
-	1940m E	Unknown	Ancient Semi Natural Woodland
-	1959m E	Unknown	Ancient Semi Natural Woodland
-	1961m E	Unknown	Ancient Semi Natural Woodland
-	1978m E	Unknown	Ancient Semi Natural Woodland
-	1988m NW	Unknown	Ancient Semi Natural Woodland
-	1994m E	Unknown	Ancient Semi Natural Woodland

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m	0

Areas designated to prevent urban sprawl by keeping land permanently open.

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or ‘classified’) under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was

closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m	0

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units

10.17 SSSI Impact Risk Zones

Records on site	0

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	0

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations

11.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m	0

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

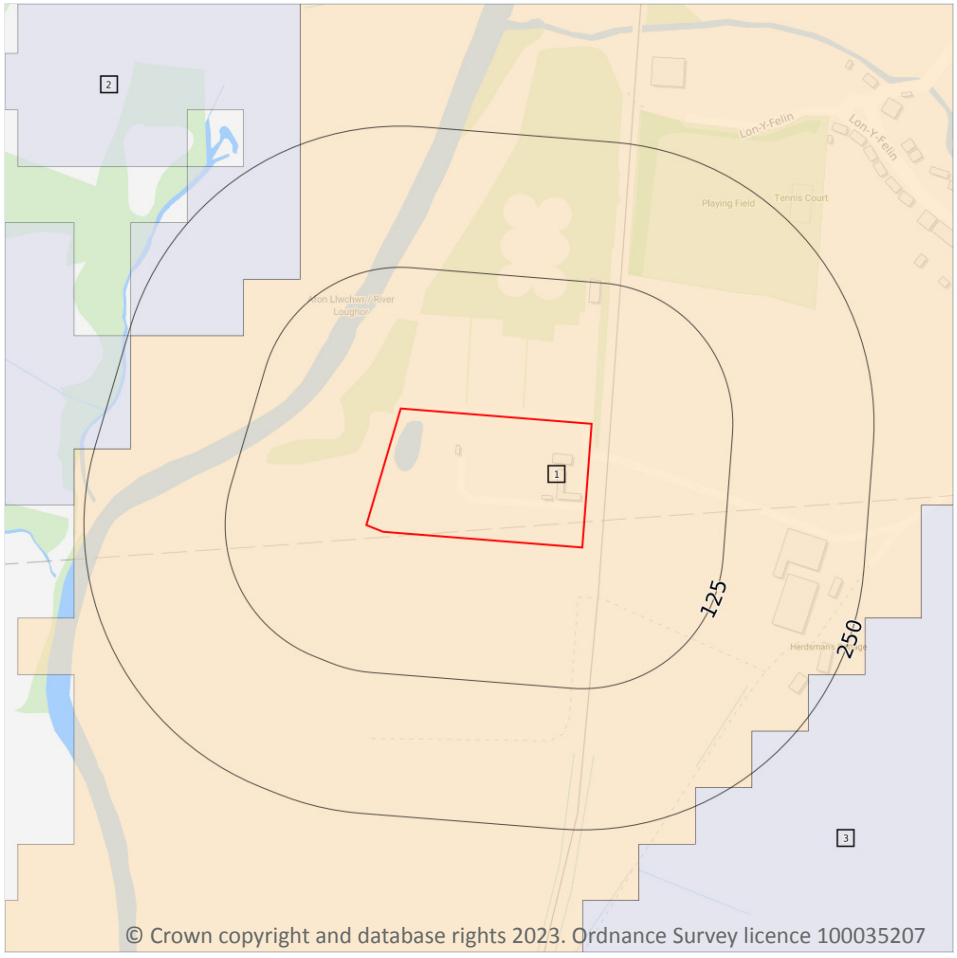
11.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12 Agricultural designations



Site Outline

Search buffers in metres (m)

- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Timber felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m	3

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 61 >**

ID	Location	Classification	Description
1	**On site**	**Grade 3a**	**Good to moderate quality agricultural land**
2	145m NW	Grade 3b	Moderate quality agricultural land
3	221m SE	Grade 3b	Moderate quality agricultural land

This data is sourced from Natural Resources Wales.

12.2 Open Access Land

Records within 250m	0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m	0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

Records within 250m	0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations

13.1 Priority Habitat Inventory

Records within 250m	0

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

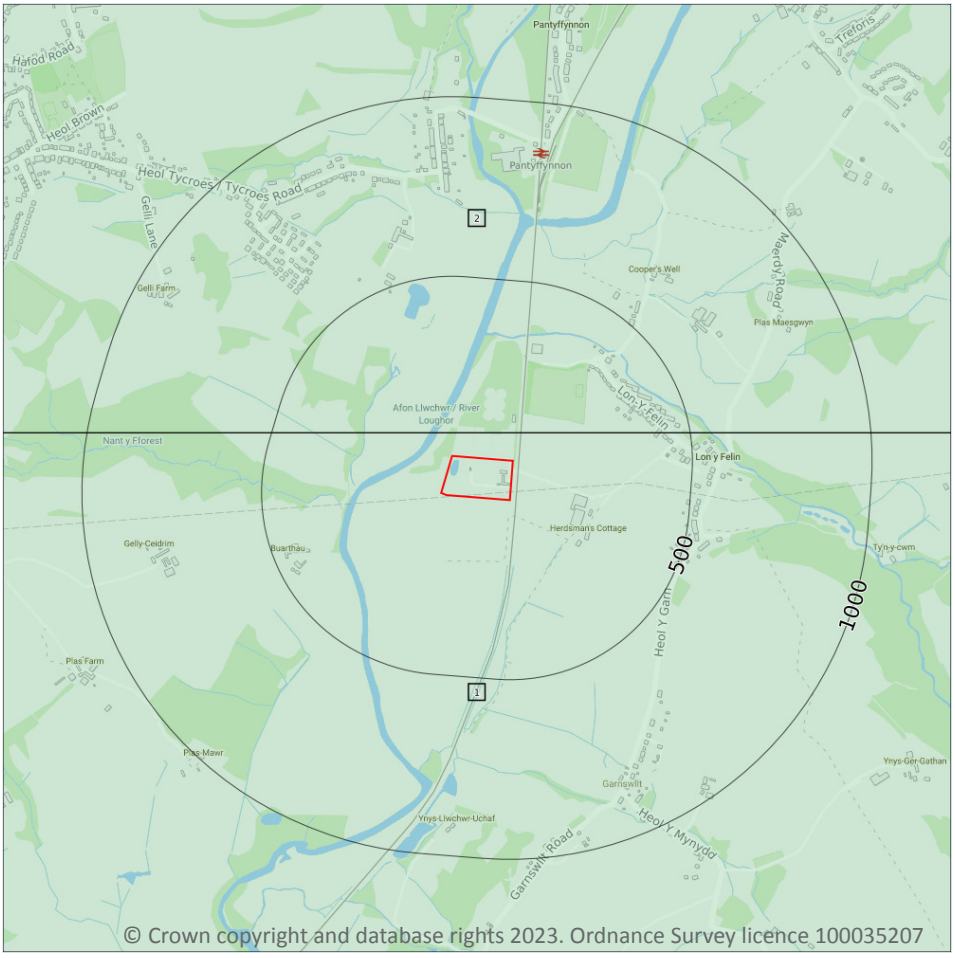
13.4 Limestone Pavement Orders

Records within 250m	0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



Site Outline

Search buffers in metres (m)

- Full coverage
- Partial coverage
- No coverage

14.1 10k Availability

Records within 500m	2

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 64 >**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**No coverage**	**Full**	**Full**	**Full**	**SN60NW**
2	64m NW	Full	Full	Full	No coverage	SN61SW

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground

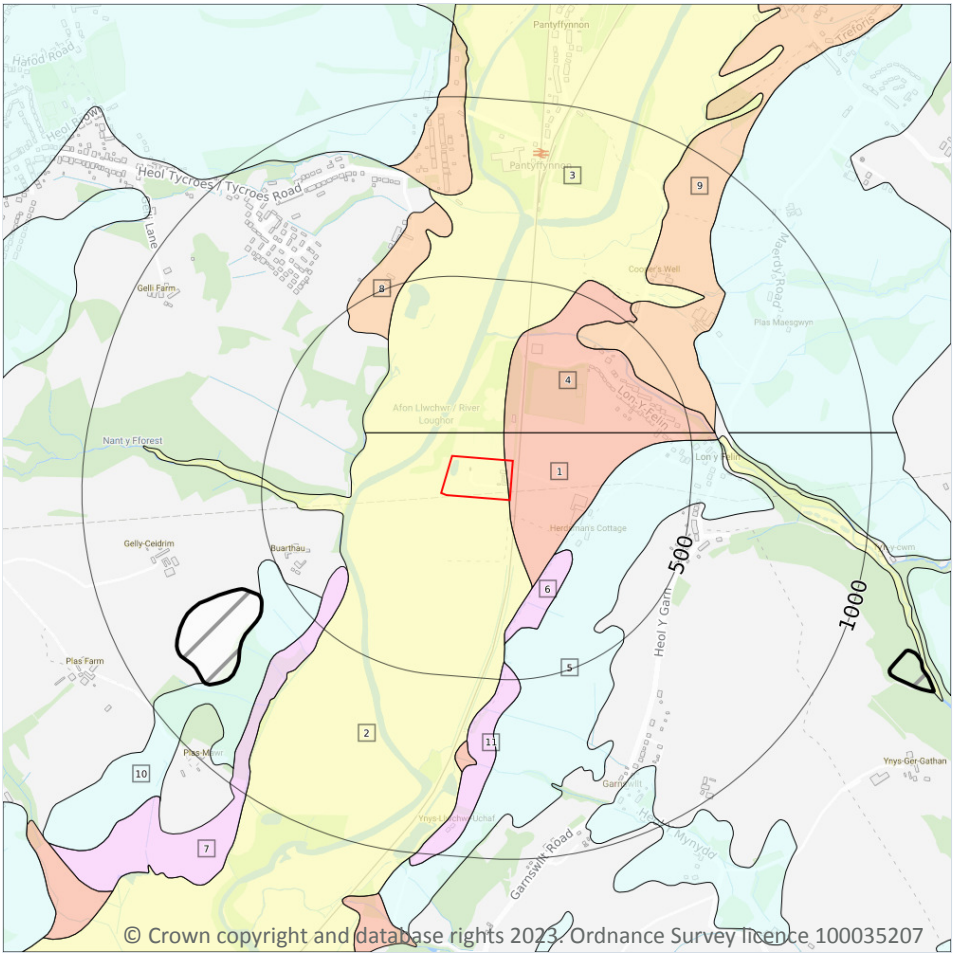
14.2 Artificial and made ground (10k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (10k)

Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m **11**

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 66 >**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**ALF-XSV**	**Alluvial Fan Deposits - Sand And Gravel**	**Sand And Gravel**
2	**On site**	**ALV-XCZSV**	**Alluvium - Clay, Silt, Sand And Gravel**	**Clay, Silt, Sand And Gravel**
3	64m NW	ALV-XCZSV	Alluvium - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel
4	76m NE	ALF-XSV	Alluvial Fan Deposits - Sand And Gravel	Sand And Gravel

ID	Location	LEX Code	Description	Rock description
5	186m SE	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton
6	196m SE	GFDUD-XSV	Glaciofluvial Deposits, Devensian - Sand And Gravel	Sand And Gravel
7	338m SW	GFDUD-XSV	Glaciofluvial Deposits, Devensian - Sand And Gravel	Sand And Gravel
8	368m NW	RTDU-XSV	River Terrace Deposits (undifferentiated) - Sand And Gravel	Sand And Gravel
9	377m NE	RTDU-XSV	River Terrace Deposits (undifferentiated) - Sand And Gravel	Sand And Gravel
10	442m SW	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton
11	449m S	GFDUD-XSV	Glaciofluvial Deposits, Devensian - Sand And Gravel	Sand And Gravel

This data is sourced from the British Geological Survey.

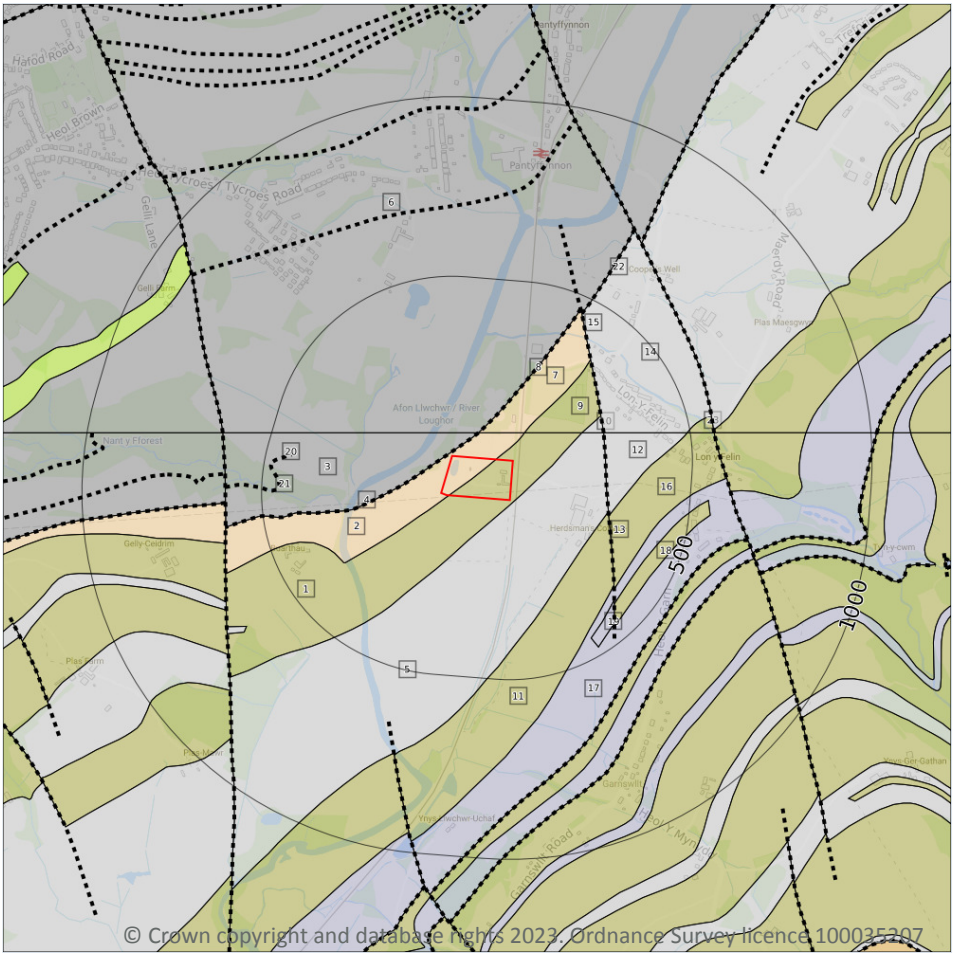
14.4 Landslip (10k)

Records within 500m	0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m **16**

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 68 >**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**LLFB-SDST**	**Llynfi Member - Sandstone**	**Bolsovian Sub-age**
2	**On site**	**SWUCM-MDSS**	**South Wales Upper Coal Measures Formation - Mudstone, Siltstone And Sandstone**	**Westphalian D Sub-age - Bolsovian Sub-age**
3	10m NW	SWMCM-MDSS	South Wales Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age

ID	Location	LEX Code	Description	Rock age
5	10m SE	LLFB-MDSS	Llynfi Member - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age
6	64m NW	SWMCM-MDSS	South Wales Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age - Duckmantian Sub-age
7	70m N	SWUCM-MDSS	South Wales Upper Coal Measures Formation - Mudstone, Siltstone And Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
9	85m NE	LLFB-SDST	Llynfi Member - Sandstone	Bolsovian Sub-age
10	208m NE	LLFB-MDSS	Llynfi Member - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age
11	242m SE	RA-SDST	Rhondda Member - Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
12	258m E	LLFB-MDSS	Llynfi Member - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age
14	265m E	LLFB-MDSS	Llynfi Member - Mudstone, Siltstone And Sandstone	Bolsovian Sub-age
16	279m E	RA-SDST	Rhondda Member - Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
17	375m SE	RA-MDSS	Rhondda Member - Mudstone, Siltstone And Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
18	402m SE	RA-SDST	Rhondda Member - Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
19	402m SE	RA-MDSS	Rhondda Member - Mudstone, Siltstone And Sandstone	Westphalian D Sub-age - Bolsovian Sub-age
23	492m E	RA-SDST	Rhondda Member - Sandstone	Westphalian D Sub-age - Bolsovian Sub-age

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m **7**

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

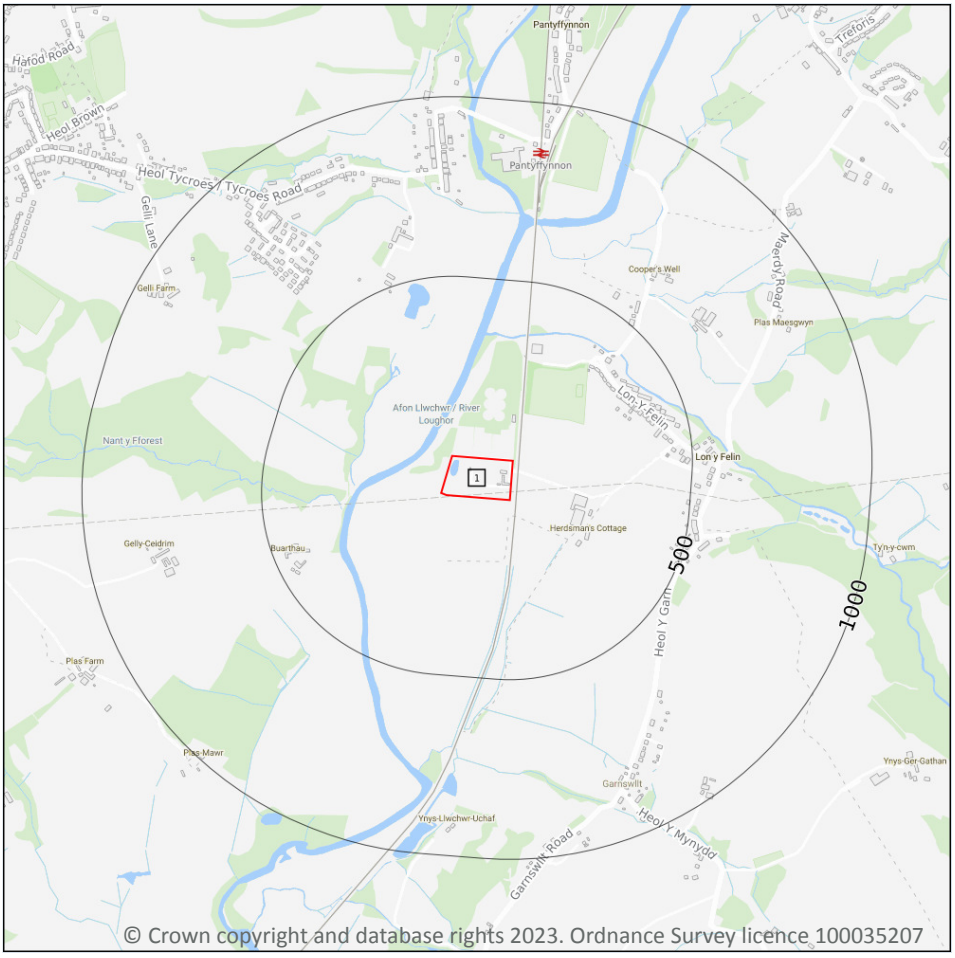
Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 68 >**

ID	Location	Category	Description
4	10m NW	FOSSIL_HORIZON	Fossil horizon, marine band
8	70m N	FOSSIL_HORIZON	Fossil horizon, marine band

ID	Location	Category	Description
13	258m E	FAULT	Normal fault, inferred; crossmarks on downthrow side
15	265m E	FAULT	Normal fault, inferred; crossmarks on downthrow side
20	430m W	ROCK	Coal seam, inferred
21	451m W	ROCK	Coal seam, observed
22	452m NE	FOSSIL_HORIZON	Fossil horizon, marine band

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



Site Outline

Search buffers in metres (m)

Geological map tile

15.1 50k Availability

Records within 500m	1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme. Where 50k data is not available, this area has been filled in with 625k scale data.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 71 >**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**Full**	**EW230_ammanford_v4**

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground

15.2 Artificial and made ground (50k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

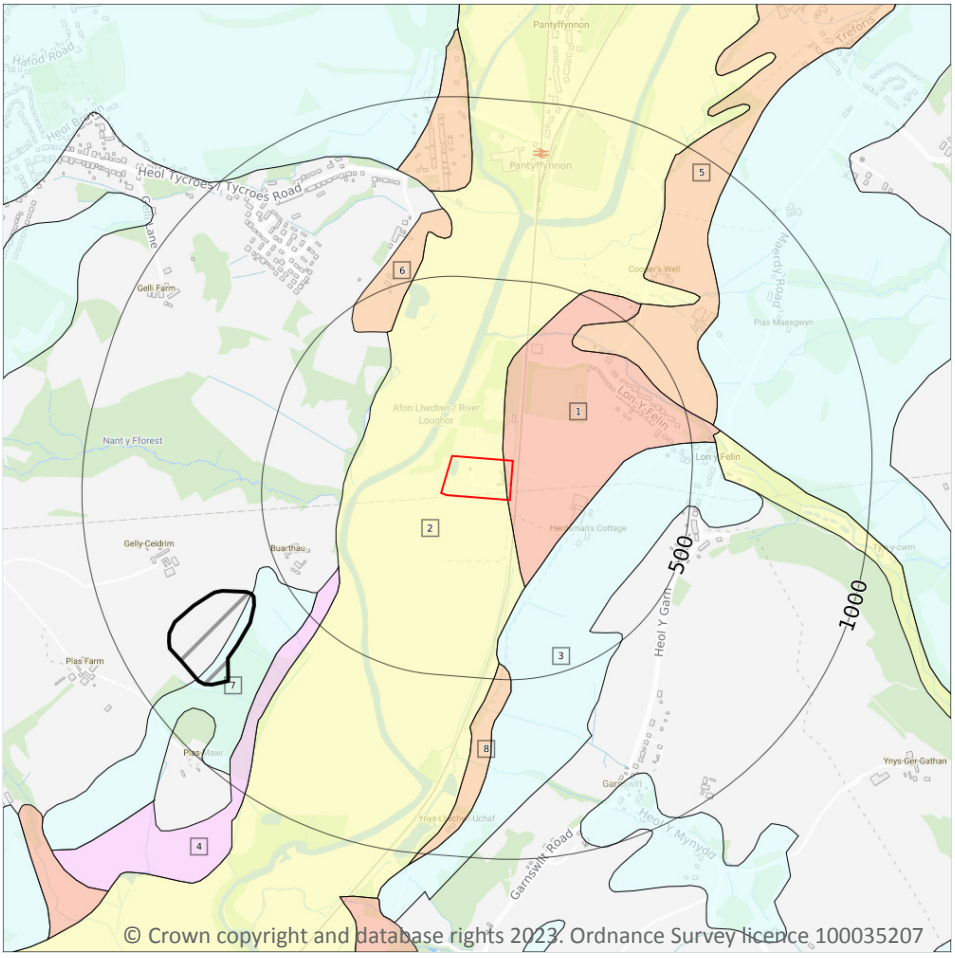
15.3 Artificial ground permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m **8**

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 73 >**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**ALF-XSV**	**ALLUVIAL FAN DEPOSITS**	**SAND AND GRAVEL**
2	**On site**	**ALV-XCZSV**	**ALLUVIUM**	**CLAY, SILT, SAND AND GRAVEL**
3	176m SE	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
4	352m SW	GFDUD-XSV	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL

ID	Location	LEX Code	Description	Rock description
5	361m NE	RTDU-XSV	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND AND GRAVEL
6	387m NW	RTDU-XSV	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND AND GRAVEL
7	442m SW	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
8	456m S	RTDU-XSV	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND AND GRAVEL

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	**2**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Intergranular**	**High**	**Very Low**
On site	**Intergranular**	**Very High**	**High**

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	**0**

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

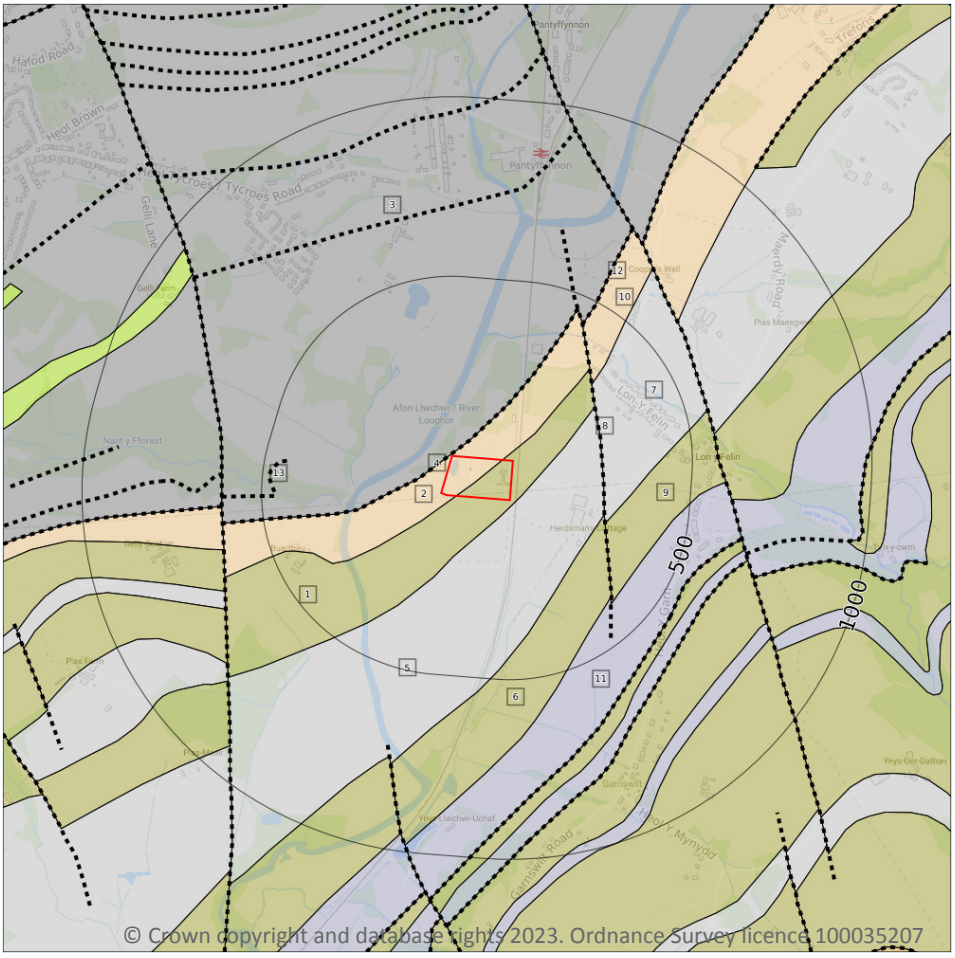
15.7 Landslip permeability (50k)

Records within 50m	**0**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m **9**

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 75 >**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**LLFB-SDST**	**LLYNFI MEMBER - SANDSTONE**	**WESTPHALIAN**
2	**On site**	**SWUCM-MDSS**	**SOUTH WALES UPPER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE**	**WESTPHALIAN**
3	6m NW	SWMCM-MDSS	SOUTH WALES MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN

ID	Location	LEX Code	Description	Rock age
5	14m SE	LLFB-MDSS	LLYNFI MEMBER - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
6	241m SE	RA-SDST	RHONDDA MEMBER - SANDSTONE	WESTPHALIAN
7	248m E	LLFB-MDSS	LLYNFI MEMBER - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
9	273m E	RA-SDST	RHONDDA MEMBER - SANDSTONE	WESTPHALIAN
10	306m NE	SWUCM-MDSS	SOUTH WALES UPPER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN
11	390m SE	RA-MDSS	RHONDDA MEMBER - MUDSTONE, SILTSTONE AND SANDSTONE	WESTPHALIAN

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m **4**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Fracture**	**Moderate**	**Low**
On site	**Fracture**	**High**	**Moderate**
5m NW	Fracture	Moderate	Low
14m SE	Fracture	Moderate	Low

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m **4**

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 75 >**

ID	Location	Category	Description
4	6m NW	FOSSIL_HORIZON	Marine band
8	248m E	FAULT	Fault, inferred, displacement unknown
12	427m NE	FOSSIL_HORIZON	Marine band
13	428m W	ROCK	Coal seam, observed

This data is sourced from the British Geological Survey.

16 Boreholes

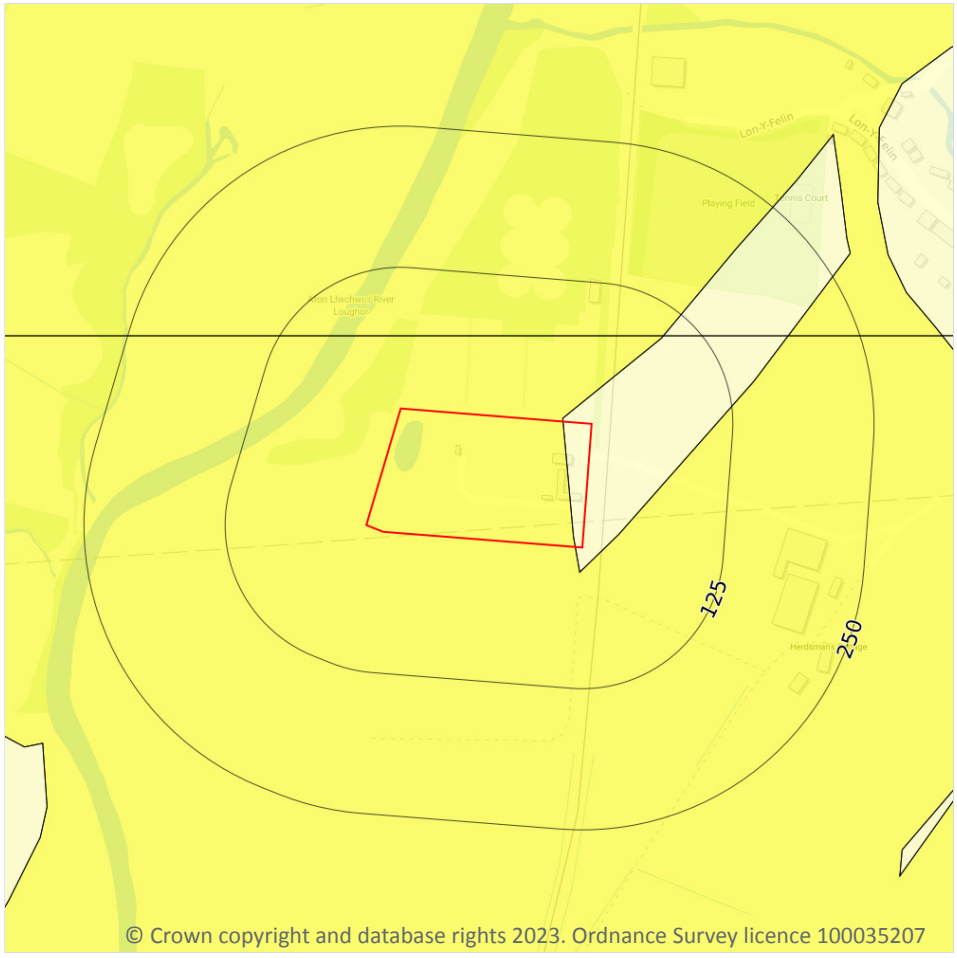
16.1 BGS Boreholes

Records within 250m	0

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m	2

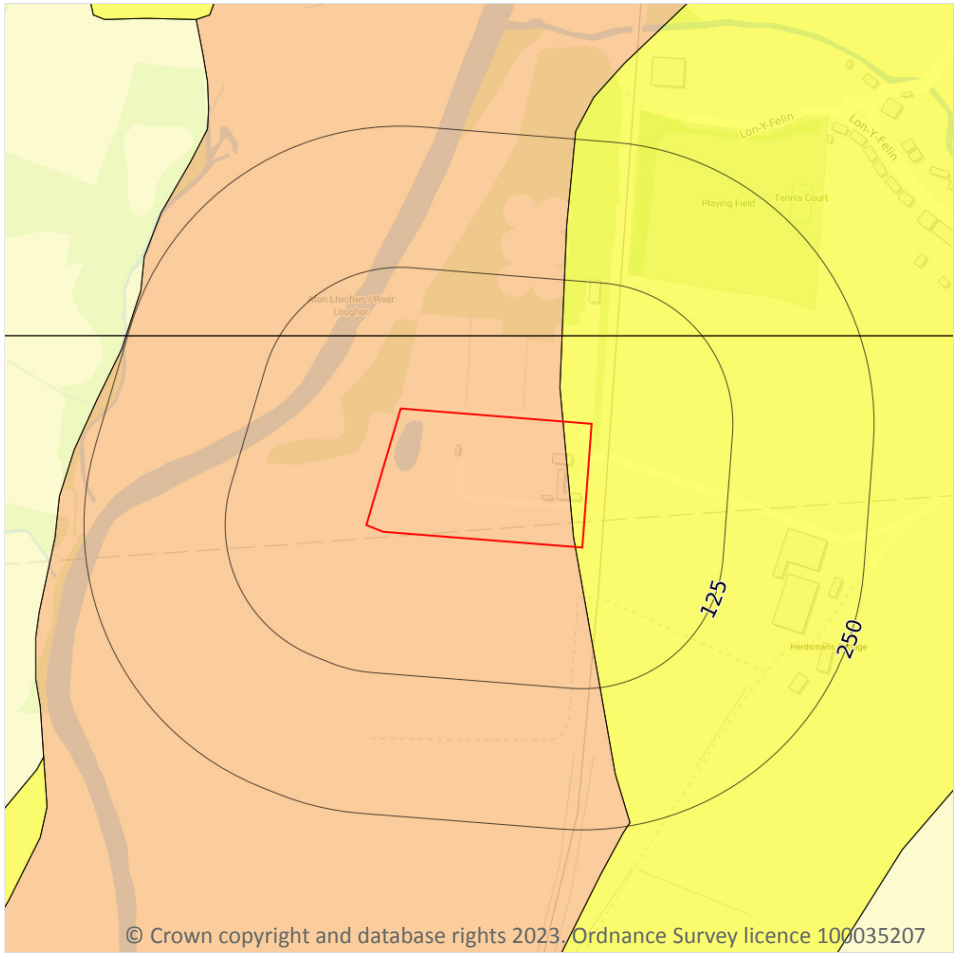
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 79 >**

Location	Hazard rating	Details
On site	**Negligible**	**Ground conditions predominantly non-plastic.**
On site	**Very low**	**Ground conditions predominantly low plasticity.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m	2

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

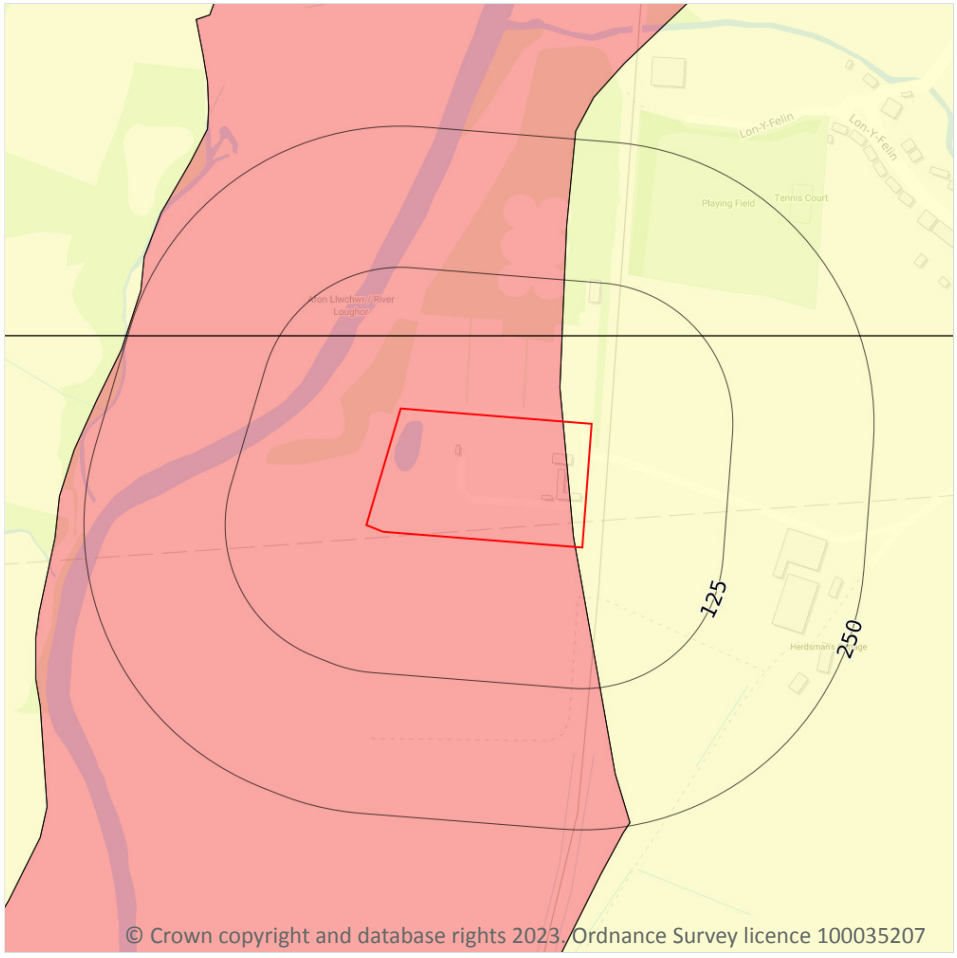
Features are displayed on the Natural ground subsidence - Running sands map on **page 80 >**

Location	Hazard rating	Details
On site	**Very low**	**Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.**

Location	Hazard rating	Details
On site	**Low**	**Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.3 Compressible deposits

Records within 50m	2

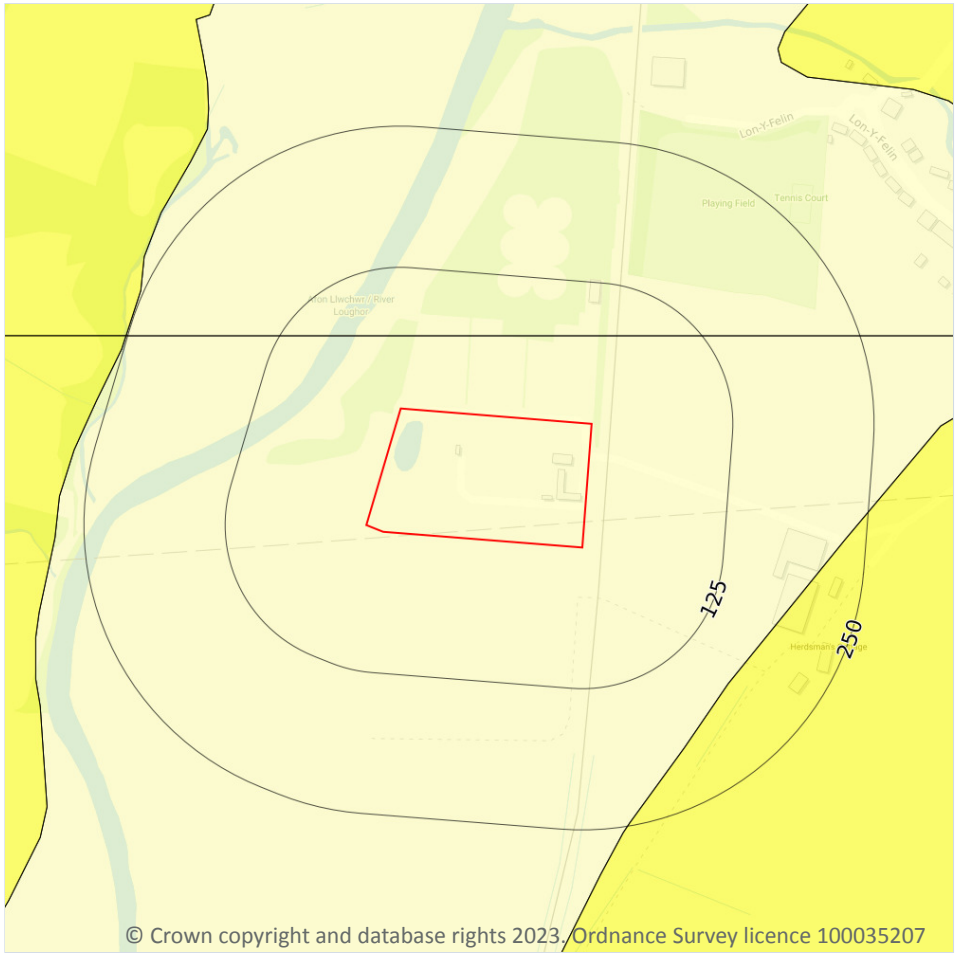
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 82 >**

Location	Hazard rating	Details
On site	**Negligible**	**Compressible strata are not thought to occur.**
On site	**Moderate**	**Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	1

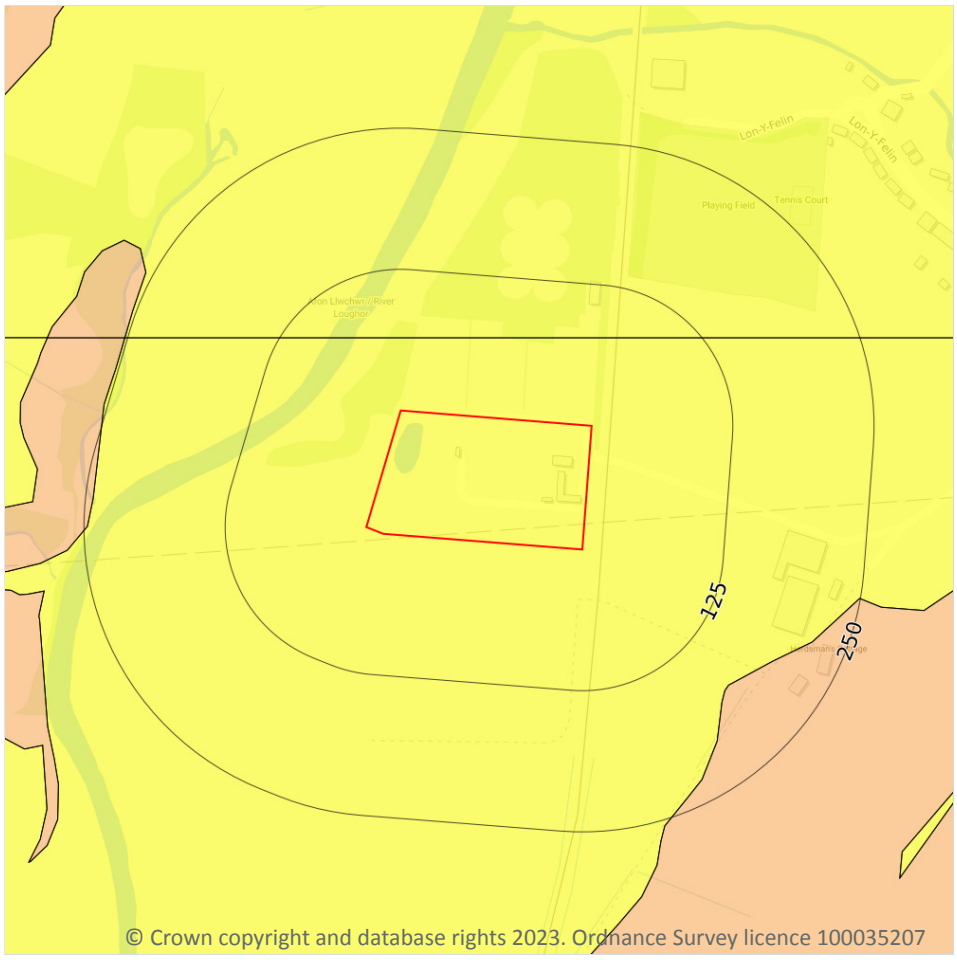
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 84 >**

Location	Hazard rating	Details
On site	**Negligible**	**Deposits with potential to collapse when loaded and saturated are believed not to be present.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m	1

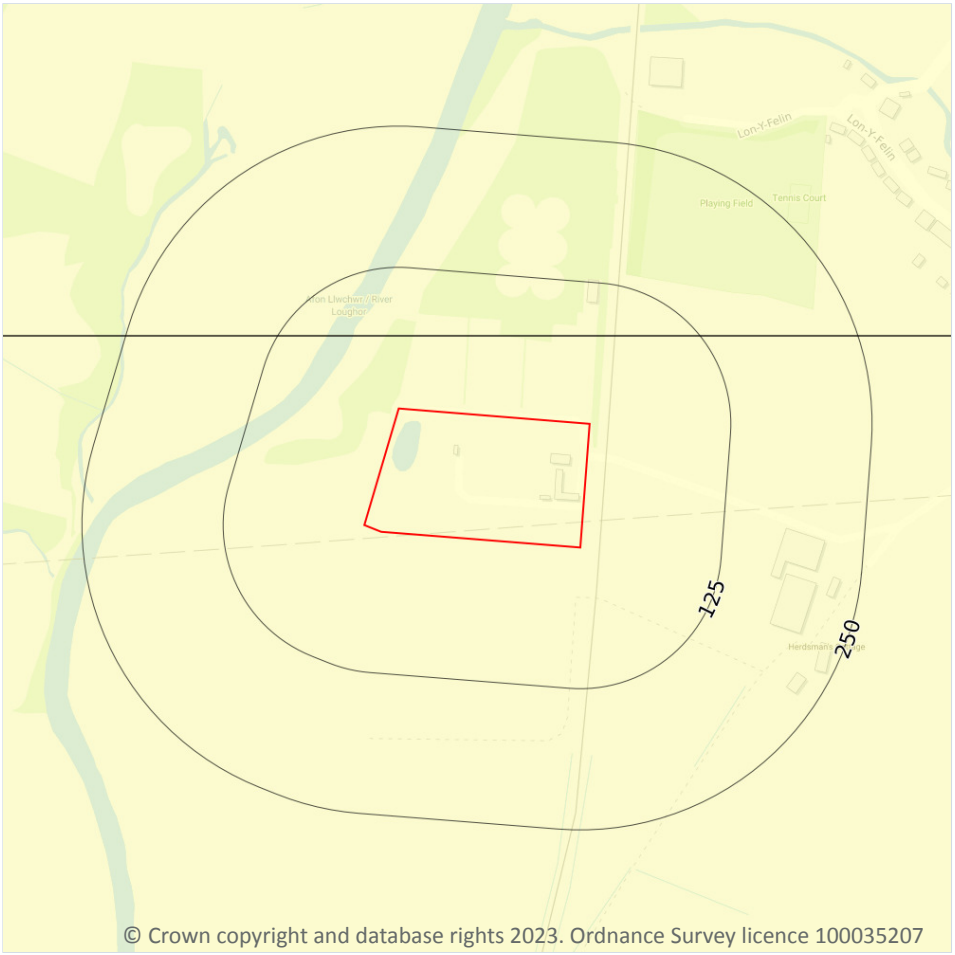
The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 85 >**

Location	Hazard rating	Details
On site	**Very low**	**Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m	1

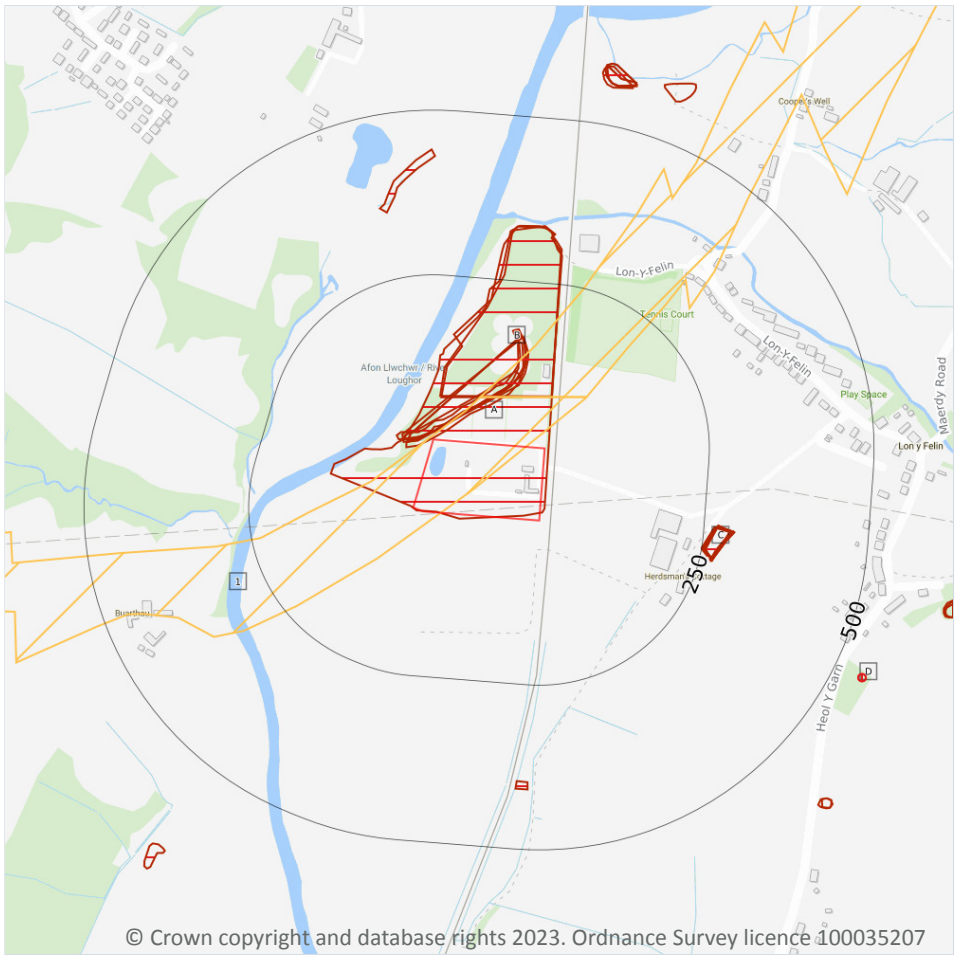
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 86 >**

Location	Hazard rating	Details
On site	**Negligible**	**Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.**

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



Site Outline

Search buffers in metres (m)

- Natural cavities (Area)
- Natural cavities (Point)
- BritPits
- Surface ground workings
- Underground workings
- Historical Mineral Planning Areas
- Mining Cavities

Non Coal Mining

- Sporadic underground mining of restricted extent possible
- Localised small scale underground mining possible
- Small scale mining possible
- Underground mining known or likely within or in close proximity
- Underground mining known within or in very close proximity

18.1 Natural cavities

Records within 500m	0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m	0

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	10

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 88 >**

ID	Location	Land Use	Year of mapping	Mapping scale
A	**On site**	**Sewage Works**	**1948**	**1:10560**
A	2m NW	Unspecified Ground Workings	1938	1:10560
A	10m NW	Unspecified Pit	1905	1:10560
A	11m NW	Unspecified Pit	1948	1:10560
A	11m NW	Unspecified Pit	1938	1:10560
A	11m NW	Unspecified Pit	1938	1:10560
A	13m NW	Unspecified Ground Workings	1901	1:10560
B	65m NW	Sewage Works	1979	1:10000
B	67m NW	Sewage Works	1992	1:10000
C	250m E	Pond	1901	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	11

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

Features are displayed on the Mining, ground workings and natural cavities map on **page 88 >**

ID	Location	Land Use	Year of mapping	Mapping scale
D	539m SE	Unspecified Shaft	1988	1:10000
D	539m SE	Unspecified Shaft	1965	1:10560
-	869m E	Unspecified Level	1876	1:10560
-	902m E	Unspecified Level	1905	1:10560
-	931m N	Colliery	1878	1:10560
-	934m E	Unspecified Level	1876	1:10560
-	943m N	Colliery	1901	1:10560
-	952m N	Old Coal Level	1878	1:10560
-	962m NW	Disused Colliery	1905	1:10560
-	986m N	Unspecified Old Level	1948	1:10560
-	987m N	Old Coal Level	1901	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	2

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

Features are displayed on the Mining, ground workings and natural cavities map on **page 88 >**

ID	Location	Name	Commodity	Class	Likelihood
1	**On site**	**Not available**	**Iron Ore (Bedded)**	**B**	**Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered**
2	70m N	Not available	Iron Ore (Bedded)	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	**0**

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

18.8 JPB mining areas

Records on site	**0**

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	**1**

Areas which could be affected by past, current or future coal mining.

Location	Details
On site	**The site is located within a coal mining area as defined by the Coal Authority. A Consultants Coal Mining Report is recommended to further assess coal mining issues at the site. This can be ordered directly through Groundsure or your preferred search provider.**

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

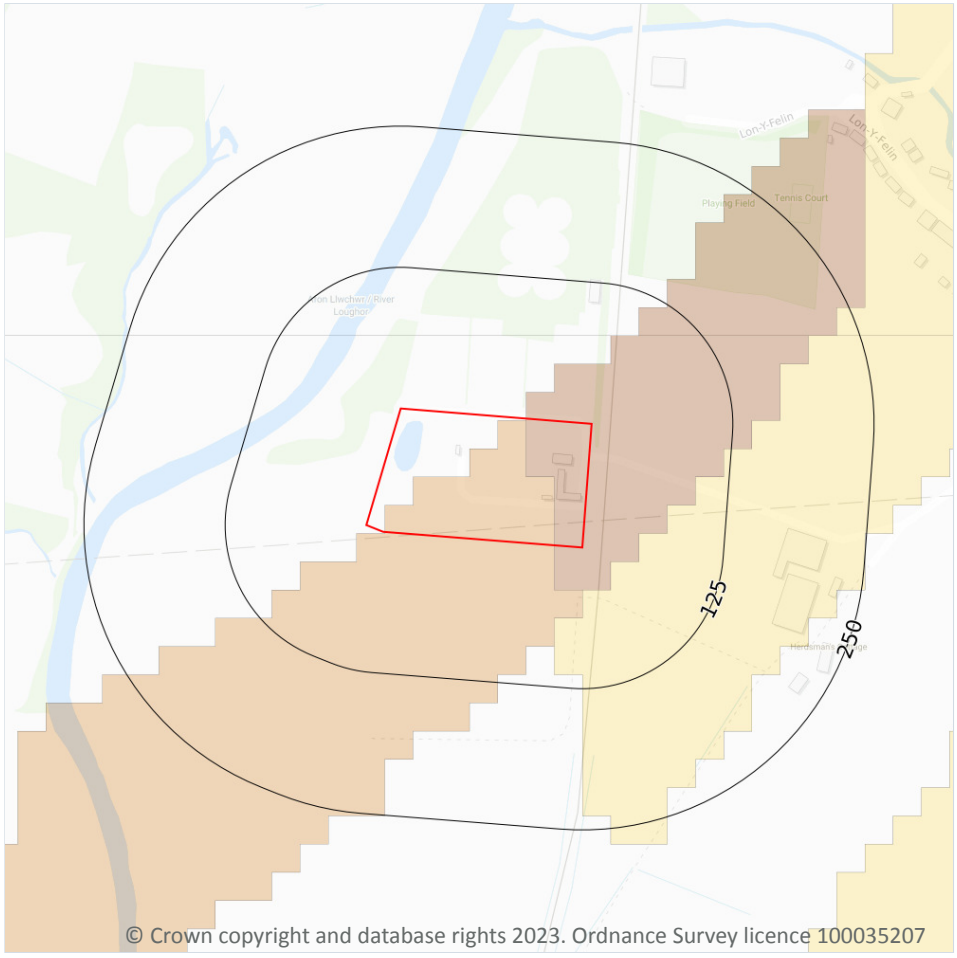
18.13 Clay mining

Records on site	0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



Site Outline

Search buffers in metres (m)

- Greater than 30%
- Between 10% and 30%
- Between 5% and 10%
- Between 3% and 5%
- Between 1% and 3%
- Less than 1%

19.1 Radon

Records on site	3

The Radon Potential data classifies areas based on their likelihood of a property having a radon level at or above the Action Level in Great Britain. The dataset is intended for use at 1:50,000 scale and was derived from both geological assessments and indoor radon measurements (more than 560,000 records). A minimum 50m buffer should be considered when searching the maps, as the smallest detectable feature at this scale is 50m. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain (1:100,000 scale).

Features are displayed on the Radon map on **page 93 >**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Between 10% and 30%**	**Full**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Between 5% and 10%**	**Basic**
On site	**Less than 1%**	**None**

This data is sourced from the British Geological Survey and UK Health Security Agency.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m	10

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km^2. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km^2; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 - 25 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**30 - 45 mg/kg**
On site	**25 - 35 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**25 - 35 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
3m NE	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
5m NW	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
9m W	25 - 35 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
14m SE	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg
22m SE	25 - 35 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
31m W	15 - 25 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
44m SW	25 - 35 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m	0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km^2).

This data is sourced from the British Geological Survey.

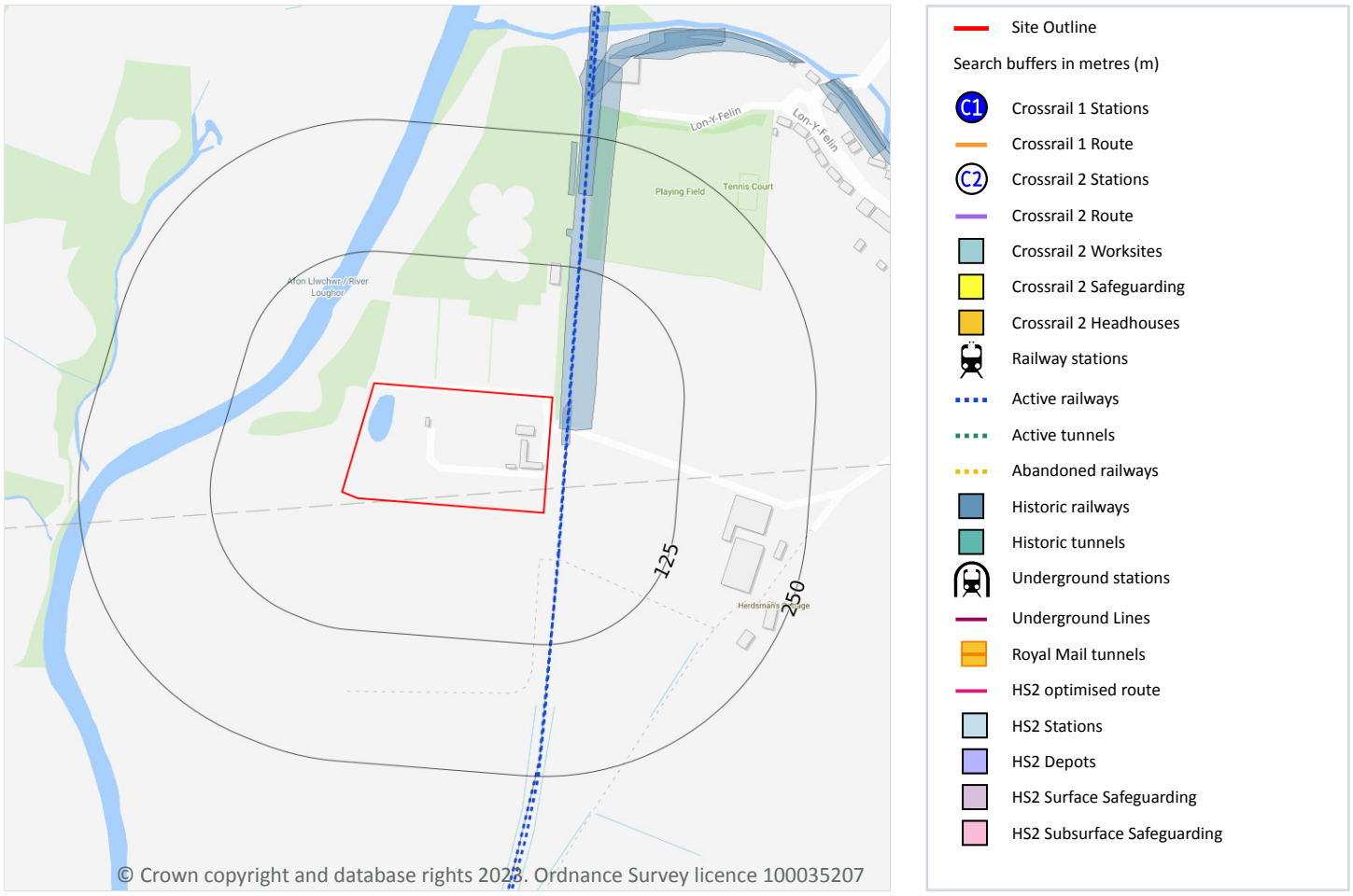
20.3 BGS Measured Urban Soil Chemistry

Records within 50m	0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km^2.

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects



21.1 Underground railways (London)

Records within 250m	0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m	0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m	4

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

Features are displayed on the Railway infrastructure and projects map on **page 97 >**

Location	Land Use	Year of mapping	Mapping scale
8m NE	Railway Sidings	1905	10560
11m E	Railway Sidings	1906	2500
193m NE	Railway Sidings	1879	2500
195m NE	Railway Sidings	1876	10560

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m	0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	5

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

Features are displayed on the Railway infrastructure and projects map on **page 97 >**

Location	Name	Type
16m NE	Heart of Wales Line	rail
17m NE	Not given	Single Track
41m SE	Not given	Single Track
135m NE	Not given	Single Track
235m S	Not given	Single Track

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 ltd.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see https://www.groundsure.com/sources-reference ↗.

Terms and conditions

Groundsure's Terms and Conditions can be accessed at this link: https://www.groundsure.com/terms-and-conditions-april-2023/ ↗.

APPENDIX B:

Laboratory Reports

GARNSWLLT WWTW

GROUND INVESTIGATION FACTUAL REPORT

Report No. Q1031/FR.01 June 2023

DOCUMENT CONTROL

Contract Name:	**Garnswllt WWTW**
Contract Reference:	**Q1031**
Report Type:	**Ground Investigation Factual Report**
Report Reference:	**Q1031/FR.01**
Date of Report Production:	**June 2023**
Client:	**J.N. Bentley**

Version:	Date:	Prepared by:	Checked by:	Approved by:
0	02/06/23	A. Jones	P. Darby	J. Stark
				
		Project Manager	Principal Engineering Geologist *B.Sc.(Hons).,M.Sc., C.Geol., F.G.S.*	*Technical Manager B.Sc.(Hons.),M.Sc., C.Geol., F.G.S.*

Quantum Geotechnic Ltd, Plas Newydd, Llanedi, Swansea, SA4 0FQ. T: 01554 744880 E: enquiries@quantumgeotech.co.uk
Website: http://www.quantumgeotech.co.uk/

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	23-11514-1		
Initial Date of Issue:	24-Apr-2023		
Client	Quantum Geotechnic Ltd		
Client Address:	Plas Newydd Llanedi Pontarddulais Swansea SA4 0FQ		
Contact(s):	Arwel Jones		
Project	Q1031 GARNSWLLT		
Quotation No.:	Q22-29520	**Date Received:**	06-Apr-2023
Order No.:		**Date Instructed:**	14-Apr-2023
No. of Samples:	3		
Turnaround (Wkdays):	7	**Results Due:**	24-Apr-2023
Date Approved:	24-Apr-2023		
Approved By:			

Details:	Stuart Henderson, Technical Manager

Results - Water

Project: Q1031 GARNSWLLT

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-11514	23-11514	23-11514
Quotation No.: Q22-29520			**Chemtest Sample ID.:**		1619814	1619815	1619816
Order No.:			Client Sample Ref.:		EW1	EW1	EW1
			Sample Location:		BH1	BH2	BH3
			Sample Type:		WATER	WATER	WATER
			Top Depth (m):		1.51	1.38	3.93
			Bottom Depth (m):		8.71	8.34	8.6
			Date Sampled:		04-Apr-2023	04-Apr-2023	04-Apr-2023
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
pH	U	1010		N/A	8.1	7.9	8.0
Total Dissolved Solids	N	1020	mg/l	1.0	300	370	310
Alkalinity (Bicarbonate)	U	1220	mg CaCO3/l	10	230	300	310
Chloride	U	1220	mg/l	1.0	22	16	12
Fluoride	U	1220	mg/l	0.050	0.14	0.15	0.16
Ammoniacal Nitrogen	U	1220	mg/l	0.050	6.9	17	49
Nitrate as NO3	U	1220	mg/l	0.50	< 0.50	< 0.50	< 0.50
Sulphur	N	1220	mg/l	1.0	7.0	3.7	< 1.0
Sulphate	U	1220	mg/l	1.0	21	11	< 1.0
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Magnesium (Dissolved)	U	1455	mg/l	0.20	6.7	7.8	6.2
Sodium (Dissolved)	U	1455	mg/l	1.50	18	21	6.7
Calcium (Total)	N	1455	mg/l	5.0	73	62	30
Total Hardness as CaCO3	U	1270	mg/l	15	190	180	92
Arsenic (Dissolved)	U	1455	µg/l	0.20	0.73	0.67	1.8
Boron (Dissolved)	U	1455	µg/l	10.0	37	31	45
Barium (Dissolved)	U	1455	µg/l	5.00	55	49	46
Beryllium (Dissolved)	U	1455	µg/l	1.00	< 1.0	< 1.0	< 1.0
Cadmium (Dissolved)	U	1455	µg/l	0.11	< 0.11	< 0.11	< 0.11
Chromium (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50
Copper (Dissolved)	U	1455	µg/l	0.50	1.0	0.59	2.5
Iron (Dissolved)	N	1455	µg/l	5.0	9.1	22	16
Mercury (Dissolved)	U	1455	µg/l	0.05	< 0.05	< 0.05	< 0.05
Manganese (Dissolved)	U	1455	µg/l	0.50	1000	30	420
Molybdenum (Dissolved)	U	1455	µg/l	0.20	0.90	0.75	0.63
Nickel (Dissolved)	U	1455	µg/l	0.50	0.80	1.6	2.6
Lead (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50
Antimony (Dissolved)	U	1455	µg/l	0.50	0.94	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50	0.62
Vanadium (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50
Zinc (Dissolved)	U	1455	µg/l	2.5	9.2	7.3	6.9
Chromium (Trivalent)	N	1490	µg/l	20	< 20	< 20	< 20
Chromium (Hexavalent)	U	1490	µg/l	20	< 20	< 20	< 20
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10

Results - Water

Project: Q1031 GARNSWLLT

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-11514	23-11514	23-11514
Quotation No.: Q22-29520			**Chemtest Sample ID.:**		1619814	1619815	1619816
Order No.:			Client Sample Ref.:		EW1	EW1	EW1
			Sample Location:		BH1	BH2	BH3
			Sample Type:		WATER	WATER	WATER
			Top Depth (m):		1.51	1.38	3.93
			Bottom Depth (m):		8.71	8.34	8.6
			Date Sampled:		04-Apr-2023	04-Apr-2023	04-Apr-2023
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10	< 10
Dichlorodifluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Chloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromomethane	U	1760	µg/l	5	< 5	< 5	< 5
Chloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	U	1760	µg/l	5	< 5	< 5	< 5
Trichloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Benzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Trichloroethene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	U	1760	µg/l	10	< 10	< 10	< 10
Bromodichloromethane	U	1760	µg/l	5	< 5	< 5	< 5
cis-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10	< 10

Results - Water

Project: Q1031 GARNSWLLT

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-11514	23-11514	23-11514
Quotation No.: Q22-29520			**Chemtest Sample ID.:**		1619814	1619815	1619816
Order No.:			Client Sample Ref.:		EW1	EW1	EW1
			Sample Location:		BH1	BH2	BH3
			Sample Type:		WATER	WATER	WATER
			Top Depth (m):		1.51	1.38	3.93
			Bottom Depth (m):		8.71	8.34	8.6
			Date Sampled:		04-Apr-2023	04-Apr-2023	04-Apr-2023
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Toluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10	< 10
1,1,2-Trichloroethane	U	1760	µg/l	10	< 10	< 10	< 10
Tetrachloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane	U	1760	µg/l	10	< 10	< 10	< 10
1,2-Dibromoethane	U	1760	µg/l	5	< 5	< 5	< 5
Chlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Styrene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	1760	µg/l	50	< 50	< 50	< 50
N-Propylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
N-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	< 50	< 50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Naphthalene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10

Results - Water

Project: Q1031 GARNSWLLT

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-11514	23-11514	23-11514
Quotation No.: Q22-29520			**Chemtest Sample ID.:**		1619814	1619815	1619816
Order No.:			Client Sample Ref.:		EW1	EW1	EW1
			Sample Location:		BH1	BH2	BH3
			Sample Type:		WATER	WATER	WATER
			Top Depth (m):		1.51	1.38	3.93
			Bottom Depth (m):		8.71	8.34	8.6
			Date Sampled:		04-Apr-2023	04-Apr-2023	04-Apr-2023
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Phenanthrene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	1800	µg/l	2.0	< 2.0	< 2.0	< 2.0
Resorcinol	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	0.0060
Phenol	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050
Cresols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050
Xylenols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050
1-Naphthol	N	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050
Trimethylphenols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l-1 CaCO3 equivalent.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	23-12011-1		
Initial Date of Issue:	24-Apr-2023		
Client	Quantum Geotechnic Ltd		
Client Address:	Plas Newydd Llanedi Pontarddulais Swansea SA4 0FQ		
Contact(s):	Arwel Jones		
Project	Q1031 Garnswllt WWTW		
Quotation No.:	Q22-29520	**Date Received:**	13-Apr-2023
Order No.:		**Date Instructed:**	14-Apr-2023
No. of Samples:	2		
Turnaround (Wkdays):	7	**Results Due:**	24-Apr-2023
Date Approved:	24-Apr-2023		
Approved By:			

Details:	Stuart Henderson, Technical Manager

Results - Water

Project: Q1031 Garnswllt WWTW

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-12011	23-12011
Quotation No.: Q22-29520			**Chemtest Sample ID.:**		1622014	1622015
Order No.:			Client Sample Ref.:		EW1	EW1
			Sample Location:		BHSD01	BHSD02
			Sample Type:		WATER	WATER
			Top Depth (m):		1.54	1.58
			Bottom Depth (m):		16.60	13.77
			Date Sampled:		11-Apr-2023	11-Apr-2023
			Time Sampled:		10:00	10:20
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
pH	U	1010		N/A	8.0	7.5
Total Dissolved Solids	N	1020	mg/l	1.0	290	210
Alkalinity (Bicarbonate)	U	1220	mg CaCO3/l	10	130	150
Chloride	U	1220	mg/l	1.0	21	35
Fluoride	U	1220	mg/l	0.050	0.11	0.13
Ammoniacal Nitrogen	U	1220	mg/l	0.050	3.4	< 0.050
Nitrate as NO3	U	1220	mg/l	0.50	6.0	22
Sulphur	N	1220	mg/l	1.0	6.0	10
Sulphate	U	1220	mg/l	1.0	18	30
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	mg/l	0.050	< 0.050	< 0.050
Magnesium (Dissolved)	U	1455	mg/l	0.20	4.9	< 0.20
Sodium (Dissolved)	U	1455	mg/l	1.50	25	< 1.5
Calcium (Total)	N	1455	mg/l	5.0	110	35
Total Hardness as CaCO3	U	1270	mg/l	15	180	< 15
Arsenic (Dissolved)	U	1455	µg/l	0.20	0.89	< 0.20
Boron (Dissolved)	U	1455	µg/l	10.0	43	< 10
Barium (Dissolved)	U	1455	µg/l	5.00	21	< 5.0
Beryllium (Dissolved)	U	1455	µg/l	1.00	< 1.0	< 1.0
Cadmium (Dissolved)	U	1455	µg/l	0.11	< 0.11	< 0.11
Chromium (Dissolved)	U	1455	µg/l	0.50	< 0.50	0.79
Copper (Dissolved)	U	1455	µg/l	0.50	2.0	< 0.50
Iron (Dissolved)	N	1455	µg/l	5.0	< 5.0	< 5.0
Mercury (Dissolved)	U	1455	µg/l	0.05	< 0.05	< 0.05
Manganese (Dissolved)	U	1455	µg/l	0.50	6.9	< 0.50
Molybdenum (Dissolved)	U	1455	µg/l	0.20	1.8	0.22
Nickel (Dissolved)	U	1455	µg/l	0.50	1.0	0.65
Lead (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50
Antimony (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	µg/l	0.50	0.73	< 0.50
Vanadium (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50
Zinc (Dissolved)	U	1455	µg/l	2.5	10	< 2.5
Chromium (Trivalent)	N	1490	µg/l	20	< 20	< 20
Chromium (Hexavalent)	U	1490	µg/l	20	< 20	< 20
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	

Results - Water

Project: Q1031 Garnswllt WWTW

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-12011	23-12011
Quotation No.: Q22-29520			**Chemtest Sample ID.:**		1622014	1622015
Order No.:			Client Sample Ref.:		EW1	EW1
			Sample Location:		BHSD01	BHSD02
			Sample Type:		WATER	WATER
			Top Depth (m):		1.54	1.58
			Bottom Depth (m):		16.60	13.77
			Date Sampled:		11-Apr-2023	11-Apr-2023
			Time Sampled:		10:00	10:20
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	
Dichlorodifluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Chloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Vinyl Chloride	N	1760	µg/l	1.0	< 1.0	< 1.0
Bromomethane	U	1760	µg/l	5	< 5	< 5
Chloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0
Trichlorofluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1-Dichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
Bromochloromethane	U	1760	µg/l	5	< 5	< 5
Trichloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Tetrachloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	1760	µg/l	1.0	< 1.0	< 1.0
Benzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dichloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0
Trichloroethene	N	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dichloropropane	U	1760	µg/l	1.0	< 1.0	< 1.0
Dibromomethane	U	1760	µg/l	10	< 10	< 10

Results - Water

Project: Q1031 Garnswllt WWTW

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-12011	23-12011
Quotation No.: Q22-29520			**Chemtest Sample ID.:**		1622014	1622015
Order No.:			Client Sample Ref.:		EW1	EW1
			Sample Location:		BHSD01	BHSD02
			Sample Type:		WATER	WATER
			Top Depth (m):		1.54	1.58
			Bottom Depth (m):		16.60	13.77
			Date Sampled:		11-Apr-2023	11-Apr-2023
			Time Sampled:		10:00	10:20
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Bromodichloromethane	U	1760	µg/l	5	< 5	< 5
cis-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10
Toluene	U	1760	µg/l	1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10
1,1,2-Trichloroethane	U	1760	µg/l	10	< 10	< 10
Tetrachloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,3-Dichloropropane	U	1760	µg/l	2.0	< 2.0	< 2.0
Dibromochloromethane	U	1760	µg/l	10	< 10	< 10
1,2-Dibromoethane	U	1760	µg/l	5	< 5	< 5
Chlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0
Ethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0
Styrene	U	1760	µg/l	1.0	< 1.0	< 1.0
Tribromomethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Isopropylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
Bromobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	1760	µg/l	50	< 50	< 50
N-Propylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
2-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
4-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
N-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	< 50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0	< 1.0
Naphthalene	U	1800	µg/l	0.10	< 0.10	< 0.10

Results - Water

Project: Q1031 Garnswllt WWTW

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-12011	23-12011
Quotation No.: Q22-29520			**Chemtest Sample ID.:**		1622014	1622015
Order No.:			Client Sample Ref.:		EW1	EW1
			Sample Location:		BHSD01	BHSD02
			Sample Type:		WATER	WATER
			Top Depth (m):		1.54	1.58
			Bottom Depth (m):		16.60	13.77
			Date Sampled:		11-Apr-2023	11-Apr-2023
			Time Sampled:		10:00	10:20
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Acenaphthylene	U	1800	µg/l	0.10	< 0.10	< 0.10
Acenaphthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Fluorene	U	1800	µg/l	0.10	< 0.10	< 0.10
Phenanthrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10
Fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10
Chrysene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1800	µg/l	0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	1800	µg/l	2.0	< 2.0	< 2.0
Resorcinol	U	1920	mg/l	0.0050	< 0.0050	< 0.0050
Phenol	U	1920	mg/l	0.0050	< 0.0050	< 0.0050
Cresols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050
Xylenols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050
1-Naphthol	N	1920	mg/l	0.0050	< 0.0050	< 0.0050
Trimethylphenols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l-1 CaCO3 equivalent.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	23-12951-1
Initial Date of Issue:	28-Apr-2023
Client	Quantum Geotechnic Ltd
Client Address:	Plas Newydd Llanedi Pontarddulais Swansea SA4 0FQ
Contact(s):	Arwel Jones
Project	Q1031 GARNSWLLT WTW

Quotation No.:		**Date Received:**	20-Apr-2023
Order No.:		**Date Instructed:**	24-Apr-2023
No. of Samples:	2		
Turnaround (Wkdays):	5	**Results Due:**	28-Apr-2023
Date Approved:	28-Apr-2023		

Approved By:

Details: Stuart Henderson, Technical Manager

Results - Water

Project: Q1031 GARNSWLLT WTW

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-12951	23-12951
Quotation No.:			**Chemtest Sample ID.:**		1626280	1626281
Order No.:			Client Sample Ref.:		EW1	EW1
			Sample Location:		BHD003	BHD004
			Sample Type:		WATER	WATER
			Top Depth (m):		2.14	4.03
			Bottom Depth (m):		11.76	14.85
			Date Sampled:		18-Apr-2023	18-Apr-2023
			Time Sampled:		10:00	10:10
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
pH	U	1010		N/A	6.5	6.6
Total Dissolved Solids	N	1020	mg/l	1.0	210	240
Alkalinity (Bicarbonate)	U	1220	mg CaCO3/l	10	150	220
Chloride	U	1220	mg/l	1.0	36	14
Fluoride	U	1220	mg/l	0.050	0.18	0.19
Ammoniacal Nitrogen	U	1220	mg/l	0.050	0.10	27
Nitrate as NO3	U	1220	mg/l	0.50	5.6	< 0.50
Sulphur	N	1220	mg/l	1.0	10	< 1.0
Sulphate	U	1220	mg/l	1.0	30	1.5
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	mg/l	0.050	< 0.050	< 0.050
Magnesium (Dissolved)	U	1455	mg/l	0.20	4.5	6.5
Sodium (Dissolved)	U	1455	mg/l	1.50	14	9.3
Calcium (Total)	N	1455	mg/l	5.0	59	60
Total Hardness as CaCO3	U	1270	mg/l	15	160	120
Arsenic (Dissolved)	U	1455	µg/l	0.20	0.22	0.74
Boron (Dissolved)	U	1455	µg/l	10.0	33	40
Barium (Dissolved)	U	1455	µg/l	5.00	45	94
Beryllium (Dissolved)	U	1455	µg/l	1.00	< 1.0	< 1.0
Cadmium (Dissolved)	U	1455	µg/l	0.11	< 0.11	< 0.11
Chromium (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50
Copper (Dissolved)	U	1455	µg/l	0.50	0.69	3.0
Iron (Dissolved)	N	1455	µg/l	5.0	< 5.0	< 5.0
Mercury (Dissolved)	U	1455	µg/l	0.05	< 0.05	< 0.05
Manganese (Dissolved)	U	1455	µg/l	0.50	1700	970
Molybdenum (Dissolved)	U	1455	µg/l	0.20	1.7	0.54
Nickel (Dissolved)	U	1455	µg/l	0.50	2.0	2.7
Lead (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50
Antimony (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	µg/l	0.50	0.72	< 0.50
Vanadium (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50
Zinc (Dissolved)	U	1455	µg/l	2.5	4.5	46
Chromium (Trivalent)	N	1490	µg/l	20	[B] < 20	[B] < 20
Chromium (Hexavalent)	U	1490	µg/l	20	[B] < 20	[B] < 20
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10

Results - Water

Project: Q1031 GARNSWLLT WTW

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-12951	23-12951
Quotation No.:			**Chemtest Sample ID.:**		1626280	1626281
Order No.:			Client Sample Ref.:		EW1	EW1
			Sample Location:		BHD003	BHD004
			Sample Type:		WATER	WATER
			Top Depth (m):		2.14	4.03
			Bottom Depth (m):		11.76	14.85
			Date Sampled:		18-Apr-2023	18-Apr-2023
			Time Sampled:		10:00	10:10
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10
Dichlorodifluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Chloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Vinyl Chloride	N	1760	µg/l	1.0	< 1.0	< 1.0
Bromomethane	U	1760	µg/l	5	< 5	< 5
Chloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0
Trichlorofluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1-Dichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
Bromochloromethane	U	1760	µg/l	5	< 5	< 5
Trichloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Tetrachloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	1760	µg/l	1.0	< 1.0	< 1.0
Benzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dichloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0
Trichloroethene	N	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dichloropropane	U	1760	µg/l	1.0	< 1.0	< 1.0
Dibromomethane	U	1760	µg/l	10	< 10	< 10

Results - Water

Project: Q1031 GARNSWLLT WTW

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-12951	23-12951
Quotation No.:			**Chemtest Sample ID.:**		1626280	1626281
Order No.:			Client Sample Ref.:		EW1	EW1
			Sample Location:		BHD003	BHD004
			Sample Type:		WATER	WATER
			Top Depth (m):		2.14	4.03
			Bottom Depth (m):		11.76	14.85
			Date Sampled:		18-Apr-2023	18-Apr-2023
			Time Sampled:		10:00	10:10
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Bromodichloromethane	U	1760	µg/l	5	< 5	< 5
cis-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10
Toluene	U	1760	µg/l	1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10
1,1,2-Trichloroethane	U	1760	µg/l	10	< 10	< 10
Tetrachloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,3-Dichloropropane	U	1760	µg/l	2.0	< 2.0	< 2.0
Dibromochloromethane	U	1760	µg/l	10	< 10	< 10
1,2-Dibromoethane	U	1760	µg/l	5	< 5	< 5
Chlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0
Ethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0
Styrene	U	1760	µg/l	1.0	< 1.0	< 1.0
Tribromomethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Isopropylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
Bromobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	1760	µg/l	50	< 50	< 50
N-Propylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
2-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
4-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
N-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	< 50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0	< 1.0
Naphthalene	U	1800	µg/l	0.10	< 0.10	< 0.10

Results - Water

Project: Q1031 GARNSWLLT WTW

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-12951	23-12951
Quotation No.:			**Chemtest Sample ID.:**		1626280	1626281
Order No.:			Client Sample Ref.:		EW1	EW1
			Sample Location:		BHD003	BHD004
			Sample Type:		WATER	WATER
			Top Depth (m):		2.14	4.03
			Bottom Depth (m):		11.76	14.85
			Date Sampled:		18-Apr-2023	18-Apr-2023
			Time Sampled:		10:00	10:10
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Acenaphthylene	U	1800	µg/l	0.10	< 0.10	< 0.10
Acenaphthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Fluorene	U	1800	µg/l	0.10	< 0.10	< 0.10
Phenanthrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10
Fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10
Chrysene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1800	µg/l	0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	1800	µg/l	2.0	< 2.0	< 2.0
Resorcinol	U	1920	mg/l	0.0050	< 0.0050	< 0.0050
Phenol	U	1920	mg/l	0.0050	< 0.0050	< 0.0050
Cresols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050
Xylenols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050
1-Naphthol	N	1920	mg/l	0.0050	< 0.0050	< 0.0050
Trimethylphenols	U	1920	mg/l	0.0050	0.0060	< 0.0050
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l-1 CaCO3 equivalent.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	23-11514-1		
Initial Date of Issue:	24-Apr-2023		
Client	Quantum Geotechnic Ltd		
Client Address:	Plas Newydd Llanedi Pontarddulais Swansea SA4 0FQ		
Contact(s):	Arwel Jones		
Project	Q1031 GARNSWLLT		
Quotation No.:	Q22-29520	**Date Received:**	06-Apr-2023
Order No.:		**Date Instructed:**	14-Apr-2023
No. of Samples:	3		
Turnaround (Wkdays):	7	**Results Due:**	24-Apr-2023
Date Approved:	24-Apr-2023		
Approved By:			

Details:	Stuart Henderson, Technical Manager

Results - Water

Project: Q1031 GARNSWLLT

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-11514	23-11514	23-11514
Quotation No.: Q22-29520			**Chemtest Sample ID.:**		1619814	1619815	1619816
Order No.:			Client Sample Ref.:		EW1	EW1	EW1
			Sample Location:		BH1	BH2	BH3
			Sample Type:		WATER	WATER	WATER
			Top Depth (m):		1.51	1.38	3.93
			Bottom Depth (m):		8.71	8.34	8.6
			Date Sampled:		04-Apr-2023	04-Apr-2023	04-Apr-2023
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
pH	U	1010		N/A	8.1	7.9	8.0
Total Dissolved Solids	N	1020	mg/l	1.0	300	370	310
Alkalinity (Bicarbonate)	U	1220	mg CaCO3/l	10	230	300	310
Chloride	U	1220	mg/l	1.0	22	16	12
Fluoride	U	1220	mg/l	0.050	0.14	0.15	0.16
Ammoniacal Nitrogen	U	1220	mg/l	0.050	6.9	17	49
Nitrate as NO3	U	1220	mg/l	0.50	< 0.50	< 0.50	< 0.50
Sulphur	N	1220	mg/l	1.0	7.0	3.7	< 1.0
Sulphate	U	1220	mg/l	1.0	21	11	< 1.0
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	mg/l	0.050	< 0.050	< 0.050	< 0.050
Magnesium (Dissolved)	U	1455	mg/l	0.20	6.7	7.8	6.2
Sodium (Dissolved)	U	1455	mg/l	1.50	18	21	6.7
Calcium (Total)	N	1455	mg/l	5.0	73	62	30
Total Hardness as CaCO3	U	1270	mg/l	15	190	180	92
Arsenic (Dissolved)	U	1455	µg/l	0.20	0.73	0.67	1.8
Boron (Dissolved)	U	1455	µg/l	10.0	37	31	45
Barium (Dissolved)	U	1455	µg/l	5.00	55	49	46
Beryllium (Dissolved)	U	1455	µg/l	1.00	< 1.0	< 1.0	< 1.0
Cadmium (Dissolved)	U	1455	µg/l	0.11	< 0.11	< 0.11	< 0.11
Chromium (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50
Copper (Dissolved)	U	1455	µg/l	0.50	1.0	0.59	2.5
Iron (Dissolved)	N	1455	µg/l	5.0	9.1	22	16
Mercury (Dissolved)	U	1455	µg/l	0.05	< 0.05	< 0.05	< 0.05
Manganese (Dissolved)	U	1455	µg/l	0.50	1000	30	420
Molybdenum (Dissolved)	U	1455	µg/l	0.20	0.90	0.75	0.63
Nickel (Dissolved)	U	1455	µg/l	0.50	0.80	1.6	2.6
Lead (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50
Antimony (Dissolved)	U	1455	µg/l	0.50	0.94	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50	0.62
Vanadium (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50
Zinc (Dissolved)	U	1455	µg/l	2.5	9.2	7.3	6.9
Chromium (Trivalent)	N	1490	µg/l	20	< 20	< 20	< 20
Chromium (Hexavalent)	U	1490	µg/l	20	< 20	< 20	< 20
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10

Results - Water

Project: Q1031 GARNSWLLT

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-11514	23-11514	23-11514
Quotation No.: Q22-29520			**Chemtest Sample ID.:**		1619814	1619815	1619816
Order No.:			Client Sample Ref.:		EW1	EW1	EW1
			Sample Location:		BH1	BH2	BH3
			Sample Type:		WATER	WATER	WATER
			Top Depth (m):		1.51	1.38	3.93
			Bottom Depth (m):		8.71	8.34	8.6
			Date Sampled:		04-Apr-2023	04-Apr-2023	04-Apr-2023
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	< 10	< 10
Dichlorodifluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Chloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromomethane	U	1760	µg/l	5	< 5	< 5	< 5
Chloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Trichlorofluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	U	1760	µg/l	5	< 5	< 5	< 5
Trichloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Benzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Trichloroethene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	U	1760	µg/l	10	< 10	< 10	< 10
Bromodichloromethane	U	1760	µg/l	5	< 5	< 5	< 5
cis-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10	< 10

Results - Water

Project: Q1031 GARNSWLLT

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-11514	23-11514	23-11514
Quotation No.: Q22-29520			**Chemtest Sample ID.:**		1619814	1619815	1619816
Order No.:			Client Sample Ref.:		EW1	EW1	EW1
			Sample Location:		BH1	BH2	BH3
			Sample Type:		WATER	WATER	WATER
			Top Depth (m):		1.51	1.38	3.93
			Bottom Depth (m):		8.71	8.34	8.6
			Date Sampled:		04-Apr-2023	04-Apr-2023	04-Apr-2023
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Toluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10	< 10
1,1,2-Trichloroethane	U	1760	µg/l	10	< 10	< 10	< 10
Tetrachloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Dibromochloromethane	U	1760	µg/l	10	< 10	< 10	< 10
1,2-Dibromoethane	U	1760	µg/l	5	< 5	< 5	< 5
Chlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Ethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Styrene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	1760	µg/l	50	< 50	< 50	< 50
N-Propylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
N-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	< 50	< 50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0	< 2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0	< 1.0	< 1.0
Naphthalene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10

Results - Water

Project: Q1031 GARNSWLLT

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-11514	23-11514	23-11514
Quotation No.: Q22-29520			**Chemtest Sample ID.:**		1619814	1619815	1619816
Order No.:			Client Sample Ref.:		EW1	EW1	EW1
			Sample Location:		BH1	BH2	BH3
			Sample Type:		WATER	WATER	WATER
			Top Depth (m):		1.51	1.38	3.93
			Bottom Depth (m):		8.71	8.34	8.6
			Date Sampled:		04-Apr-2023	04-Apr-2023	04-Apr-2023
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Phenanthrene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1800	µg/l	0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	1800	µg/l	2.0	< 2.0	< 2.0	< 2.0
Resorcinol	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	0.0060
Phenol	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050
Cresols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050
Xylenols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050
1-Naphthol	N	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050
Trimethylphenols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050	< 0.0050
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l-1 CaCO3 equivalent.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
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C - Sample not received in appropriate containers
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E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt
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customerservices@chemtest.com

Eurofins Chemtest Ltd
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	23-12011-1		
Initial Date of Issue:	24-Apr-2023		
Client	Quantum Geotechnic Ltd		
Client Address:	Plas Newydd Llanedi Pontarddulais Swansea SA4 0FQ		
Contact(s):	Arwel Jones		
Project	Q1031 Garnswllt WWTW		
Quotation No.:	Q22-29520	**Date Received:**	13-Apr-2023
Order No.:		**Date Instructed:**	14-Apr-2023
No. of Samples:	2		
Turnaround (Wkdays):	7	**Results Due:**	24-Apr-2023
Date Approved:	24-Apr-2023		
Approved By:			

Details:	Stuart Henderson, Technical Manager

Results - Water

Project: Q1031 Garnswllt WWTW

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-12011	23-12011
Quotation No.: Q22-29520			**Chemtest Sample ID.:**		1622014	1622015
Order No.:			Client Sample Ref.:		EW1	EW1
			Sample Location:		BHSD01	BHSD02
			Sample Type:		WATER	WATER
			Top Depth (m):		1.54	1.58
			Bottom Depth (m):		16.60	13.77
			Date Sampled:		11-Apr-2023	11-Apr-2023
			Time Sampled:		10:00	10:20
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
pH	U	1010		N/A	8.0	7.5
Total Dissolved Solids	N	1020	mg/l	1.0	290	210
Alkalinity (Bicarbonate)	U	1220	mg CaCO3/l	10	130	150
Chloride	U	1220	mg/l	1.0	21	35
Fluoride	U	1220	mg/l	0.050	0.11	0.13
Ammoniacal Nitrogen	U	1220	mg/l	0.050	3.4	< 0.050
Nitrate as NO3	U	1220	mg/l	0.50	6.0	22
Sulphur	N	1220	mg/l	1.0	6.0	10
Sulphate	U	1220	mg/l	1.0	18	30
Cyanide (Total)	U	1300	mg/l	0.050	< 0.050	< 0.050
Cyanide (Free)	U	1300	mg/l	0.050	< 0.050	< 0.050
Magnesium (Dissolved)	U	1455	mg/l	0.20	4.9	< 0.20
Sodium (Dissolved)	U	1455	mg/l	1.50	25	< 1.5
Calcium (Total)	N	1455	mg/l	5.0	110	35
Total Hardness as CaCO3	U	1270	mg/l	15	180	< 15
Arsenic (Dissolved)	U	1455	µg/l	0.20	0.89	< 0.20
Boron (Dissolved)	U	1455	µg/l	10.0	43	< 10
Barium (Dissolved)	U	1455	µg/l	5.00	21	< 5.0
Beryllium (Dissolved)	U	1455	µg/l	1.00	< 1.0	< 1.0
Cadmium (Dissolved)	U	1455	µg/l	0.11	< 0.11	< 0.11
Chromium (Dissolved)	U	1455	µg/l	0.50	< 0.50	0.79
Copper (Dissolved)	U	1455	µg/l	0.50	2.0	< 0.50
Iron (Dissolved)	N	1455	µg/l	5.0	< 5.0	< 5.0
Mercury (Dissolved)	U	1455	µg/l	0.05	< 0.05	< 0.05
Manganese (Dissolved)	U	1455	µg/l	0.50	6.9	< 0.50
Molybdenum (Dissolved)	U	1455	µg/l	0.20	1.8	0.22
Nickel (Dissolved)	U	1455	µg/l	0.50	1.0	0.65
Lead (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50
Antimony (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	µg/l	0.50	0.73	< 0.50
Vanadium (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50
Zinc (Dissolved)	U	1455	µg/l	2.5	10	< 2.5
Chromium (Trivalent)	N	1490	µg/l	20	< 20	< 20
Chromium (Hexavalent)	U	1490	µg/l	20	< 20	< 20
Aliphatic TPH >C5-C6	N	1675	µg/l	0.10	< 0.10	
Aliphatic TPH >C6-C8	N	1675	µg/l	0.10	< 0.10	

Results - Water

Project: Q1031 Garnswllt WWTW

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-12011	23-12011
Quotation No.: Q22-29520			**Chemtest Sample ID.:**		1622014	1622015
Order No.:			Client Sample Ref.:		EW1	EW1
			Sample Location:		BHSD01	BHSD02
			Sample Type:		WATER	WATER
			Top Depth (m):		1.54	1.58
			Bottom Depth (m):		16.60	13.77
			Date Sampled:		11-Apr-2023	11-Apr-2023
			Time Sampled:		10:00	10:20
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Aliphatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	
Aliphatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	
Aliphatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	
Aliphatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	
Aliphatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	
Aliphatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	
Total Aliphatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	
Aromatic TPH >C5-C7	N	1675	µg/l	0.10	< 0.10	
Aromatic TPH >C7-C8	N	1675	µg/l	0.10	< 0.10	
Aromatic TPH >C8-C10	N	1675	µg/l	0.10	< 0.10	
Aromatic TPH >C10-C12	N	1675	µg/l	0.10	< 0.10	
Aromatic TPH >C12-C16	N	1675	µg/l	0.10	< 0.10	
Aromatic TPH >C16-C21	N	1675	µg/l	0.10	< 0.10	
Aromatic TPH >C21-C35	N	1675	µg/l	0.10	< 0.10	
Aromatic TPH >C35-C44	N	1675	µg/l	0.10	< 0.10	
Total Aromatic Hydrocarbons	N	1675	µg/l	5.0	< 5.0	
Total Petroleum Hydrocarbons	N	1675	µg/l	10	< 10	
Dichlorodifluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Chloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Vinyl Chloride	N	1760	µg/l	1.0	< 1.0	< 1.0
Bromomethane	U	1760	µg/l	5	< 5	< 5
Chloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0
Trichlorofluoromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
Trans 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1-Dichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0
cis 1,2-Dichloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
Bromochloromethane	U	1760	µg/l	5	< 5	< 5
Trichloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Tetrachloromethane	U	1760	µg/l	1.0	< 1.0	< 1.0
1,1-Dichloropropene	U	1760	µg/l	1.0	< 1.0	< 1.0
Benzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dichloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0
Trichloroethene	N	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dichloropropane	U	1760	µg/l	1.0	< 1.0	< 1.0
Dibromomethane	U	1760	µg/l	10	< 10	< 10

Results - Water

Project: Q1031 Garnswllt WWTW

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-12011	23-12011
Quotation No.: Q22-29520			**Chemtest Sample ID.:**		1622014	1622015
Order No.:			Client Sample Ref.:		EW1	EW1
			Sample Location:		BHSD01	BHSD02
			Sample Type:		WATER	WATER
			Top Depth (m):		1.54	1.58
			Bottom Depth (m):		16.60	13.77
			Date Sampled:		11-Apr-2023	11-Apr-2023
			Time Sampled:		10:00	10:20
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Bromodichloromethane	U	1760	µg/l	5	< 5	< 5
cis-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10
Toluene	U	1760	µg/l	1.0	< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	1760	µg/l	10	< 10	< 10
1,1,2-Trichloroethane	U	1760	µg/l	10	< 10	< 10
Tetrachloroethene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,3-Dichloropropane	U	1760	µg/l	2.0	< 2.0	< 2.0
Dibromochloromethane	U	1760	µg/l	10	< 10	< 10
1,2-Dibromoethane	U	1760	µg/l	5	< 5	< 5
Chlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	U	1760	µg/l	2.0	< 2.0	< 2.0
Ethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
m & p-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0
o-Xylene	U	1760	µg/l	1.0	< 1.0	< 1.0
Styrene	U	1760	µg/l	1.0	< 1.0	< 1.0
Tribromomethane	U	1760	µg/l	1.0	< 1.0	< 1.0
Isopropylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
Bromobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	N	1760	µg/l	50	< 50	< 50
N-Propylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
2-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
4-Chlorotoluene	U	1760	µg/l	1.0	< 1.0	< 1.0
Tert-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
Sec-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	N	1760	µg/l	1.0	< 1.0	< 1.0
4-Isopropyltoluene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
N-Butylbenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	1760	µg/l	50	< 50	< 50
1,2,4-Trichlorobenzene	U	1760	µg/l	1.0	< 1.0	< 1.0
Hexachlorobutadiene	U	1760	µg/l	1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	1760	µg/l	2.0	< 2.0	< 2.0
Methyl Tert-Butyl Ether	N	1760	µg/l	1.0	< 1.0	< 1.0
Naphthalene	U	1800	µg/l	0.10	< 0.10	< 0.10

Results - Water

Project: Q1031 Garnswllt WWTW

Client: Quantum Geotechnic Ltd			**Chemtest Job No.:**		23-12011	23-12011
Quotation No.: Q22-29520			**Chemtest Sample ID.:**		1622014	1622015
Order No.:			Client Sample Ref.:		EW1	EW1
			Sample Location:		BHSD01	BHSD02
			Sample Type:		WATER	WATER
			Top Depth (m):		1.54	1.58
			Bottom Depth (m):		16.60	13.77
			Date Sampled:		11-Apr-2023	11-Apr-2023
			Time Sampled:		10:00	10:20
Determinand	**Accred.**	**SOP**	**Units**	**LOD**		
Acenaphthylene	U	1800	µg/l	0.10	< 0.10	< 0.10
Acenaphthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Fluorene	U	1800	µg/l	0.10	< 0.10	< 0.10
Phenanthrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10
Fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10
Chrysene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1800	µg/l	0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1800	µg/l	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1800	µg/l	0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	1800	µg/l	2.0	< 2.0	< 2.0
Resorcinol	U	1920	mg/l	0.0050	< 0.0050	< 0.0050
Phenol	U	1920	mg/l	0.0050	< 0.0050	< 0.0050
Cresols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050
Xylenols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050
1-Naphthol	N	1920	mg/l	0.0050	< 0.0050	< 0.0050
Trimethylphenols	U	1920	mg/l	0.0050	< 0.0050	< 0.0050
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1270	Total Hardness of Waters	Total hardness	Calculation applied to calcium and magnesium results, expressed as mg l-1 CaCO3 equivalent.
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1490	Hexavalent Chromium in Waters	Chromium [VI]	Automated colorimetric analysis by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
1675	TPH Aliphatic/Aromatic split in Waters by GC-FID(cf. Texas Method 1006 / TPH CWG)	Aliphatics: >C5–C6, >C6–C8, >C8– C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Pentane extraction / GCxGC FID detection
1760	Volatile Organic Compounds (VOCs) in Waters by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics. (cf. USEPA Method 8260)	Automated headspace gas chromatographic (GC) analysis of water samples with mass spectrometric (MS) detection of volatile organic compounds.
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

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All water samples will be retained for 14 days from the date of receipt
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customerservices@chemtest.com