H Fraser Consulting
Contaminated Land and Hydrogeology

Dolidre Poultry

Hydrogeological Impact Appraisal

Prepared for: Edward Morgan
Dolidre Poultry
Llanddewi
Llandrindod Wells
Powys
LD1 6SE

Date: 28/12/2023
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Version History

Version	Author	Approved by	Issue date	Comment
30424R1D1	Emilie Roberts, Xenia Boyes	Joe Gomme	30/08/23	Draft report issued to client
30424R1	Emilie Roberts, Xenia Boyes	Joe Gomme	28/12/23	Final report for submission to EA

CONTENTS

FIGURES

TABLES

APPENDICES

1. INTRODUCTION

Edward Morgan of Dolidre Poultry has appointed H Fraser Consulting Ltd to conduct a Hydrogeological Impact Appraisal (HIA), which is required for a water abstraction licence application relating to two boreholes at Dolidre Poultry, Llanddewi, Llandrindod Wells, Powys, LD1 6SE (SO 10866 67988).

Natural Resources Wales's (NRW) key concern is to identify to what degree the current groundwater abstraction regime at the poultry farm is derogating groundwater baseflow to the River Ithon, notably during periods of low river flows. NRW does not require a pumping test and has confirmed that a 1 km search radius for the water features survey is required.

1.1 Objectives

The objective is to prepare a basic (Tier 1) Hydrogeological Impact Appraisal (HIA) to support your licence application, to include a desk-based Water Features Survey (WFS) and sitework to assess pumped and rest water levels.

1.2 Scope of work

The following scope of work has been undertaken:

- Desk study, including purchase of a Groundsure report
- Desk-based water features survey to 1 km radius of the abstraction boreholes
- Sitework: determination of pumped and rest groundwater levels
- Assessment, including scoping groundwater calculations to investigate the lateral extent of groundwater drawdown
- Development of conceptual model
- Impact appraisal
- Identification of mitigation measures
- Development of monitoring strategy

2 REGIONAL WATER RESOURCE STATUS

In 2007 the Environment Agency (EA) released the report "HIA for groundwater abstractions". The report states that:

> *"England and Wales has been divided up into CAMS areas,[1] and each area will eventually be assigned a resource availability status, from four possible categories:*
>
> *i. Water available: Water likely to be available at all flows including low flows. Restrictions may apply.*
>
> *ii. No water available: No water available for further licensing at low flows, although water may be available at higher flows with appropriate restrictions.*
>
> *iii. Over-licensed: Current actual abstraction is resulting in no water available at low flows. If existing licences were used to their full allocation they would have the potential to cause unacceptable environmental impact at low flows. Water may be available at high flows with appropriate restrictions.*
>
> *iv. Over-abstracted: Existing abstraction is causing unacceptable environmental impact at low flows. Water may still be available at high flows with appropriate restrictions."*

The site is in the River Wye CAMS area where the surface water resource availability status is "*No water available: No water available for further licensing at low flows, although water may be available at higher flows with appropriate restrictions*", therefore "*the onus is on abstractors to demonstrate that their abstraction is not part of the regional water resources problem. Abstractors may have to accept seasonal restrictions*." (EA, 2007: Table 4.1)

Further detail on the River Wye CAMS is provided in The Wye Abstraction Licensing Strategy (NRW & EA 2015), which has been used to inform Sections 2.1, 2.2 and 2.3 below.

2.1 Resource availability

Surface Water

The surface water resource availability status for the site is that water is available for licensing at high, median and low flows but that at very low flows restricted water is available for licensing.

At high, median and low flows (Q30, Q50 and Q70 respectively) there is more water than required to meet the needs of the environment. Water is therefore generally available for abstraction. New licences will be considered depending on local and downstream impacts. Any consumptive licence issued will have abstraction restrictions to protect medium and low flows, and non-consumptive licences can be issued but local flow restrictions will be applied.

At very low flows (Q95), the volume of water abstraction already licensed compromises the needs of the environment. If all licensed water is abstracted, there will not be enough water left for the environment. This means:

- No further consumptive licences will be granted for abstraction at very low flows.
- Non-consumptive licences can be issued but local flow restrictions will be applied.

[1] "CAMS" means Catchment Abstraction Management Strategy.

In this situation, water may be available if you can 'buy' (known as licence trading) the entitlement to abstract water from an existing licence holder.

Groundwater

The degree of connection between the watercourses in the CAMS area and the regional groundwater needs to be assessed on a case by case basis. Groundwater flow direction within the bedrock and superficial deposits is assumed to mirror topography with groundwater discharging into the streams and rivers within the catchment area. However, the differing nature of the aquifers present across the area, from fractured limestones to mudstones, to mixed sedimentary superficial deposits means that the volume of water that can actually/physically be abstracted from the strata will be naturally highly variable.

Abstraction from aquifers such as the river gravels would likely have a direct impact on surface water and therefore be subject to the same licensing controls as surface water.

The majority of the strata present are classed as Secondary aquifers. These strata contain permeable layers that are generally 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. In some areas these strata are able to support larger scale commercial and public water supply abstraction.

2.2 Abstraction conditions

Abstraction conditions such as Hands-off Flow and Hands-off Level do not apply to non-consumptive abstraction (surface water and groundwater) or a consumptive groundwater abstraction assessed not to have an adverse impact on the Wye catchment Special Area of Conservation (SAC) species and/or habitats. In these instances, application of abstraction restrictions will be assessed on a case by case basis and resource reliability discussed with you on application.

2.3 Groundwater licensing policy

The Wye Abstraction Licensing Strategy (NRW & EA 2015) states:

> *There is no separate groundwater licensing policy as such and surface water availability may override local groundwater availability. Licences will only be granted if it can be demonstrated that the abstractions (with appropriate restrictions) will have "no adverse effect" on the integrity of the River Wye SAC. The following principles will apply:*
>
> - *Any application for a new groundwater abstraction licence or upwards variation to an existing licence will be treated on a case by case basis.*
> - *Applications will be assessed as to their impact on designated sites and local features of importance such as watercourses, and other groundwater users.*
> - *We will not issue a licence that would cause deterioration in the ecological quality of a water body.*
> - *Abstraction restrictions will be dependent upon aspects such as aquifer type, the depth of the borehole/well, the proximity to a surface water course, the proximity to a designated site and local features of importance, the quantity of water applied for and purpose (how consumptive the abstraction will be).*
> - *Where a groundwater application is found to adversely impact flows in the River Wye SAC or designated tributaries then the surface water Hands-off Flow (HOF) equivalent of 1,900 Ml/d (418 mgd) restriction at Redbrook gauging station will be applied. The*

appropriate HOF location will be based on the point of impact of the groundwater abstraction and determined during the licence application process.

- *In most cases a time limit of 31 March 2027 will be applied. A shorter time period may be applied if we feel there is a need to review an abstraction earlier so we can monitor the effect of the abstraction on the SAC and change the licence conditions if necessary. In exceptional circumstances we may grant longer term licences.*
- *There is the presumption of renewal for time limited licences, subject to the three renewal criteria (environmental sustainability, continued justification of need, and efficient use of water) and local considerations such as connectivity to watercourses and wetland sites, however:*
    - *conditions may be replaced with more restrictive terms and conditions to protect the environment e.g. as a result of a WFD assessment,*
    - *renewals may be subject to minor changes including the addition of water efficiency conditions,*
    - *we will also take into account any objections received to the renewal of the licence,*
    - *where connectivity to a watercourse is a factor and the RA flows have fallen below the EFI, we may seek to reduce licensed quantities as part of the renewal process, and*
    - *where connectivity to a watercourse is a factor and the FL flows have fallen below the EFI, we may seek to reduce unused portions of licensed quantities as part of the renewal process.*
- *We will endeavour to give six years notice if a time limited licence will not be renewed or is to be renewed but on more restrictive terms that significantly impact on the use of the licence.*
- *As CAMS resource assessments and WFD assessments are reviewed and updated, we may identify water resources pressures that will need to be investigated through our Restoring Sustainable Abstraction programme (or future equivalent, if applicable).*

3 DESK STUDY

3.1 Location

Dolidre (or Dol y Dre) Farm is located c.0.6 km south of the village of Llanddewi (or Ystradenni), which is situated on the A483 between Newtown and Llandrindod Wells in Powys. The site location is shown in Figure 3.1.

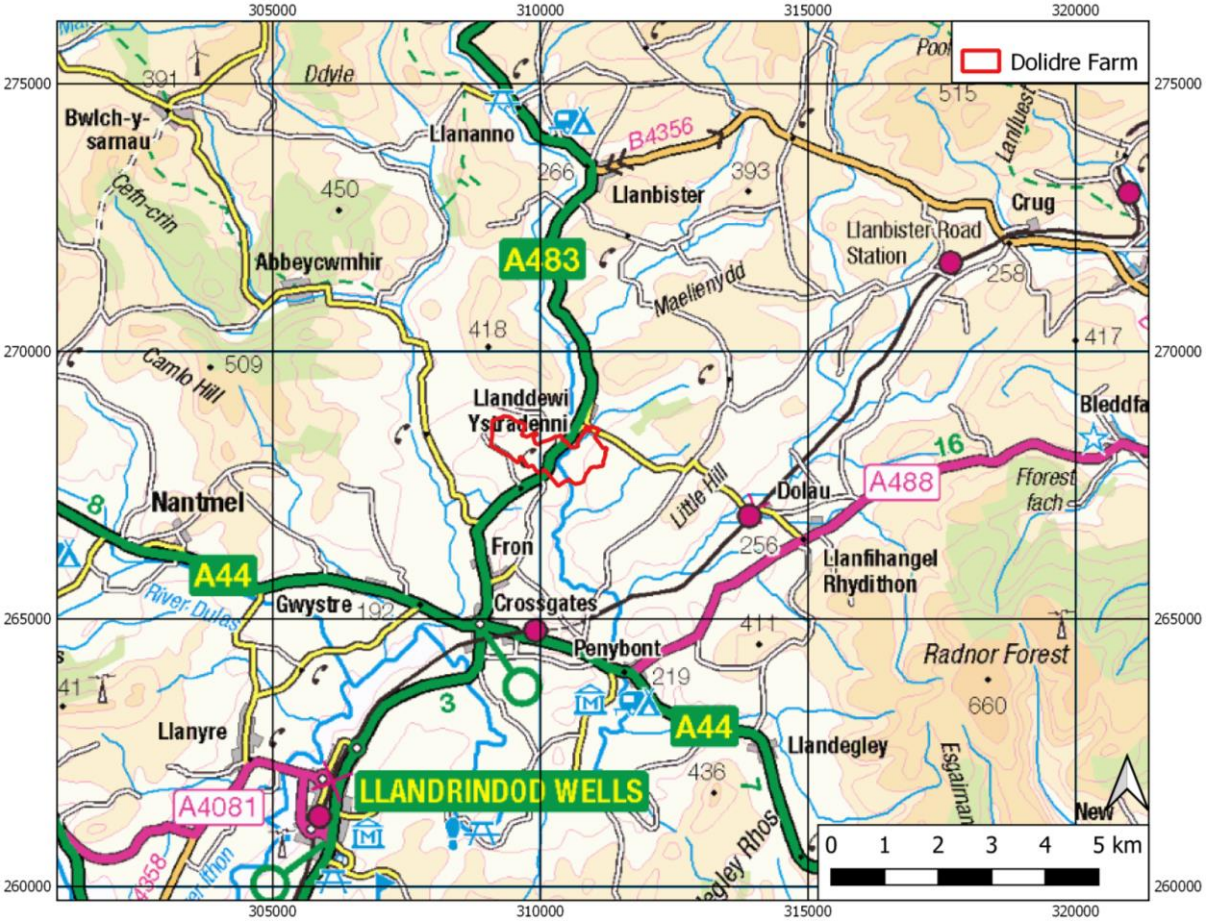

Figure 3.1 Site location

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Two groundwater abstraction boreholes located on the farm provide water for the chicken sheds. For the purposes of this report, the site is defined as the two boreholes and the study area is defined as the area within 1 km of the boreholes, as shown in Figure 3.2.

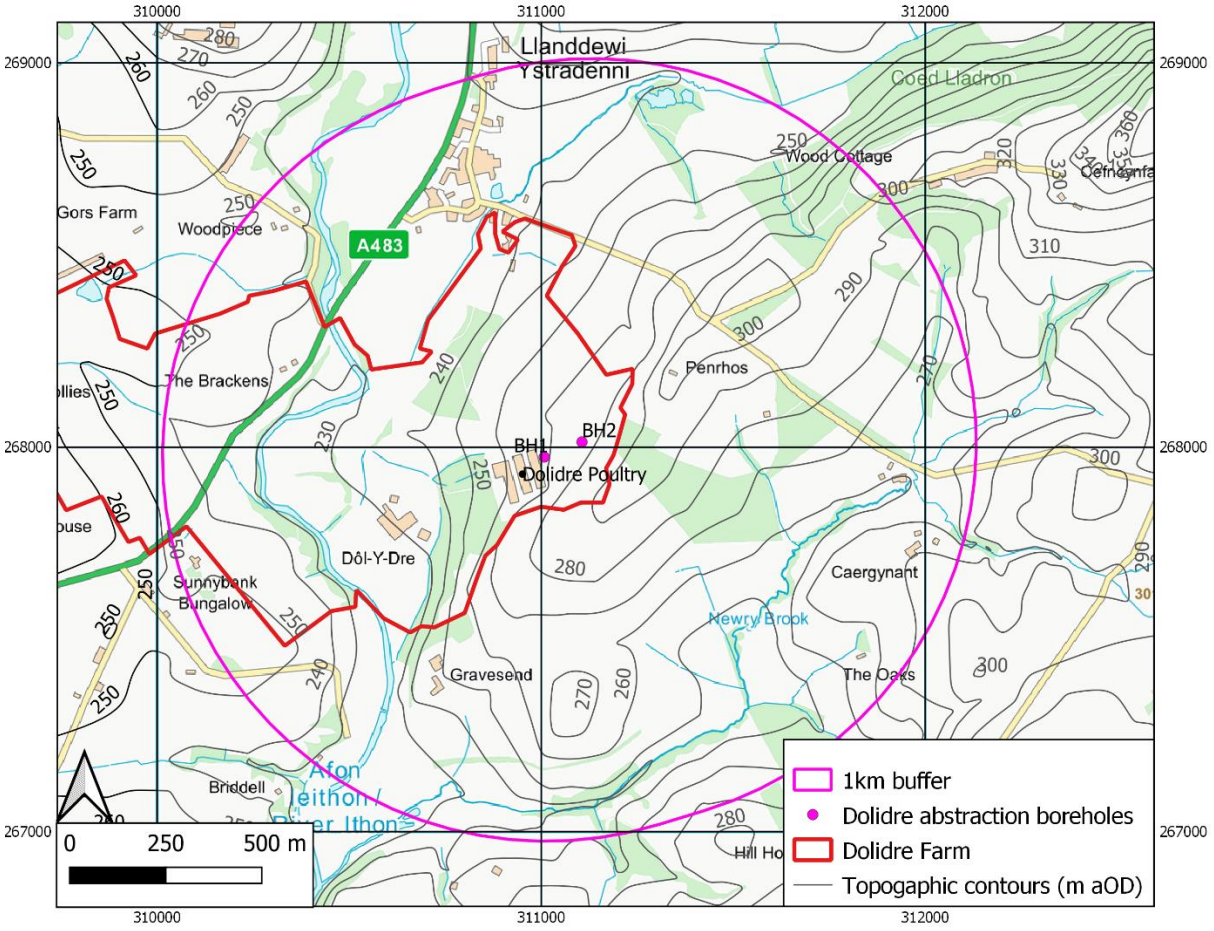

Figure 3.2 Study area
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The poultry site is located along the eastern boundary of the c.140 ha Dolidre Farm. The farm is accessed via a track c.110 m south of Llandewi village and the poultry site is located c.300 m beyond the main buildings of Dolidre Farm. The site and its two associated boreholes are situated on the north-western slope of a hill at Penrhos, which rises to 304 m aOD. BH1 (NGR 311008, 267974) is located immediately behind the poultry houses and BH2 (NGR 311106, 268013) is located c.105 m uphill from BH1.

3.2 Current abstraction

Dolidre Poultry began operating in 2009 with further expansion in 2016, whereby 140,000 birds are housed in three sheds. Water is supplied by two boreholes and there is no mains water at the poultry farm. The abstraction is currently not licensed. Available borehole and pump information is as follows:

- BH1 was drilled in July 2009 by Powys Drilling Services Ltd to a depth of 62.5 m, with a pump depth of 50 m. The pump specification is an ESPA S4G2 20 3-phase 4" pump
- BH2 was drilled in March 2011 by Powys Drilling Services Ltd to a depth of 64 m, with a pump depth of 45.7 m. The pump specification is a Grundfos SP5A-21 3-phase 4" pump

Geological logs for the boreholes are unfortunately unavailable.

Abstraction can occur 24 hrs/day, with pumping automatically triggered by low tank volume. This results in the pump switching on and off fairly frequently (a matter of minutes). The required volume increases with the maturity of the flock and there are periods when no water is used (e.g.

the 7-day downtime between flocks, once the sheds have been washed). A growing cycle is typically 48 days, with 38 days of growth followed by 3 days washing and then a 7 day rest period.

Abstraction is recorded by means of a daily water meter reading. The abstraction history is summarised in Table 3.1.

Table 3.1 Summary of abstraction history

Date		Maximum quantities abstracted				
from	**to**	**yearly**	**daily**	**hourly**	**peak**	**max. duration**
		m^3/annum	**m^3/d**	**m^3/hr**	**l/s**	**hr/d**
01/01/2011	31/12/2015	4,380	25	Not measured	Unknown[2]	24
01/01/2016	current	6,675	39	Not measured	Unknown[2]	24

The water use is consumptive: the water is used as poultry drinking water, and at the end of each flock cycle, the sheds are washed and the resulting dirty water is spread on farmland, in line with the farm's Nutrient and Manure Management Plan. The water use is not seasonal, with maximum demand occurring on a 48-day cycle.

3.3 Catchment overview

Dolidre Poultry Farm is located within the Wye Catchment Abstraction Management Strategy (CAMS) area. The catchment overview is taken from NRW & EA publication "Wye Abstraction Licensing Strategy, September 2015".

3.3.1 Hydrology

The River Wye is the sixth largest river in the UK. The River Wye has a total catchment area of 4,171 km^2 spanning both England and Wales. From its source in the Cambrian Mountains of mid-Wales, the main River Wye flows for approximately 250 km (150 miles) and is varied in its character as it transforms from an upland stream to a lowland river. The river is tidal for approximately 23 km (14 miles) from the tidal limit at Bigsweir Bridge to Chepstow where it flows into the Severn Estuary.

The annual average rainfall across the area varies between 2,200 mm in the mountainous headwaters, to 700 mm in the lower catchment. The river can be flashy in nature and respond quickly following rainfall in the upper parts of the catchment, due to the low permeability of the underlying geology. Prolonged rainfall can lead to large flood events, conversely, river levels can drop quickly particularly during very dry periods.

The River Wye is a 'regulated river'. Water is released from the Elan Valley Reservoirs to support public water supply and other abstractions in the lower reaches of the Wye, when flows, as measured at Redbrook gauging station, fall below a certain threshold.

[2] See Section 5.2

3.3.2 Geology and Hydrogeology

The solid (bedrock) geology underlying the Wye catchment range in age from the Precambrian to the early Jurassic. These are overlain with a patchy veneer of superficial deposits laid down during the last Ice Age and by more recent alluvial processes. The main aquifer is the Lower Old Red Sandstone covering 67% of the CAMS area. This is a Secondary (Minor) aquifer in which groundwater storage and flow is principally within joints and fault-related fracture systems. The other significant aquifers are the Carboniferous Limestone (a Principal aquifer) in the south of the catchment and the superficial deposits located along the valley floors. The remaining geological strata yield small volumes of groundwater but are still important for small-scale abstractions in the more remote areas.

3.3.3 Topography

The River Wye catchment comprises some of the most diverse rural landscapes in England and Wales, ranging from the mountainous uplands through highly developed agricultural land of the lower catchment. The River Wye rises on the slopes of Plynlimon in the Cambrian Mountains of mid-Wales at an altitude of 680 m. In its upper reaches, it is a typical fast flowing upland river with steep gradients. In its middle and lower reaches, it flows through the flatter agricultural plains of Herefordshire, and becomes siltier and slower flowing as it nears the Severn Estuary at Chepstow.

Its distinctive landscape has afforded the Wye Valley with the designation of an Area of Outstanding Natural Beauty (AONB), since 1971. The AONB is a 58 mile/92 km reach straddling the border between England and Wales from Hereford to Chepstow and is considered to be one of the finest lowland river landscapes in Britain. A small part of the catchment, around the area of Talgarth, falls within the Brecon Beacons National Park.

3.3.4 Land Use

Agriculture is the major land use in the catchment area. There are large variations in the type of farming across the catchment linked to the quality of the soil. The main urban areas within the catchment are Hereford, Monmouth, Leominster, Ross-on-Wye and Hay-on-Wye. Tourism is a major contributor to the rural economy.

3.3.5 Main Water Resources Pressures

Surface water is the main source of supply for abstraction. In the upper catchment the headwaters of the Elan River are impounded, creating the Elan Valley system of reservoirs. These are vital in providing potable water for Birmingham, Gloucestershire and South Wales. Aside from public water supply, the main pressure on water resources in the catchment is from agricultural businesses where water is required for trickle and spray irrigation and other agricultural uses. Other sectors requiring water for abstraction include the food and drink manufacturers, quarry operators and golf clubs.

3.3.6 Ecological importance

The River Wye system acts as an important wildlife corridor, an essential migration route and a key breeding area for many nationally and internationally important species. The ecological value of the river and its tributaries is recognised through their national designation as Sites of Special Scientific Interest (SSSIs) and as a riverine SAC under the European Union Habitats Directive (1992). The SAC designation applies to the River Wye itself and some of its tributaries including the Rivers Llynfi, Bachhowy, Edw, Duhonw, Irfon, Dulas, Ithon, Aran, Elan and Lugg (up to Hampton Court Weir). The River Wye SAC has been designated for its range of migratory fish, particularly salmon, shad and lamprey species, which spawn mainly in the gravel shoals in the middle and upper catchment. Other SAC species include the white-clawed crayfish, which occur in coarser sediments along its

length; otters which live and breed in the river and along the banks throughout the catchment; and bullheads which are widespread. Also of importance are the communities of water crowfoot (Ranunculus) and a small area of watershed mire. All these features are considered potentially sensitive to abstraction pressures.

The River Wye and its tributaries also support UK Biodiversity Action Plan (BAP) species, many of which are at risk from abstraction. These include otter, water vole, twaite and allis shad, depressed river and freshwater pearl mussels, white-clawed crayfish (a seriously threatened species), river lamprey, fine lined pea mussel and river jelly lichen, common frog, toad, palmate and smooth newt. Other species within the system depend on still waters and damp habitats and are equally vulnerable to changes in hydrology and groundwater levels.

The River Wye is the only UK river that supports all six unionid mussels found in the UK. The rare pearl mussel and depressed river mussel (both UK BAP priority species) have been recorded. These species lives on silty river margins and are vulnerable to abstraction. Rare invertebrates are present throughout the catchment.

The River Monnow supports nationally rare shoal invertebrates, while a rare diving beetle is present in the Wye at Glasbury and Rhayader. The Wye catchment makes an ideal environment for migratory fish and also supports many species of coarse fish.

The River Wye flows into the Wye Estuary (SAC designation), and subsequently the Severn Estuary, which is designated as a SSSI, a Habitats Directive Special Protection Area (SPA) and SAC. The Severn Estuary is included on the list of wetlands of international importance under the Ramsar Convention (Ramsar Site).

Over time, development pressure and changing agricultural practices have adversely affected water bodies and watercourses within the catchment and caused significant loss or deterioration of wetland habitats. This has led to many of the remaining water related habitats being formally recognised through statutory protection and / or by the UK and local BAPs.

3.4 Hydrology

3.4.1 Rainfall

The nearest Met Office weather station is Sennybridge (NGR 289451 241743, 307 m aOD)[3], c.21 miles from Dolidre. Climate averages at Sennybridge are shown in Table 3.2.

Table 3.2 Meteorological data

Month	Max. temp (°C)	Min. temp (°C)	Days of air frost (days)	Rainfall (mm)	Days of rainfall ≥1 mm (days)
Jan	5.98	0.63	13.22	171.82	18.75
Feb	6.43	0.45	11.72	136	15.46
Mar	8.69	1.5	9.7	117.79	14.83
Apr	11.63	2.9	5.66	94.79	13.57
May	14.69	5.48	1.86	93.71	13.33

[3] https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcm2jvb2g

Month	Max. temp (°C)	Min. temp (°C)	Days of air frost (days)	Rainfall (mm)	Days of rainfall ≥1 mm (days)
Jun	17.19	8.32	0.13	90.13	12.43
Jul	18.83	10.17	0	102.33	13.87
Aug	18.45	9.98	0	112.56	15.06
Sep	16.19	8	0.27	116.91	13.37
Oct	12.52	5.88	2.57	168.71	17.2
Nov	8.86	2.95	6.72	168.77	18.63
Dec	6.42	0.96	11.79	192.1	18.77
Annual	**12.19**	**4.79**	**63.6**	**1565**	**185**

3.4.2 Rivers

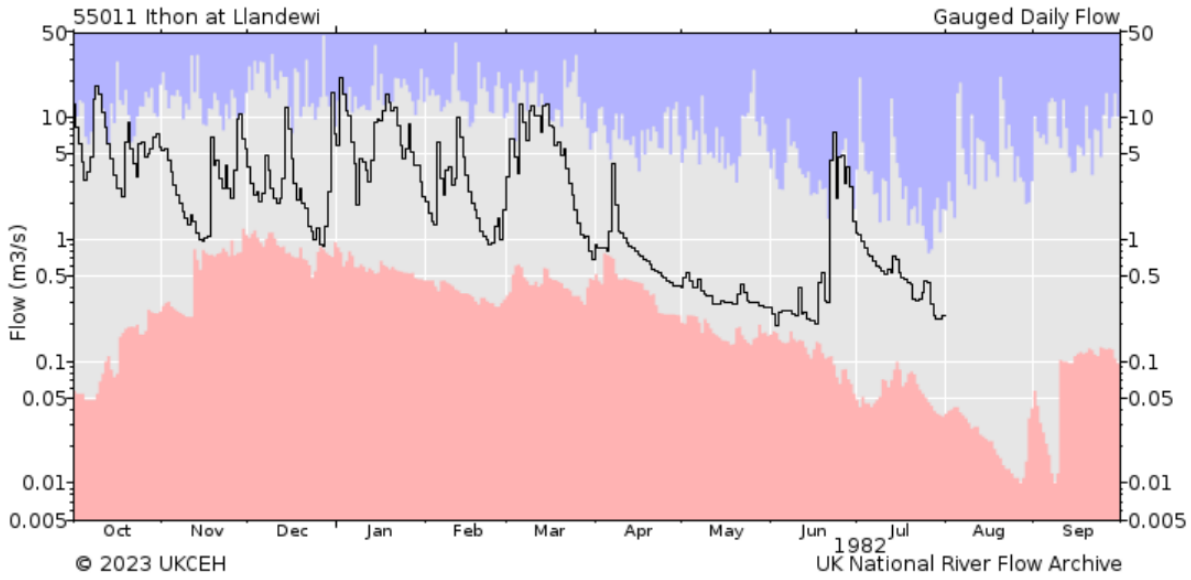
Dolidre is located within the Wye catchment. Locally, the main watercourse is the River Ithon, located c.500 m west of the Dolidre boreholes. The River Ithon discharges to the River Wye approximately 15 km southwest of Dolidre, just south of the town of Newbridge.

Historic flow data exists for the River Ithon at Llandewi[4] (NGR SO 104 682), 500 m northwest (i.e. upstream) of the Dolidre boreholes, as summarised in Table 3.3 and Figure 3.3.

Table 3.3 Daily flow data for the River Ithon at Llandewi

Period of Record:	1959 - 1982
Percent Complete:	98 %
Base Flow Index:	0.38
Mean Flow:	2.626 m^3/s
95% Exceedance (Q95):	0.137 m^3/s
70% Exceedance (Q70):	0.62 m^3/s
50% Exceedance (Q50):	1.413 m^3/s
10% Exceedance (Q10):	6.598 m^3/s
5% Exceedance (Q5):	9.678 m^3/s

[4] https://nrfa.ceh.ac.uk/data/station/info/55011



Key: Red and blue envelopes represent lowest and highest flows on each day over the period of record.

Figure 3.3 Hydrograph for the River Ithon at Llandewi

The River Ithon at Llandewi has a catchment area of 111 km^2 and a baseflow index (BFI)[5] is 0.38. Between 1959 and 1982 the mean flow was 2.63 m^3/s and the Q95 flow was 0.14 m^3/s.

3.5 Geology

The local geology comprises Ordovician to Silurian aged sedimentary rocks (Mudstones and Sandstones) overlain on lower ground by Till with some Alluvium, as shown in Figure 3.4 and described in Table 3.4. The sedimentary bedrock is marine in origin. Sediments are detrital and comprise coarse- to fine-grained slurries of debris from the continental shelf flowing into a deep-sea environment, forming distinctively graded beds.[6]

The boreholes lie within Devensian Till underlain by Sandstone of the Penstrowed Grits Formation. The boreholes are situated on the southeastern fringe of the Till, with no superficial deposits found 50 m uphill (south and east of the boreholes). Alluvium is present 360 m west of the boreholes, along the course of the River Ithon. Within the study area, the bedrock occurs as bands running northeast to southwest, getting younger towards the southeast. A northeast to southwest trending fault occurs along the course of the Newry Brook (Section 4.1.1).

Records of the two BGS boreholes within 1 km of the site are shown in Table 3.5. The nearest BGS borehole (SO16NW1) is 840 m west.

[5] BFI is the proportion of the river runoff that derives from stored sources; the more permeable the rock, superficial deposits and soils in a catchment, the higher the baseflow and the more sustained the river's flow during periods of dry weather. The BFI of 0.38 means that 38% of the flow is from groundwater, 62 % from rainfall runoff.

[6] http://mapapps.bgs.ac.uk/geologyofbritain/home.html

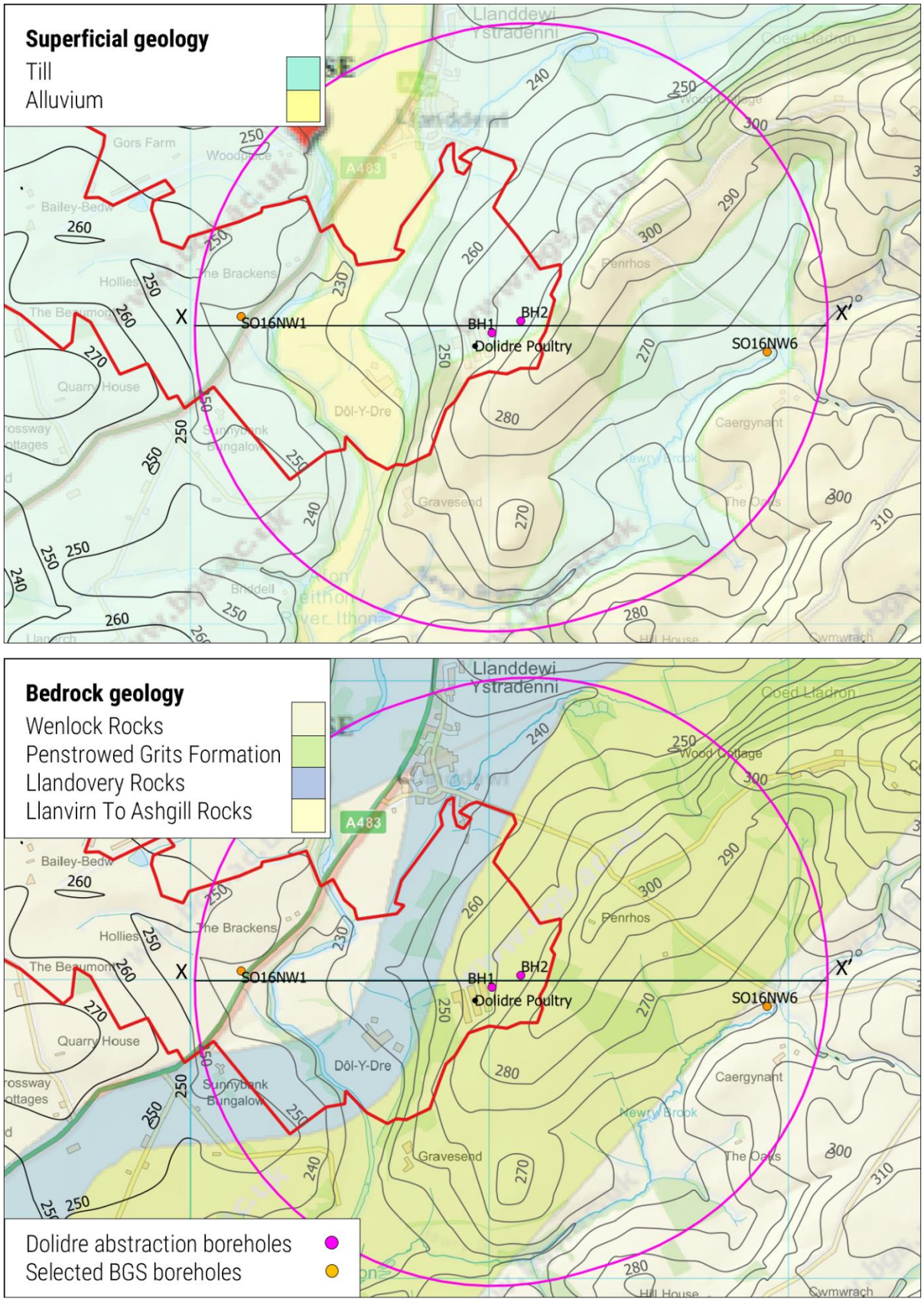


Figure 3.4 Geology

Table 3.4 Summary of local geology

Name	Description	Age
Superficial deposits		
Alluvium	Alluvium is a general term for clay, silt, sand and gravel. It is the unconsolidated detrital material deposited by a river, stream or other body of running water as a sorted or semi-sorted sediment in the bed of the stream or on its floodplain or delta, or as a cone or fan at the base of a mountain slope. [7]	Quaternary (<2 Ma)
Devensian Till	Diamicton. Unsorted and unstratified drift, generally unconsolidated, deposited directly by and underneath a glacier without subsequent reworking by water from the glacier. It consists of a heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape.[8]	Quaternary (<2 Ma)
Bedrock		
Wenlock Rocks (undifferentiated)	Argillaceous Rock	Silurian (433-427 Ma)
Penstrowed Grits Formation	Sandstone.[9] Mudstones with greywacke sandstones, medium- to coarse-grained in thick beds, many isolated, but commonly in packets, forming 20%-100% of the packet. Thickness 0->100m[10].	Silurian (433-431 Ma)
Llandovery Rocks (undifferentiated) -	Argillaceous Rock.[11] Formations are dominated by mudstone, but also contain some formations in which sandstone is dominant.[12]	Silurian (444-433 Ma)
Llanvirn To Ashgill Rocks (undifferentiated)	Argillaceous Rocks And [subequal/subordinate] Sandstone, Interbedded.[13] No lexicon	Ordovician (466-444 Ma)

[7] https://www.bgs.ac.uk/lexicon/lexicon.cfm?pub=ALV
[8] https://www.bgs.ac.uk/lexicon/lexicon.cfm?pub=TILL
[9] http://mapapps.bgs.ac.uk/geologyofbritain/home.html
[10] https://www.bgs.ac.uk/lexicon/lexicon.cfm?pub=PEG
[11] http://mapapps.bgs.ac.uk/geologyofbritain/home.html
[12] https://www.bgs.ac.uk/lexicon/lexicon.cfm?pub=LDVY
[13] http://mapapps.bgs.ac.uk/geologyofbritain/home.html

Table 3.5 Local BGS borehole data

BGS ref	Name	Easting	Northing	Description
SO16NW1	Brynderwy, nr Llandrindod Well	310170	268030	TOPSOIL to 0.6m; yellow CLAY to 3.0m; blue shaly CLAY to 9.1m; blue rock MARL to 12.2m. Water strike at 6.4m; rest water level 0.6m below well top.
SO16NW6	BARNFIELD GARAGE LLANDDGWI	311930	267910	SOIL to 0.6m; CLAY to 17m; SHALE to 68.6m Water strike at 22.9m; artesian borehole

3.6 Hydrogeology

3.6.1 Aquifer classification

The bedrock aquifer within a 500 m radius of the boreholes is classed as a secondary aquifer (previously minor and/or non-aquifer), as shown in Figure 3.5.[14]

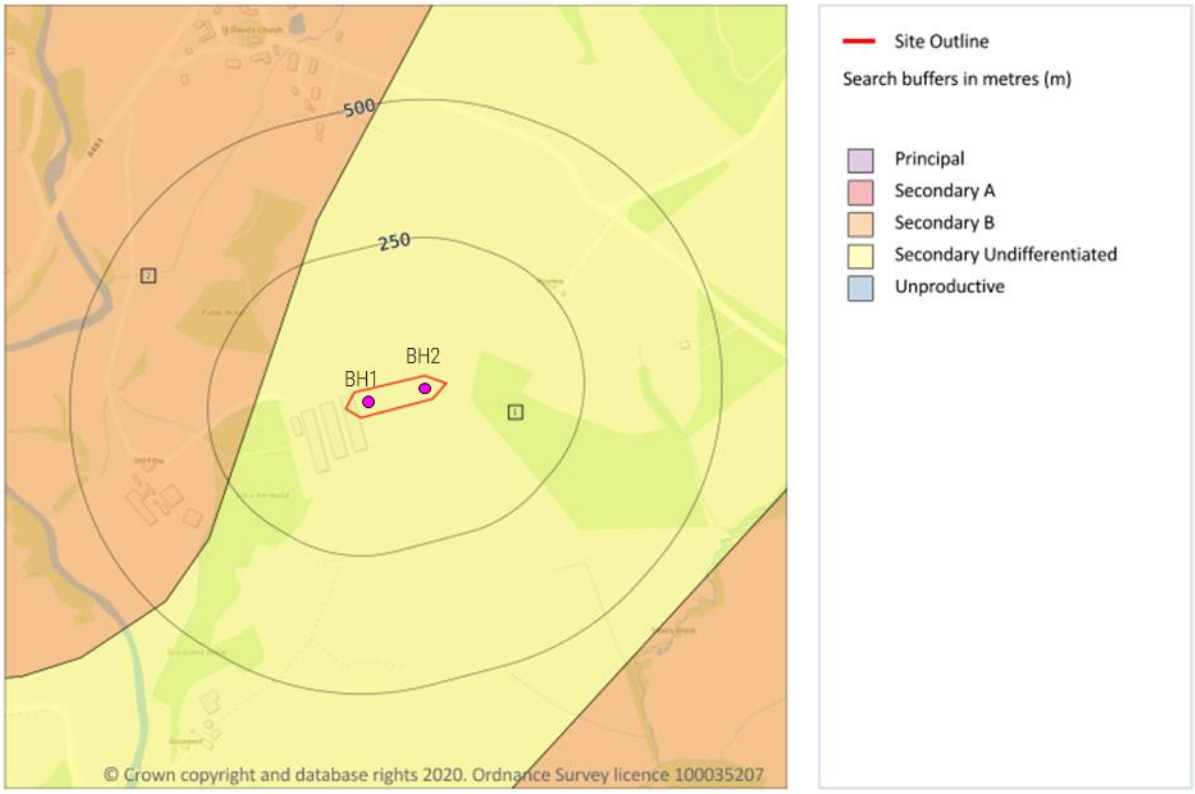


Figure 3.5 Map of aquifers within bedrock geology

More specifically, the Penstrowed Grits Formation (within which the abstraction boreholes lie) is classified as a Secondary (undifferentiated) aquifer. This description is assigned where it is not

[14] Groundsure report GS-6739036.

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. The other bedrock units (located at least 159 m from the boreholes) are classified as a Secondary B aquifer, defined as predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

There are no records of superficial aquifers within 500 m of the site[15]: NRW does not appear to record superficial aquifers. The abstraction boreholes are drilled through a thin layer of Till, which peters out to the south and east. Alluvium associated with the River Ithon occurs 360 m west of the boreholes. Generally the Till is often classified as a Secondary (undifferentiated) aquifer and Alluvium is often classified as a Secondary A aquifer, defined as 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.

The boreholes do not lie within 500 m of a source protection zone (SPZ).

Groundwater level is likely to reflect topography.

3.6.2 Aquifer properties

Geologically speaking, the bedrock in the area is all older than Devonian age (>419 Ma). Regionally, the pre-Devonian aquifer properties are as follows.[16]

> *The principal controls on the core and aquifer properties of the pre-Devonian aquifers are the degree of induration and cementation as well as the extent and depth of fracturing. Primary porosity in most horizons is very low (commonly less than 2%). Flow is almost entirely via fractures, and groundwater flow and storage occurs in joints and fracture systems developed to varying degrees according to the formation's deformation history and proximity to local structural features such as faults and fold axes. Primary porosity therefore contributes an insignificant proportion of the total permeability and storage.*

3.7 Environmental designations

Environmental designations recorded within 1 km of the Dolidre boreholes are shown in Figure 3.6 and summarised in Table 3.6. This information is obtained from Groundsure report GS-6739036 (Appendix A).

[15] Groundsure report GS-6739036.

[16] British Geological Survey / Environment Agency, 2000, The Physical Properties of Minor Aquifers in England and Wales. Environment Agency R&D Publication 68

Figure 3.6 Environmental designations

Table 3.6 Summary of environmental designations within 1 km of the Dolidre boreholes

Designation	Name	Location	Description
SSSI	River Ithon	454 m NW	Estuaries; Intertidal mudflats and sandflats; Atlantic salt meadows; Rivers with floating vegetation often dominated by water-crowfoot; Dry heaths; Very wet mires often identified by an unstable `quaking` surface; Caves not open to the public; Mixed woodland on base-rich soils associated with rocky slopes; Western acidic oak woodland; Bog woodland; Alder woodland on floodplains; Sea lamprey; Brook lamprey; River lamprey; Allis shad; Twaite shad; Atlantic salmon; Bullhead; Freshwater pearl mussel; White-clawed (or Atlantic stream) crayfish; Lesser horseshoe bat; Greater horseshoe bat; Otter
SAC	River Wye	454 m NW	
Designated Ancient Woodland	Unknown	25 within 1 km	Ancient semi-natural woodland; plantation on ancient woodland site; restored ancient woodland site;

The River Ithon, located 454 m northwest of the Dolidre boreholes, is a Site of Special Scientific Interest (SSSI) and is also part of the River Wye Special Area of Conservation (SAC). The nearest designated ancient woodland is 73 m SW of the Dolidre boreholes, within Dolidre Farm.

4 WATER FEATURES SURVEY

A desk-based water features survey of 1 km radius has been undertaken using data from Ordnance Survey maps, a Groundsure EnviroInsight report and a query to Powys Council regarding private water supplies. Water features are shown in Figure 4.1.

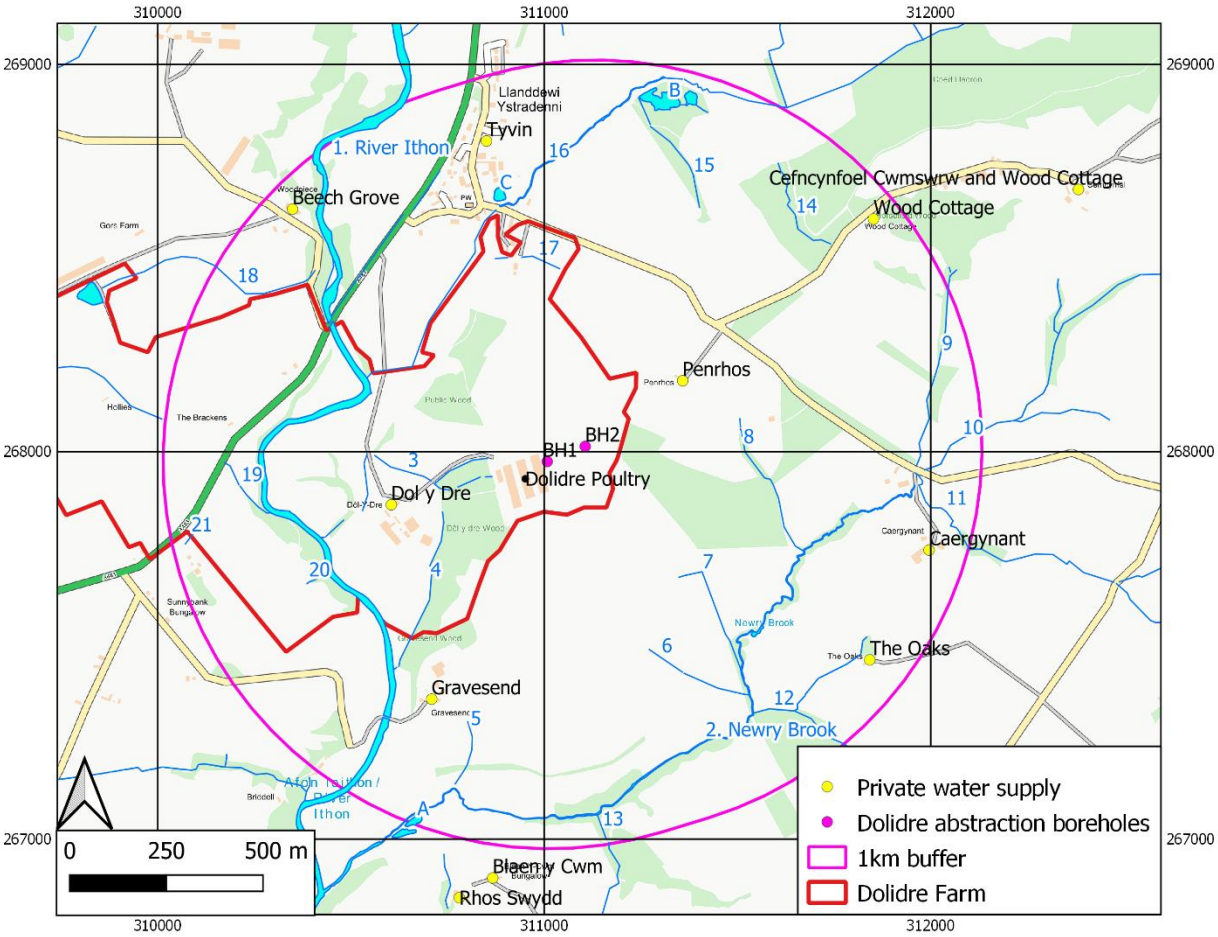


Figure 4.1 Water features (excluding aquifers) within the study area

Watercourses are numbered 1 to 21 as per Table 4.1 and other water bodies are labelled A to C as per Table 4.2

4.1.1 Watercourses

There are 21 watercourses within 1 km of the site, of which five are small (less than 200 m in length). The watercourses are described in Table 4.1 and numbered in Figure 4.1. Locally, the main feature is River Ithon which is located c.490 m west of the boreholes. The River Ithon flows locally southwards, through the town of Llandridnod Wells before its confluence with the River Wye c.15 km southwest of the site. The closest watercourse (No.3), located 150 m west of the site, rises immediately west of the poultry site and is a minor tributary of the River Ithon.

Table 4.1 Watercourses within the study area

Ref. on Figure 4.1	Easting	Northing	Distance / direction from site	Description
1	310452	268756	492mW	River Ithon
2	311418	267253	620mSE	Newry Brook

Ref. on Figure 4.1	Easting	Northing	Distance / direction from site	Description
3	310648	267949	150mW	Tributary of River Ithon rising immediately west of poultry site, meeting River Ithon near Dolidre Farm buildings
4	310706	267666	304mSW	Tributary of River Ithon rising near Dolidre Farm buildings, meeting River Ithon near Gravesend
5	310809	267282	706mS	Minor tributary (<200m) of Newry Brook near Gravesend
6	311304	267470	557mSE	Tributary of Newry Brook
7	311410	267687	415mSE	Tributary of Newry Brook
8	311516	268010	407mE	Tributary of Newry Brook
9	312029	268251	864mE	Tributary of Newry Brook
10	312082	268034	883mE	Tributary of Newry Brook
11	312040	267851	863mE	Tributary of Newry Brook, near Caergynant. Confluence with Newry on opposite bank from Dolidre
12	311593	267335	814mSE	Tributary of Newry Brook, rising near The Oaks
13	311151	267023	953mS	Tributary of Newry Brook. Confluence with Newry on opposite bank from Dolidre
14	311651	268605	764mNE	Minor watercourse with no apparent outlet near Wood Cottage
15	311386	268711	687mNE	Tributary of 15, including waterbody B
16	311010	268748	427mNW	Tributary of River Ithon meeting River Ithon upstream of Dolidre Farm
17	310984	268497	465mN	Minor watercourse (<200m) possibly connected to 16
18	310206	268425	832mNW	Tributary of River Ithon rising near Gors Farm. Confluence with Ithon on opposite bank from Dolidre
19	310217	267912	737mW	Minor tributary (<200m) of River Ithon. Confluence with Ithon on opposite bank from Dolidre
20	310391	267666	643mSW	Minor tributary (<200m) of River Ithon. Confluence with Ithon on opposite bank from Dolidre
21	310087	267782	940mW	Minor watercourse (<200m) with no apparent outlet near Sunnybank Bungalow

4.1.2 Other waterbodies

The three other waterbodies within 1 km of the site are shown in Table 4.2 and labelled on Figure 4.1. The closest waterbody is located 683 m from the site in Llanddewi (Waterbody C).

Table 4.2 Other waterbodies within 1 km the study area

Ref. on Figure 4.1	Easting	Northing	Distance / direction from site	Description
A	310672	267049	972mSW	Pond adjacent to Newry Brook
B	311323	268904	890mN	Ponds near confluence of watercourse 15 with watercourse 16
C	310886	268666	683mN	Pond in Llanddewi, near watercourse 16, opposite side of stream from Dolidre

4.1.3 Springs

There are no springs mapped within 1 km of the site. However, three springs within 1 km of the site are recorded in data regarding unlicensed abstractions obtained from Powys Council (Section 4.1.7). The closest spring is 420 m west at Dol y Dre and the next closest is 830 m N at Tyvin in Landdewi.

4.1.4 Aquifer – superficial

Superficial aquifer designations do not appear to be recorded in Wales. However, the Till is likely to be a minor / non-aquifer and the Alluvium is likely to be a minor aquifer.

4.1.5 Aquifer – bedrock

The Penstrowed Grits Formation (within which the abstraction boreholes lie) is classified as a Secondary (undifferentiated) aquifer. The other bedrock units within the study area, but located at least 159 m from the boreholes, are classified as a Secondary B aquifer.

4.1.6 Abstractions – licensed

There are no licensed groundwater or surface water abstraction licences within 1 km of the boreholes.[17]

4.1.7 Abstractions – unlicensed

Powys Council hold records regarding unlicensed private water supplies for eight properties within 1 km of the site, as shown in Table 4.3 and Figure 4.1.

[17] Groundsure report GS-6739036

Table 4.3 Unlicensed abstractions within 1 km of the site

Ref.	Easting	Northing*	Distance/ direction from BHs	Name	Class of supply	Type of supply
PWS/2180	311852	268601	950m NE	Wood Cottage	Single dwelling	Spring
PWS/1521	310349	268627	920m NW	Beech Grove	Single dwelling	Well
PWS/2120	310851	268802	830m N	Tyvin	Single dwelling	Spring
PWS/1982	311358	268183	300m NE	Penrhos	Single dwelling	Borehole
PWS/2357	311996	267746	930m SE	Caergynant	Single dwelling	Well
PWS/1689	310604	267864	420m W	Dol y Dre	Single dwelling	Spring
PWS/2060	311842	267463	920m SE	The Oaks	Single dwelling	Borehole
PWS/1764	310709	267361	680m SW	Gravesend	Single dwelling	Well

*co-ordinates inferred from addresses provided by Powys Council

The nearest private water supply is a borehole at Penrhos, 300 m northeast of the boreholes. The next nearest private water supply is a well at Gravesend, 680 m southwest of the boreholes (the client reports that the spring at Dolidre Farm is not used).

4.2 Hydrogeological assessment

The water features identified above are plotted onto the bedrock and superficial geology maps in Figure 4.2 and Figure 4.3 respectively.

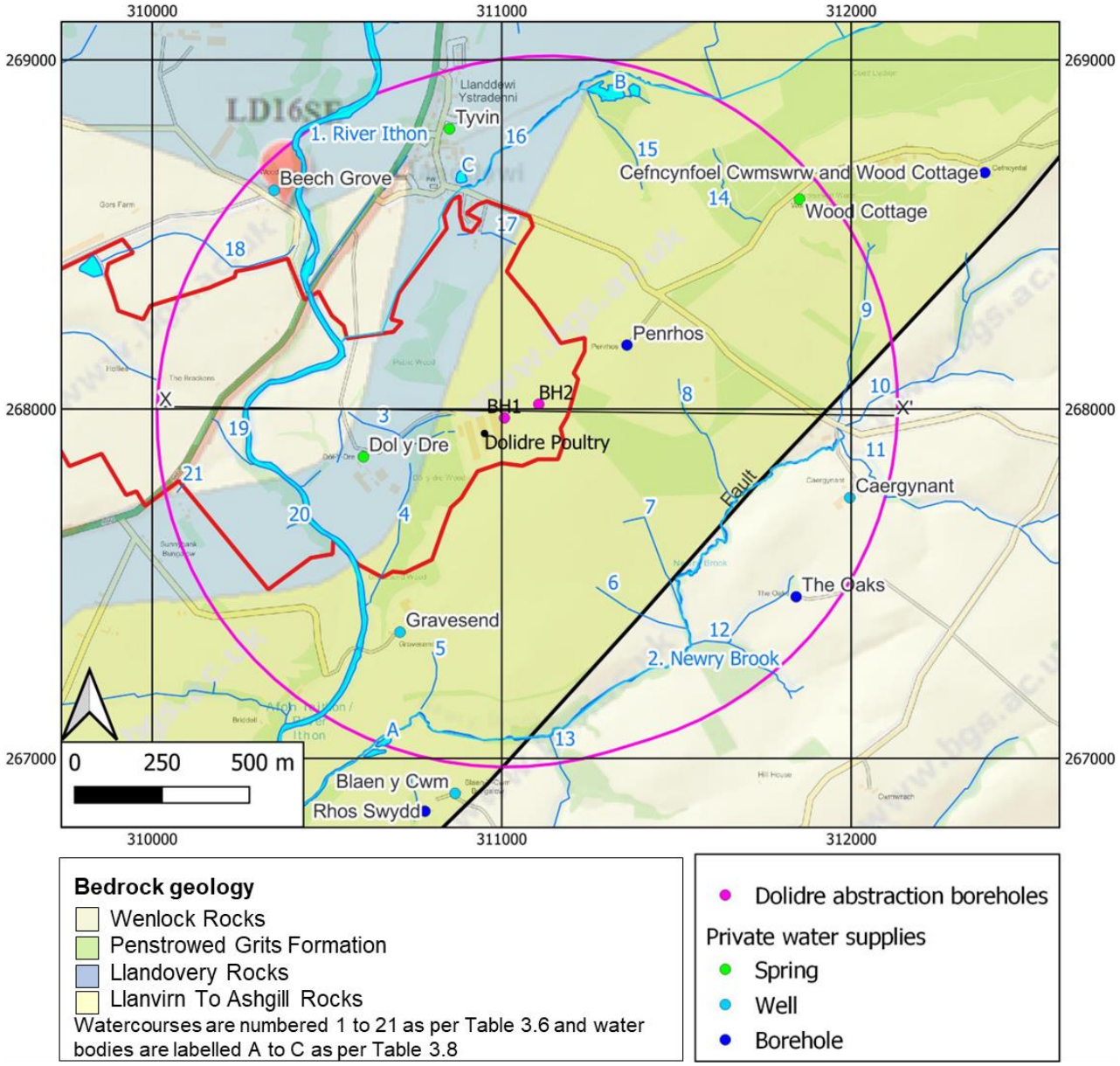


Figure 4.2 Water features against bedrock geology

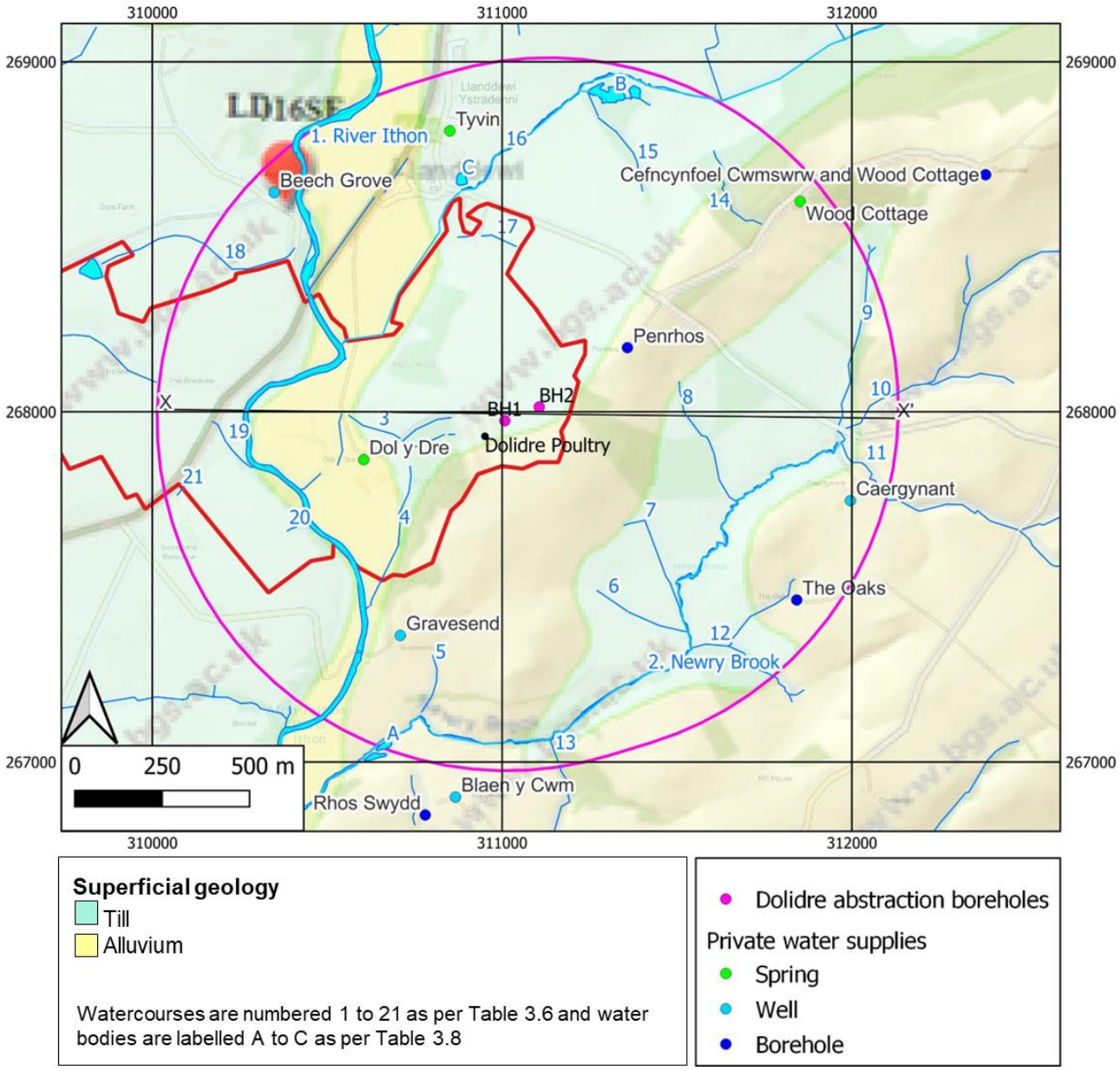


Figure 4.3 Water features against superficial geology

Regarding watercourses nearest the Dolidre boreholes, the watercourses to the southeast (Nos. 6,7,8 and 9) rise at the geological contact between the Till and the bedrock (Sandstone of the Penstrowed Grits Formation), which is exposed uphill. This indicates that groundwater emerges at the geological contact between the Till and the Sandstone in this area. However, watercourses to the west and north (Nos. 3,4 and 17) rise within the Till, but seem to rise near the contact, within the bedrock, of the Penstrowed Grits Formation and the lower permeability Llandovery Rocks.

5 SITEWORK

5.1 Set-up

Water level loggers were installed into boreholes BH1 and BH2 for 18 days, between 19 May and 5 June 2023, to measure groundwater level during peak demand and the rest period. Site operations and water consumption (measured daily, both boreholes combined) during this time are summarised in Table 5.1 and Figure 5.1.

Table 5.1 Site operations and consumption during test period

Date range	Site operations	Average consumption[1] (m^3/day)	Boreholes used
19 - 22 May 2023	Peak demand	32.6	BH1 & BH2
23 - 28 May	Reduced demand (bird numbers reduced on 23 May)	30.6	BH2 until 27 May BH1 briefly on 26 May, then 27 - 28 May
29 – 30 May	Poultry depleted	10.2	Mostly BH2
31 May – 2 June	Start of rest period: Washdown of poultry sheds	26.2	BH1 & BH2
3 – 5 June	Rest period: No poultry (just cattle)	1.2	BH1 (minimal)

[1]Includes continuous abstraction of 1.2 m^3/day for cattle trough (mostly from BH1)

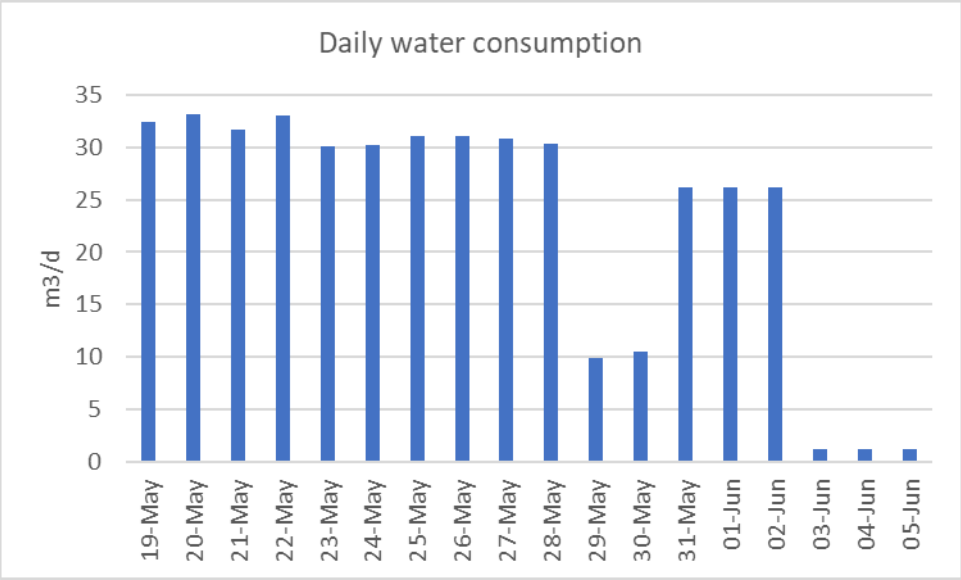


Figure 5.1 Daily water consumption

5.2 Results

Borehole parameters obtained during the test are shown in Table 5.2, and groundwater levels at BH1 and BH2 during the test period are shown in Figure 5.2.

Table 5.2 Borehole parameters inferred from sitework

	BH1	BH2	Total
Ground level[1]	268 m aOD	277 m aOD	n/a
Pump depth	50 m bgl	45.7 m bgl	n/a
Rest water level (RWL)[2]	20 m bgl	10 m bgl	n/a
Maximum pumped water level (max PWL)	50 m bgl	22 m bgl	n/a
Average pumped water level (average PWL)	30.7 m bgl	16.5 m bgl	n/a
Average drawdown	10.7 m	6.5 m	n/a
Average daily flow during growing cycle [3]	15 m^3/d	15 m^3/d	30 m^3/d

[1]Approximate: obtained using 10 m OS contours
[2] Inferred from Figure 5.2
[3]Inferred: Total measured, but the split between boreholes BH1 and BH2 is inferred

The following points are noted about the groundwater response in each borehole during the test period:

- Rest water level (RWL) was not observed during the test and was therefore inferred using extrapolation.
- BH1 frequently runs dry, but BH2 has c.23 m available drawdown (pump level c. 231 m aOD).
- The BH2 pump always (and the BH1 pump often) stays on for a short duration (a matter of minutes), therefore the logging frequency of 15 minutes is insufficient to capture the full drawdown for each occasion the pump is on.
- When BH1 is on alone, it generally runs continuously. The approximate instantaneous rate is 0.4 l/s.
- When BH2 is on alone, it is on roughly half the time (when pumping alone, i.e. on 24 May). The approximate instantaneous rate is 0.7 l/s.
- BH2 is significantly better performing than BH1 (i.e. BH2 has an instantaneous yield of c.0.7 l/s for a drawdown of c.12 m, compared to BH1 which has an instantaneous yield of 0.4 l/s for a drawdown of 30 m).
- Groundwater levels within the boreholes did not appear to be influenced by pumping in the neighbouring borehole, as detailed below:
    - Instantaneous response: no response observed in neighbouring boreholes to pump being switched on or off.
    - Longer term recovery curves: BH1 recovery curve looks the same, whether or not BH2 is on (23-26 May) or off (3-5 June)
- Total average annual flow inferred from the sitework is calculated as 9,400 m^3/year (Table 5.2). This is an over-estimate as it is higher than historic records (6,675 m^3/year, Table 3.1).

The cause for the discrepancy is that our usage data is only for the final few days of the flock, when demand is highest.

- It was not possible to obtain accurate instantaneous pump rates during the tests as water consumption is recorded daily, and the pumps switched on and off frequently (faster than the groundwater level logging rate which was set at 15 minutes). In order to verify the estimates above (BH1 0.4 l/s, BH2 0.7 l/s), maximum instantaneous flow rates, based on the pump curves and the maximum observed head, are provided in Table 5.3.

Table 5.3 Maximum flow rates based on pump curves

Parameter	BH1	BH2
Pump specification	ESPA S4G2 20 3-phase	Grundfos SP5A-21 3-phase
Maximum pumped water level	50 m bgl	22 m bgl
Max. flow rate based on pump curve	0.8 l/s	1.9 l/s

The maximum possible flow rates are 0.8 l/s at BH1 and 1.9 l/s at BH2, although it is likely that the pumps have been throttled back, giving lower instantaneous rates than theoretically possible. The estimates above (BH1 0.4 l/s, BH2 0.7 l/s) are therefore plausible, but an additional 20 % is added to the licence application in order to cover uncertainties.

Flow parameters derived from sitework are summarised in Table 5.4.

Table 5.4 Estimated flow parameters derived from sitework

Parameter	BH1	BH2	Inferred total	Comment
Date measured	22 May 2023	24 May 2023	n/a	Boreholes mostly pumping alone on these days
Measured daily rate	33 m^3/d	30.2 m^3/d	n/a	Max historic combined is 39 m^3/d
% of time pump is on (max)	100 %	50 %	n/a	
Inferred instantaneous rate	0.38 l/s	0.70 l/s	1.08 l/s	
Inferred hourly rate	1.38 m^3/hr	1.26 m^3/hr	2.63 m^3/hr	Assumes BH2 on 50% of the time (rapid on-off)

It is noted that when pumping alone, BH1 and BH2 have similar hourly / daily pump rates (c.30 m^3/d). BH2 has a higher instantaneous rate than BH1, but does not pump continuously.

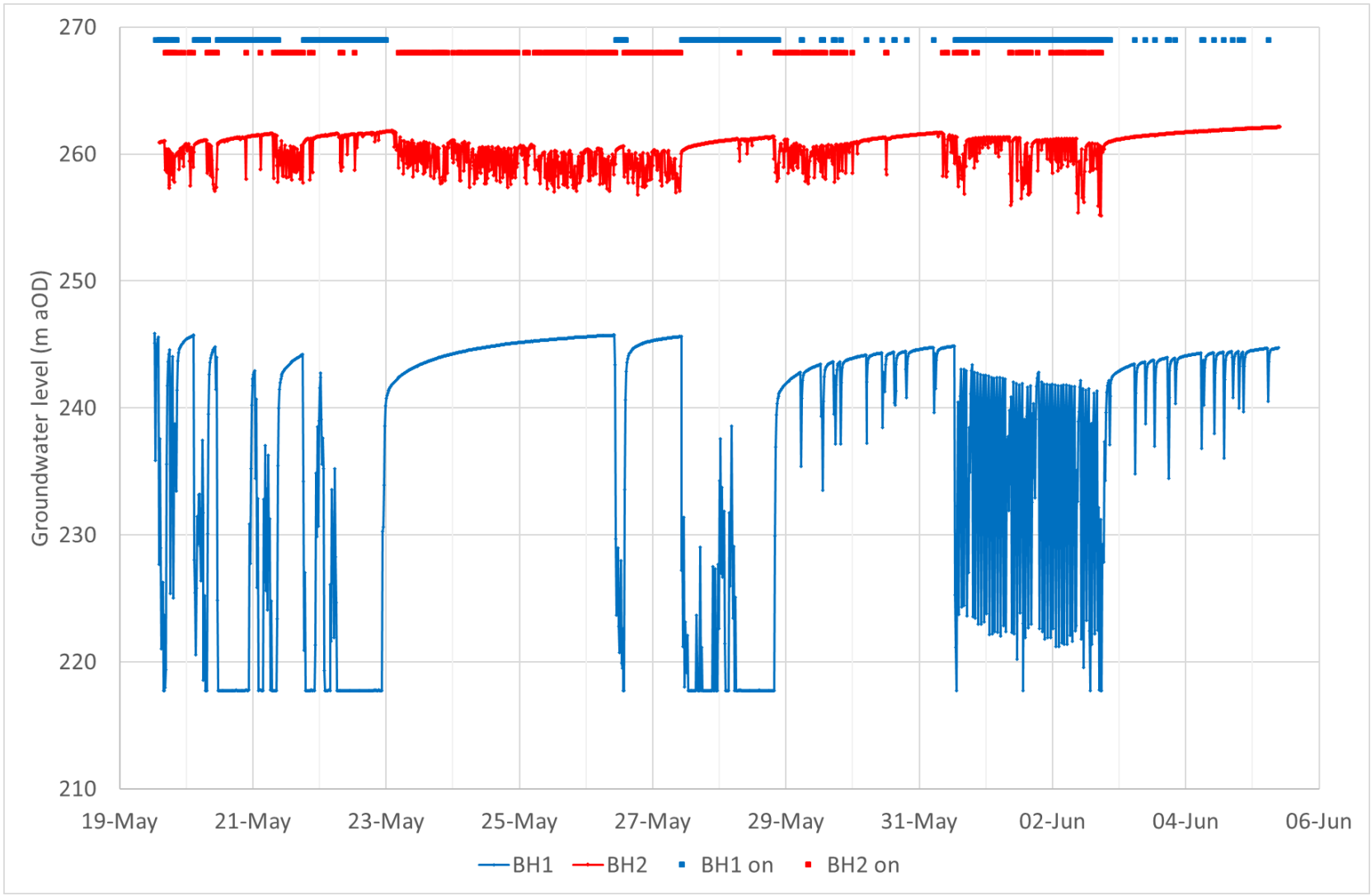


Figure 5.2 Groundwater level during test period

6 CONCEPTUAL MODEL

Dolidre Poultry has 140,000 birds housed in three sheds. Water (up to 39 m^3/d; 6,675 m^3/yr) is supplied by two boreholes (BH1 & BH2) and there is no mains water at the poultry farm. The abstraction is currently not licensed.

The local geology comprises Ordovician to Silurian aged sedimentary rocks (Mudstones and Sandstones) overlain on lower ground by Till with some Alluvium. The boreholes lie within Devensian Till underlain by Sandstone of the Penstrowed Grits Formation. The Sandstone is classified as a Secondary (undifferentiated) aquifer and it is likely that groundwater flow is almost entirely via fractures.

The River Ithon, located 454 m northwest of the Dolidre boreholes, is a Site of Special Scientific Interest (SSSI) and is also part of the River Wye SAC. The nearest designated ancient woodland is 73 m SW of the Dolidre boreholes, within Dolidre Farm.

A desk-based water features survey of 1 km radius showed that the closest watercourse (No.3), located 150 m west of the site, rises immediately west of the poultry site and is a tributary of the River Ithon. There are no licensed groundwater or surface water abstraction licences within 1 km, but eight unlicensed private water supplies. The nearest private water supply is a borehole at Penrhos, 300 m northeast of the boreholes.

Water level loggers were installed into boreholes BH1 and BH2 for 18 days, between 19 May and 5 June 2023, to measure groundwater level during peak demand and the rest period. Rest water level was not observed during the test and was therefore inferred using extrapolation. BH2 is significantly better performing than BH1 (i.e. BH2 has an instantaneous yield of c.0.7 l/s for a drawdown of c.12 m, compared to 0.4 l/s for a drawdown of 30 m at BH1). The boreholes did not appear to be influenced by pumping in the neighbouring borehole.

A conceptual hydrogeological cross section is presented in Figure 6.1.

The cross section shows an inferred groundwater divide along the ridge c.170 m to the east of the Dolidre boreholes. To the east, a mapped fault is likely to form the eastern limit of the aquifer unit, with groundwater emerging where the Till begins (e.g. at watercourse 8 in Section 4). To the west, the emergence of watercourses (e.g. at watercourse 3 in Section 4) appears to be associated with the contact between the Penstrowed Grits and the (lower permeability) Landovery Rocks.

The cross section is compiled using available information: the bedrock orientation and the thickness of the superficial deposits are not well defined. Furthermore, it is acknowledged that the rest water level of BH1 appears unusually low. The rest water level was not observed but was inferred by extrapolating recovery curves. It is possible that on-going abstraction has reduced storage in the vicinity of the borehole, such that aquifer is dewatered and the natural rest water level is not apparent.

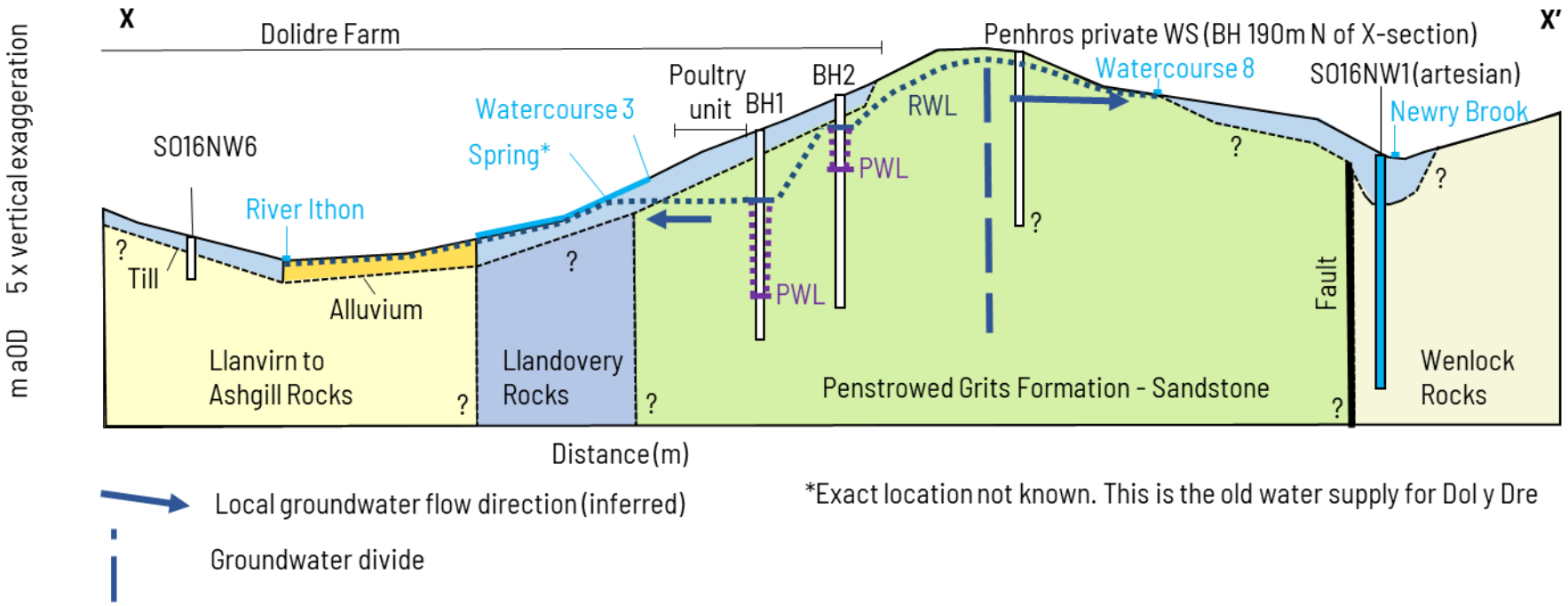


Figure 6.1 Conceptual hydrogeological cross-section

7 HYDROGEOLOGICAL IMPACT APPRAISAL

The groundwater abstraction at Dolidre has the potential to impact any nearby watercourses, waterbodies, and other groundwater abstractions. A water features survey has been conducted which has identified a number of water features within a 1 km radius of the groundwater abstraction at Dolidre (Section 4). Of greatest concern in the region is a reduction in groundwater base flow to the River Wye and its tributaries, one of which is the River Ithon, located c.500 m from the Dolidre abstraction.

To assess whether the Dolidre abstraction will have an impact on the local water features a dual approach has been taken.

- Firstly, the radius of influence around each borehole will be calculated based on the measured drawdown and inferred pumping rates.
- Secondly, a water balance calculation will compare the maximum annual water use to annual rainfall and river flow rates across the local catchment.

7.1 Abstraction volumes

The maximum required abstraction volumes, in terms of the licence application, are presented in Table 7.1. Where appropriate, these volumes are used in later calculations.

Table 7.1 Maximum volumes for abstraction licence (both boreholes combined)

Yearly	Daily	Hourly	Peak	Max. duration
7,343 m^3/annum	42.9 m^3/d	3.2 m^3/hr	1.3 l/s	24 hr/d

Yearly and daily volumes are based on historic records, plus a 10 % contingency (in case of greater demand due to hotter weather, for example). Hourly and peak records are based on estimates from the sitework (Table 5.4). A 20 % contingency has been applied, in case of greater demand together with uncertainties in the estimates.

During sitework, the peak daily volumes was c.30 m^3/day and it is inferred that BH1 and BH2 each contributed c.15 m^3/day on overage.

7.2 Radius of influence

The radius of influence around a pumped borehole gives the expected distance from the borehole that a measurable effect on the groundwater level is expected. Beyond this radius of influence the groundwater level, and subsequently any surface water bodies that are fed by groundwater, will not be affected by the groundwater abstraction.

The radius of influence (R_0) can be estimated, following the method of Sichardt (Equation 1), given the permeability of the aquifer (k), the borehole radius (r_e) and the drawdown in the pumped borehole ($H - h_w$):

$$R_0 = r_e + C(H - h_w)\sqrt{k} \qquad \textbf{Equation 1}$$

Where C is an empirical calibration factor. If ($H - h_w$) and k are in m and m/s respectively to obtain R_0 in m, C is taken to be 3000 for a circular zone of influence.

The permeability of the aquifer underlying Dolidre is unknown and is likely to be highly variable. However, as we have estimated the average pumping rate associated with each borehole (15

m^3/day) we can use the Dupuit-Thiem equation (Equation 2), which relates flow rate (Q) to permeability (k), drawdown (H-h_w), and radius of influence (R_0) to perform an inverse calculation for the permeability and the radius of influence.

$$Q = \frac{\pi k (H^2 - {h_w}^2)}{\ln ({}^{R_0}/_{r_e})}$$ **Equation 2**

The results of these calculations, as well as the parameter values used for each borehole, are summarised in Table 7.2.

Table 7.2 Estimated radius of influence

Parameter	Symbol	Units	BH1	BH2
Borehole radius	r_e	m	0.05	0.05
Initial water level (above base of aquifer)	H	m	30	40
Final water level (above base of aquifer)	h_w	m	19.3	33.5
Flow rate	Q	m^3/day	15	15
Permeability	**k**	**m/day**	**0.06**	**0.06**
Radius of influence	**R_0**	**m**	**26**	**16**

It is noted here that we have assumed the aquifer is unconfined, as it appears unlikely the Till is 6 m thick in this area. The method also assumes that flow in the aquifer is homogeneous; this is unlikely to be the case as the aquifer permeability is thought to be secondary, i.e. through fractures. The aquifer thickness is not known, but as the anticipated groundwater flow is via

fractures which tend to be more closed with depth, an estimated aquifer thickness of 50 m has been used.

The calculated radius of influence around each borehole is shown in Figure 7.1.

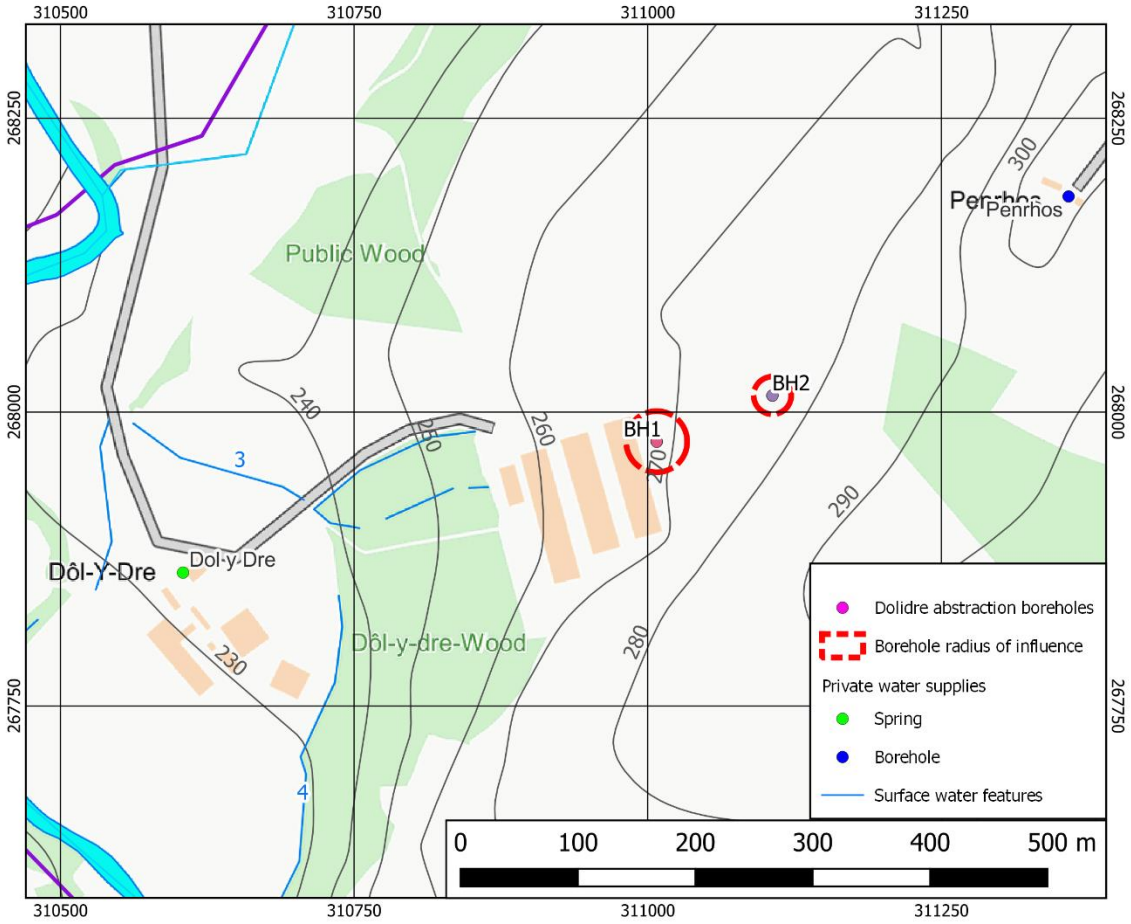


Figure 7.1 Radius of influence around abstraction boreholes

The expected radius of influence around each abstraction borehole does not intercept any of the nearby water features identified in Section 4. Even taking a permeability value ten times as large (0.6 m/d) for BH1, to simulate the possible maximum permeability in a heterogenous range, the radius of influence would only by 85 m, still placing its boundaries far from any of the assessed water features.

7.3 Water balance

In addition to calculating the radius of influence around each abstraction borehole a water balance calculation has been carried out to compare the total annual volume of water pumped, to the annual rainfall and recharge across the area.

Effective rainfall is the portion of rainfall that contributes directly to soil moisture and isn't lost through runoff or evaporation. It represents the amount of precipitation that effectively replenishes groundwater. The effective rainfall is calculated by subtracting evaporation (calculated from average monthly temperatures) and rapid runoff (assumed to be 30% of rainfall) from the overall rainfall. The total and effective rainfall calculated from the Sennybridge meteorological data are summarised in Table 7.3.

Table 7.3 Effective and total annual rainfall

Month	Average daily rainfall (mm)	Average daily runoff (mm)	Average daily Evaporation (mm)	Average daily effective rainfall (mm)
Jan	5.54	1.66	0.38	3.50
Feb	4.81	1.44	0.67	2.70
Mar	3.80	1.14	1.29	1.37
Apr	3.16	0.95	2.20	0.02
May	3.02	0.91	2.12	0.00
Jun	3.00	0.90	2.10	0.00
Jul	3.30	0.99	2.31	0.00
Aug	3.63	1.09	2.54	0.00
Sep	3.90	1.17	1.98	0.75
Oct	5.44	1.63	1.02	2.78
Nov	5.63	1.69	0.50	3.44
Dec	6.20	1.86	0.32	4.02
Annual total	**1566**	**470**	**532**	**564**

The average annual total rainfall in the area is 1,566 mm, with c.564 mm of effective rainfall.

Given these rainfall rates the equivalent surface area of rainfall that is needed to supply the Dolidre abstraction boreholes can be calculated. Using the total annual rainfall of 1,566 mm, and the Dolidre maximum annual abstraction of 7,343 m^3, rainfall across an area of only 0.47 ha would be required. Taking the effective rainfall instead of the total rainfall, an area of 1.3 ha would be required.

The water features survey (Section 4) identified Newry Brook and the River Ithon, as well as several of their tributaries, as surface water receptors near the site. The catchment area of Newry Brook where it joins the River Ithon is 3.24 km^2, while the catchment area of the River Ithon at this location is c.115 km^2.[18] When compared to the catchment areas of these water features, the Dolidre groundwater abstraction is negligible, accounting for 0.14% of the Newry Brook catchment, and 0.004 % of the River Ithon catchment.

Finally, the peak daily abstraction rate at Dolidre (42.9 m^3/day; Table 7.1) can be compared to the River Ithon Q95 flow at Llandewi. The Q95 flow rate represents low flow conditions, giving the river flow rate that is exceeded 95% of the time. At Llandewi the River Ithon Q95 flow rate is 0.14 m^3/s (12,100 m^3/day). The Dolidre peak abstraction rate is only 0.35% of the River Ithon flow rate during low flow conditions.

[18] https://fehweb.ceh.ac.uk/Map

Even assuming, therefore, that all of the water abstracted at Dolidre would otherwise contribute to baseflow in the River Ithon and its tributaries, the proportion of their flow that might be derogated is negligible, even during low flow conditions.

8 CONCLUSIONS

A hydrogeological impact appraisal has been undertaken on the groundwater abstraction at Dolidre Poultry.

Dolidre Poultry began operating in 2009 with further expansion in 2016, whereby 140,000 birds are housed in three sheds. A poultry growing cycle occurs over 48 days, with 38 days of growth followed by 3 days wash down and then a 7-day rest period. Water is supplied during the growing period and for the wash down by two boreholes. Abstraction can occur 24 hrs/day, with pumping automatically triggered by low tank volume. The maximum recorded water use is 39 m^3/d and 6,675 m^3/year.

The poultry site and its two associated boreholes are situated on the north-western slope of a hill at Penrhos, which rises to 304 m aOD. BH1 is located immediately behind the poultry houses and BH2 is located c.105 m uphill from BH1. The River Ithon is located in the base of the valley c.500 m west of the abstraction boreholes.

The local geology comprises Ordovician to Silurian aged sedimentary rocks (Mudstones and Sandstones) overlain on lower ground by Till with some Alluvium deposits along the base of the river valleys. The boreholes lie within the southeastern fringe of the Devensian Till underlain by sandstone of the Penstrowed Grits Formation.

The Penstrowed Grits Formation is classified as a Secondary aquifer. The bedrock aquifers are dominated by fracture flow, where groundwater flow and storage occurs in joints and fracture systems developed to varying degrees according to the formation's history. Primary porosity is thought to contribute an insignificant proportion of the total permeability and storage.

A desk-based water features survey has been carried out identifying a number of water features within 1 km of the abstraction boreholes. The nearest water feature identified is a small tributary to the River Ithon located 150 m west of the abstraction boreholes.

A site investigation has been conducted including the monitoring of BH1 and BH2 using level loggers for 18 days. The average pumped water level and the rest water level of the abstraction boreholes has been assessed using the monitoring data. BH1 has a rest water level of c.20 m bgl, and an average pumped water level of c.10 m bgl. It is noted that during pumping BH1 often runs dry. BH2 has a rest water level of c.30.7 m bgl, and an average pumped water level of c.16.5 m bgl.

The maximum required abstraction volumes, in terms of the licence application, are 7,343 m^3/annum, 42.9 m^3/d, 3.2 m^3/hr and 1.3 l/s, for 24 hours per day.

The groundwater levels from the monitoring have been used alongside the daily pumping rates from each borehole to estimate a radius of influence for each abstraction borehole. The radius of influence for BH1 is estimated as c.26 m, while the radius of influence for BH2 is c.16 m. The predicted radius of influence for each borehole is significantly smaller than the distance to the nearest identified water feature, suggesting that the abstraction will not have an impact on any of the nearby water features.

A water balance has been carried out to assess the impact on the local surface water features of the loss of the abstracted water from their catchments. The expected maximum annual abstraction is 7,343 m^3. When compared to the catchment areas of Newry Brook and the River Ithon the Dolidre groundwater abstraction is negligible, accounting for 0.14% of the Newry Brook catchment, and 0.004% of the River Ithon catchment. In addition, the peak daily abstraction rate at Dolidre is 0.35% of the Q95 flow of the River Ithon at Llandewi.

It is concluded, based on the estimated radius of influence and the water balance calculations, that the groundwater abstraction at Dolidre will have a negligible effect on the nearby water features.

9 REFERENCES

Environment Agency, 2007. **Hydrogeological impact appraisal for groundwater abstractions** Science Report – SC040020/SR2. ISBN 978-1-84432-674-7

Institute of Geological Sciences, 1977. **Hydrogeological map of England and Wales**, 1:625 000

Natural Resources Wales, September 2015; **Wye abstraction licensing strategy**

APPENDIX A

Groundsure Enviro-Insight report

Groundsure
LOCATION INTELLIGENCE

Enviro
Insight

310857, 267987,

Order Details

Date: 16/04/2020

Your ref: 30424_Dolidre_Poultry_Farm

Our Ref: GS-6739036

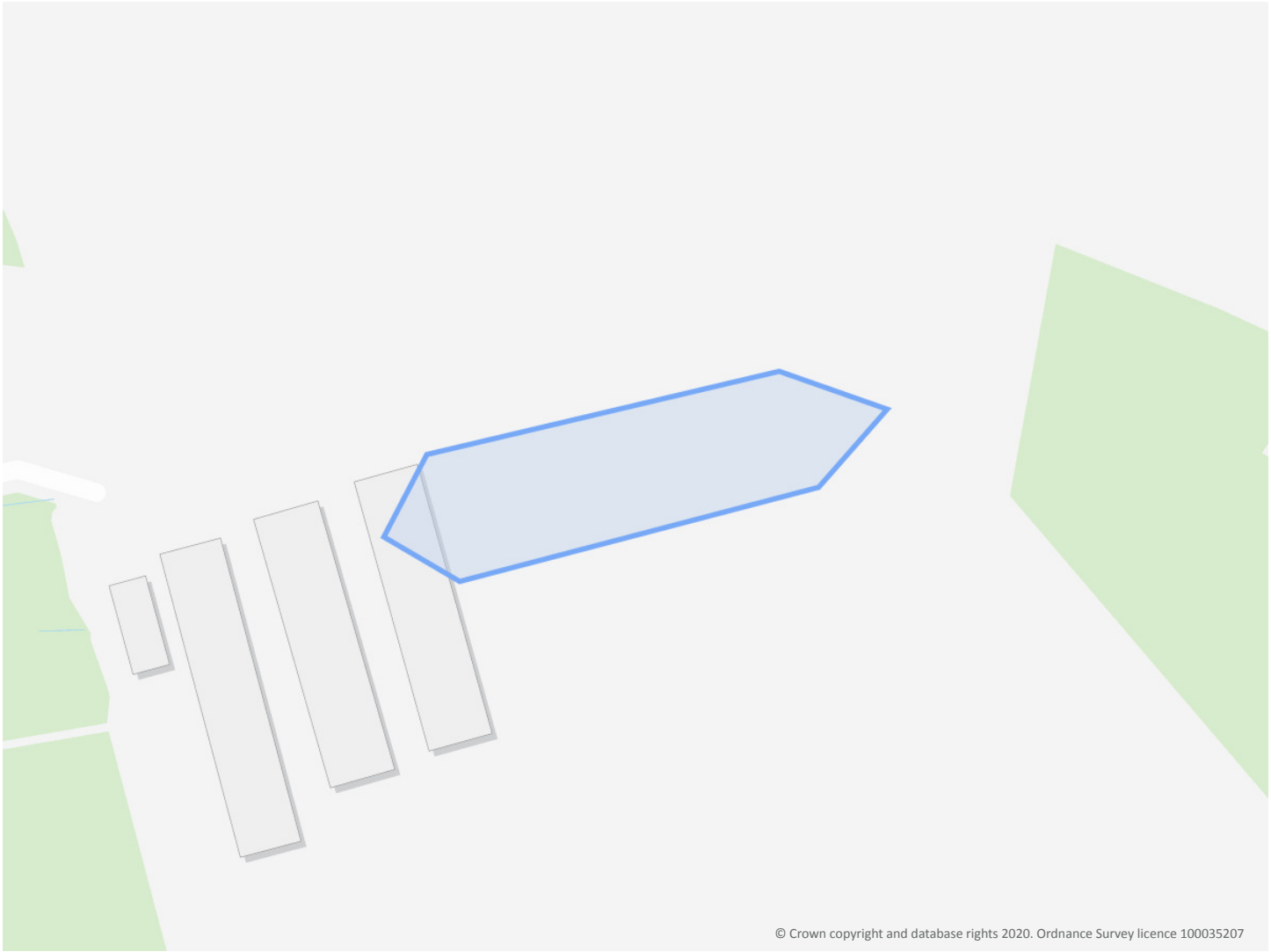
Client: H Fraser Consulting Ltd

Site Details

Location: 311037 267986

Area: 0.74 ha

Authority: Powys County Council



Contact us with any questions at:
info@groundsure.com
08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
12	1.1	Historical industrial land uses	0	0	5	9	-
13	1.2	Historical tanks	0	0	0	3	-
14	1.3	Historical energy features	0	0	0	0	-
14	1.4	Historical petrol stations	0	0	0	0	-
14	1.5	Historical garages	0	0	0	0	-
14	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
15	2.1	Historical industrial land uses	0	0	7	12	-
16	2.2	Historical tanks	0	0	0	5	-
17	2.3	Historical energy features	0	0	0	0	-
17	2.4	Historical petrol stations	0	0	0	0	-
17	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
18	3.1	Active or recent landfill	0	0	0	0	-
18	3.2	Historical landfill (BGS records)	0	0	0	0	-
18	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
18	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
18	3.5	Historical waste sites	0	0	0	0	-
19	3.6	Licensed waste sites	0	0	0	0	-
19	3.7	Waste exemptions	0	0	0	0	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
20	4.1	Recent industrial land uses	0	0	1	-	-
21	4.2	Current or recent petrol stations	0	0	0	0	-
21	4.3	Electricity cables	0	0	0	0	-
21	4.4	Gas pipelines	0	0	0	0	-
21	4.5	Sites determined as Contaminated Land	0	0	0	0	-

21	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
22	4.7	Regulated explosive sites	0	0	0	0	-
22	4.8	Hazardous substance storage/usage	0	0	0	0	-
22	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
22	**4.10**	**Licensed industrial activities (Part A(1))**	0	0	0	3	-
23	4.11	Licensed pollutant release (Part A(2)/B)	0	0	0	0	-
23	4.12	Radioactive Substance Authorisations	0	0	0	0	-
23	**4.13**	**Licensed Discharges to controlled waters**	0	0	0	2	-
24	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
24	4.15	Pollutant release to public sewer	0	0	0	0	-
24	4.16	List 1 Dangerous Substances	0	0	0	0	-
24	4.17	List 2 Dangerous Substances	0	0	0	0	-
25	4.18	Pollution Incidents (EA/NRW)	0	0	0	0	-
25	4.19	Pollution inventory substances	0	0	0	0	-
25	4.20	Pollution inventory waste transfers	0	0	0	0	-
25	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Geology (basic)	
26	5.1	Superficial geology (625k)	None (within 500m)
26	**5.2**	**Bedrock geology (625k)**	Identified (within 500m)

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
27	6.1	Superficial aquifer	None (within 500m)				
28	**6.2**	**Bedrock aquifer**	Identified (within 500m)				
30	**6.3**	**Groundwater vulnerability**	Identified (within 50m)				
31	6.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
31	6.5	Groundwater vulnerability- local information	None (within 0m)				
32	**6.6**	**Groundwater abstractions**	0	0	0	0	1
33	6.7	Surface water abstractions	0	0	0	0	0
33	6.8	Potable abstractions	0	0	0	0	0
33	6.9	Source Protection Zones	0	0	0	0	-

34	6.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
35	**7.1**	**Water Network (OS MasterMap)**	0	0	8	-	-
36	**7.2**	**Surface water features**	0	0	4	-	-
36	**7.3**	**WFD Surface water body catchments**	1	-	-	-	-
37	**7.4**	**WFD Surface water bodies**	0	0	0	-	-
37	**7.5**	**WFD Groundwater bodies**	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
38	8.1	Risk of Flooding from Rivers and Sea (RoFRaS)	None (within 50m)				
38	8.2	Historical Flood Events	0	0	0	-	-
38	8.3	Flood Defences	0	0	0	-	-
38	8.4	Areas Benefiting from Flood Defences	0	0	0	-	-
39	8.5	Flood Storage Areas	0	0	0	-	-
40	8.6	Flood Zone 2	None (within 50m)				
40	8.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding					
41	**9.1**	**Surface water flooding**	1 in 30 year, 0.1m - 0.3m (within 50m)				
Page	Section	Groundwater flooding					
43	**10.1**	**Groundwater flooding**	Negligible (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
44	**11.1**	**Sites of Special Scientific Interest (SSSI)**	0	0	0	1	1
45	11.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
45	**11.3**	**Special Areas of Conservation (SAC)**	0	0	0	1	0
46	11.4	Special Protection Areas (SPA)	0	0	0	0	0
46	11.5	National Nature Reserves (NNR)	0	0	0	0	0
46	11.6	Local Nature Reserves (LNR)	0	0	0	0	0
46	**11.7**	**Designated Ancient Woodland**	0	0	5	3	84
50	11.8	Biosphere Reserves	0	0	0	0	0
50	11.9	Forest Parks	0	0	0	0	0

50	11.10	Marine Conservation Zones	0	0	0	0	0
51	11.11	Green Belt	0	0	0	0	0
51	11.12	Proposed Ramsar sites	0	0	0	0	0
51	11.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
51	11.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
51	11.15	Nitrate Sensitive Areas	0	0	0	0	0
52	11.16	Nitrate Vulnerable Zones	0	0	0	0	0
53	11.17	SSSI Impact Risk Zones	0	-	-	-	-
53	11.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
54	12.1	World Heritage Sites	0	0	0	-	-
54	12.2	Area of Outstanding Natural Beauty	0	0	0	-	-
54	12.3	National Parks	0	0	0	-	-
54	12.4	Listed Buildings	0	0	0	-	-
55	12.5	Conservation Areas	0	0	0	-	-
55	12.6	Scheduled Ancient Monuments	0	0	0	-	-
55	12.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
56	**13.1**	**Agricultural Land Classification**	Grade 4 (within 250m)				
57	13.2	Open Access Land	0	0	0	-	-
57	13.3	Tree Felling Licences	0	0	0	-	-
57	13.4	Environmental Stewardship Schemes	0	0	0	-	-
57	13.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
58	14.1	Priority Habitat Inventory	0	0	0	-	-
58	14.2	Habitat Networks	0	0	0	-	-
58	14.3	Open Mosaic Habitat	0	0	0	-	-
58	14.4	Limestone Pavement Orders	0	0	0	-	-

Recent aerial photograph

Capture Date: 24/06/2018

Site Area: 0.74ha

Recent site history - 2016 aerial photograph

Capture Date: 30/05/2016

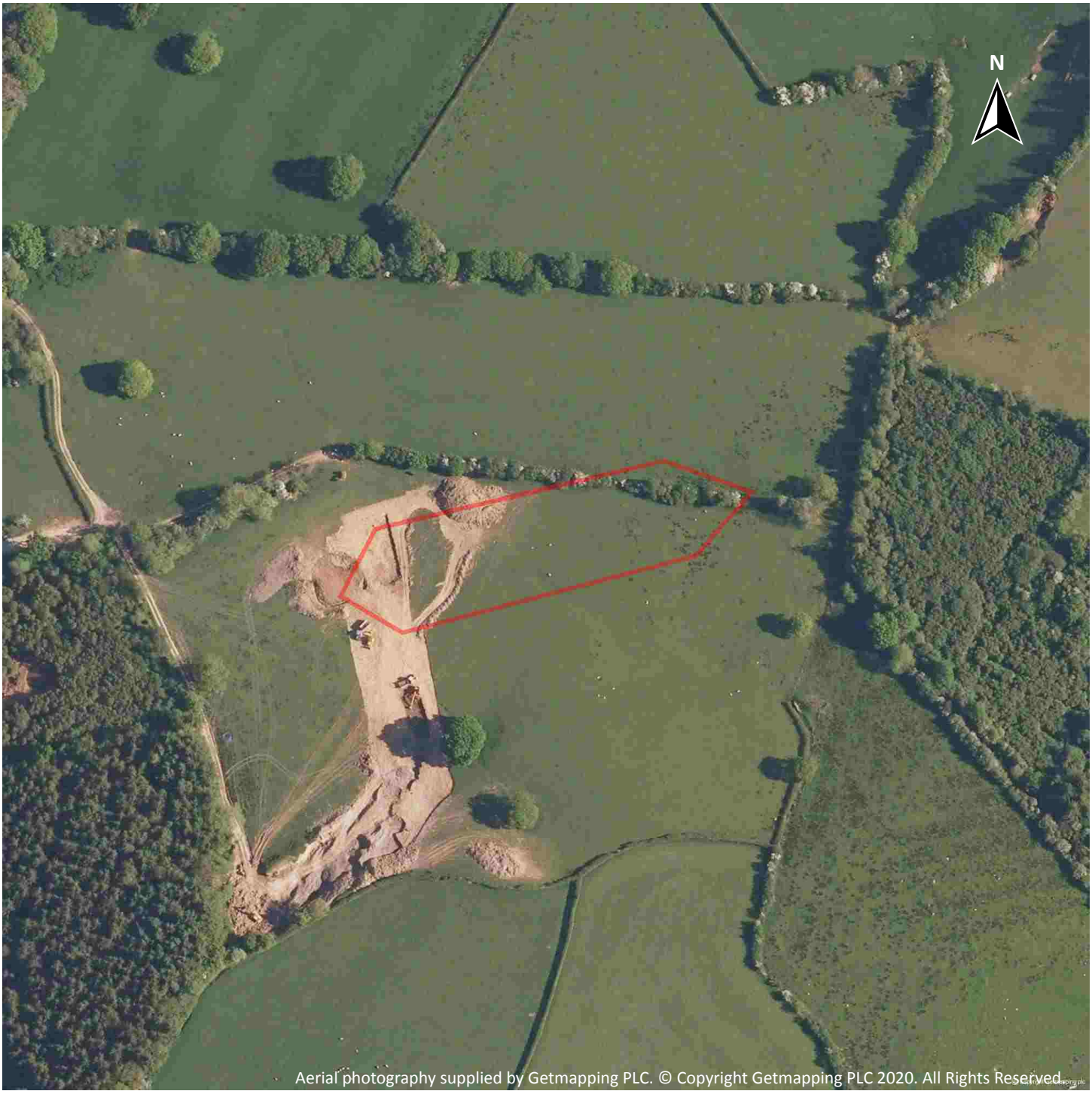
Site Area: 0.74ha

Recent site history - 2014 aerial photograph

Capture Date: 16/04/2014

Site Area: 0.74ha

Recent site history - 2009 aerial photograph



Capture Date: 12/09/2009

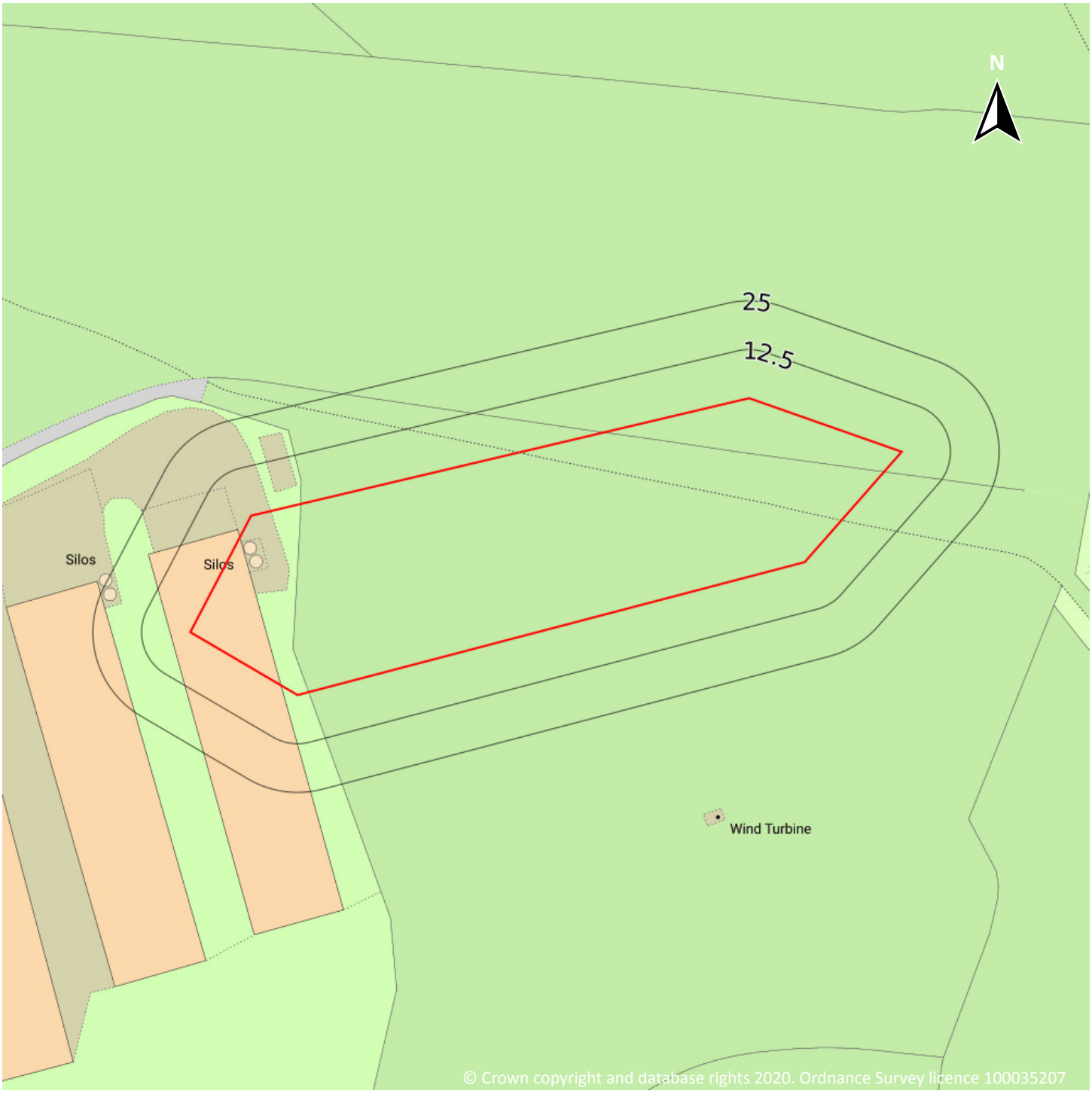
Site Area: 0.74ha

Recent site history - 2000 aerial photograph

Capture Date: 18/07/2000

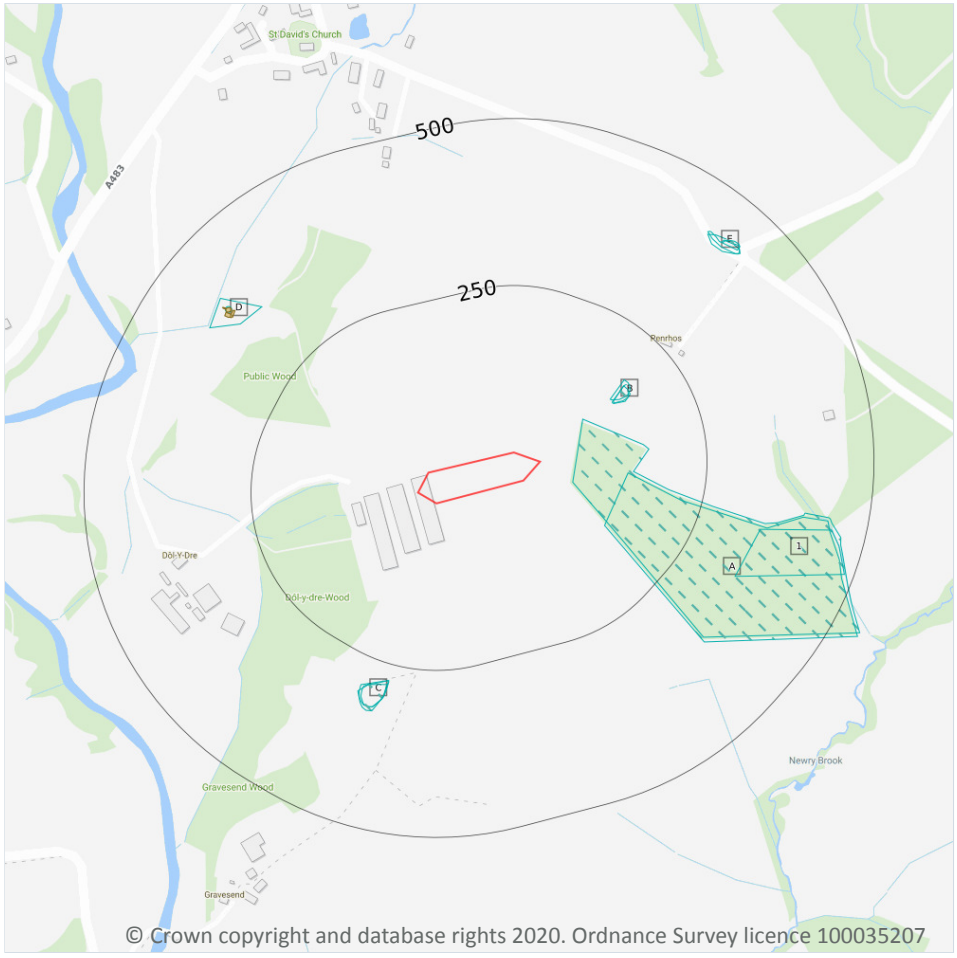
Site Area: 0.74ha

OS MasterMap site plan



Site Area: 0.74ha

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	14

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 12**

ID	Location	Land use	Dates present	Group ID
A	53m E	Nursery	1887	1139888

ID	Location	Land use	Dates present	Group ID
A	127m SE	Nursery	1948 - 1982	1115354
B	140m NE	Unspecified Old Quarry	1902 - 1948	1085513
B	141m NE	Unspecified Old Quarry	1887	1152702
B	141m NE	Unspecified Old Quarry	1948	1142189
C	274m S	Unspecified Old Quarry	1887	1034844
C	276m S	Unspecified Old Quarry	1902 - 1948	1144416
C	281m S	Unspecified Old Quarry	1948	1069428
1	339m SE	Nursery	1902 - 1948	1060365
D	352m NW	Sewage Works	1982	1008552
D	382m NW	Unspecified Tank	1982	1017148
E	415m NE	Unspecified Old Quarry	1948	1043422
E	421m NE	Unspecified Old Quarry	1902 - 1948	1071737
E	426m NE	Unspecified Quarry	1887	1011022

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 12**

ID	Location	Land use	Dates present	Group ID
D	374m NW	Tanks	1971 - 1987	161255
D	382m NW	Tanks	1971 - 1987	161036
D	390m NW	Tanks	1971	156874

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.

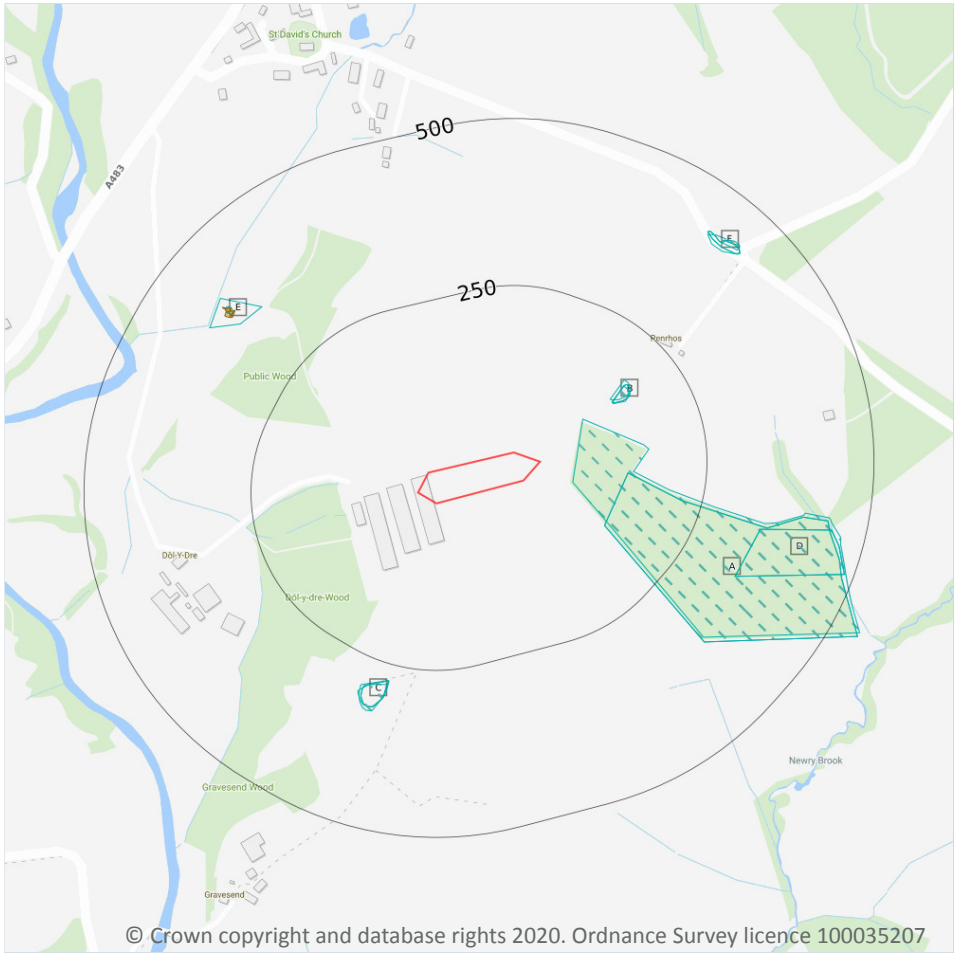
1.6 Historical military land

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



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

2.1 Historical industrial land uses

Records within 500m	19

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 15**

ID	Location	Land Use	Date	Group ID
A	53m E	Nursery	1887	1139888
A	127m SE	Nursery	1982	1115354
A	127m SE	Nursery	1948	1115354

ID	Location	Land Use	Date	Group ID
B	140m NE	Unspecified Old Quarry	1948	1085513
B	140m NE	Unspecified Old Quarry	1902	1085513
B	141m NE	Unspecified Old Quarry	1887	1152702
B	141m NE	Unspecified Old Quarry	1948	1142189
C	274m S	Unspecified Old Quarry	1887	1034844
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C	281m S	Unspecified Old Quarry	1948	1069428
D	339m SE	Nursery	1948	1060365
D	339m SE	Nursery	1902	1060365
E	352m NW	Sewage Works	1982	1008552
E	382m NW	Unspecified Tank	1982	1017148
F	415m NE	Unspecified Old Quarry	1948	1043422
F	421m NE	Unspecified Old Quarry	1948	1071737
F	421m NE	Unspecified Old Quarry	1902	1071737
F	426m NE	Unspecified Quarry	1887	1011022

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**5**

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 15**

ID	Location	Land Use	Date	Group ID
E	374m NW	Tanks	1971	161255
E	376m NW	Tanks	1987	161255
E	382m NW	Tanks	1971	161036
E	383m NW	Tanks	1987	161036

ID	Location	Land Use	Date	Group ID
E	390m NW	Tanks	1971	156874

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.

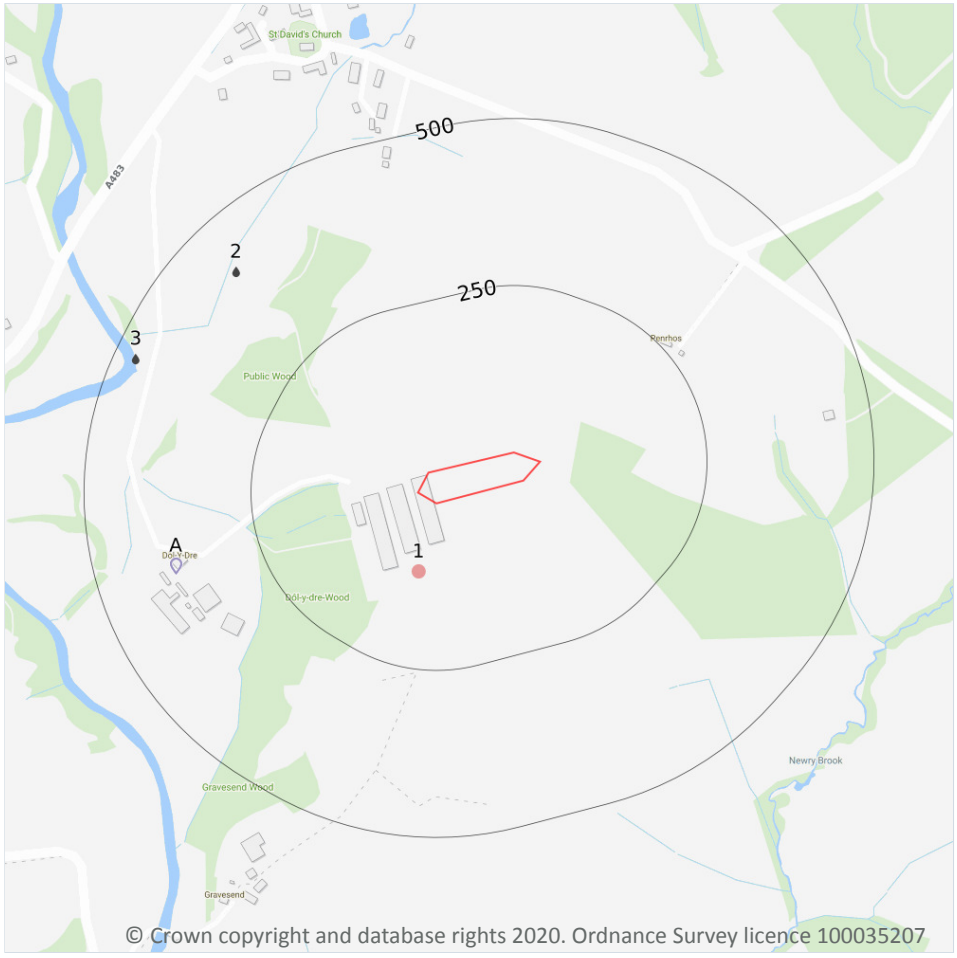
3.7 Waste exemptions

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



Site Outline

Search buffers in metres (m)

Recent industrial land uses

Part A(1) industrial activities

Licensed Discharges to controlled waters

4.1 Recent industrial land uses

Records within 250m	1

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 20**

ID	Location	Company	Address	Activity	Category
1	106m S	Quarry (Disused)	Powys, LD1	Unspecified Quarries Or Mines	Extractive Industries

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	3

Records of Part A(1) 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 20**

ID	Location	Details	
A	378m W	Operator: MORGAN; MORGAN Installation Name: DOLIDRE FARM EPR/MP3130TW Process: INTENSIVE FARMING; > 40,000 POULTRY Permit Number: MP3130TW Original Permit Number: MP3130TW	EPR Reference: - Issue Date: 30/07/2010 Effective Date: 30/07/2010 Last date noted as effective: 17/11/2015 Status: EFFECTIVE
A	378m W	Operator: MORGAN; MORGAN Installation Name: DOLIDRE FARM Process: - Permit Number: MP3130TW Original Permit Number: MP3130TW	EPR Reference: - Issue Date: 30/07/2010 Effective Date: 30/07/2010 Last date noted as effective: 01/12/2016 Status: EFFECTIVE

ID	Location	Details	
A	378m W	Operator: MR EDWARD MORGAN AND MR JAMES MORGAN Installation Name: DOLIDRE FARM Process: REARING POULTRY OR PIGS INTENSIVELY IN AN INSTALLATION NOT REGULATED BY 'ENVIRO... Permit Number: MP3130TW Original Permit Number: MP3130TW	EPR Reference: - Issue Date: 13/04/2018 Effective Date: 13/04/2018 Last date noted as effective: 30/01/2020 Status: EFFECTIVE

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

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

Records within 500m	**0**

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.

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	**2**

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 20**

ID	Location	Address	Details	
2	416m NW	LLANDEWI YSTRADENNY STW	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: AW1002801 Permit Version: 1 Receiving Water: ITHON RIVER	Status: REVOKED - UNSPECIFIED Issue date: 30/06/1984 Effective Date: 30/06/1984 Revocation Date: 16/06/1991

ID	Location	Address	Details	
3	467m NW	LLANDEWI YSTRADENNY STW	Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: AW1002801 Permit Version: 2 Receiving Water: ITHON RIVER	Status: Effective Issue date: 17/06/1991 Effective Date: 17/06/1991 Revocation Date: -

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	0

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.

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

4.18 Pollution Incidents (EA/NRW)

Records within 500m	0

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

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 Geology (basic)

5.1 Superficial geology (625k)

Records within 500m	0

Generalised geology data based on BGS's published poster maps of the UK (North and South). Superficial related themes digitised from 1977 first edition Quaternary map (North and South).

This data is sourced from the British Geological Survey.

5.2 Bedrock geology (625k)

Records within 500m	3

Generalised geology data based on BGS's published poster maps of the UK (North and South). Bedrock related themes created through generalisation of 1:50,000 data.

Location	Lex code	Description	Rock type
On site	**WEN-SCON**	**WENLOCK ROCKS (UNDIFFERENTIATED)**	**SANDSTONE AND CONGLOMERATE, INTERBEDDED**
160m W	LDVY-MDSS	LLANDOVERY ROCKS (UNDIFFERENTIATED)	MUDSTONE, SILTSTONE AND SANDSTONE
455m W	ASHL-MDSS	ASHGILL ROCKS (UNDIFFERENTIATED)	MUDSTONE, SILTSTONE AND SANDSTONE

This data is sourced from the British Geological Survey.

6 Hydrogeology - Superficial aquifer

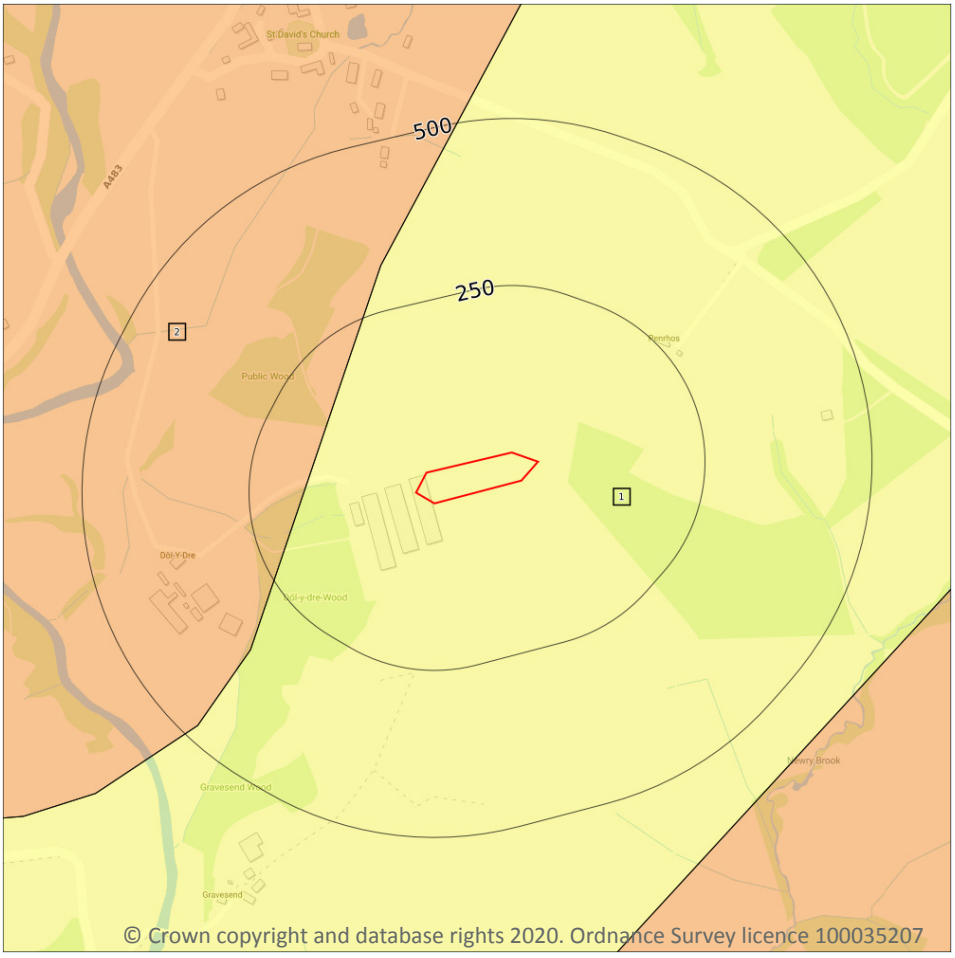
6.1 Superficial aquifer

Records within 500m	0

Aquifer status of groundwater held within superficial geology.

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

6.2 Bedrock aquifer

Records within 500m	2

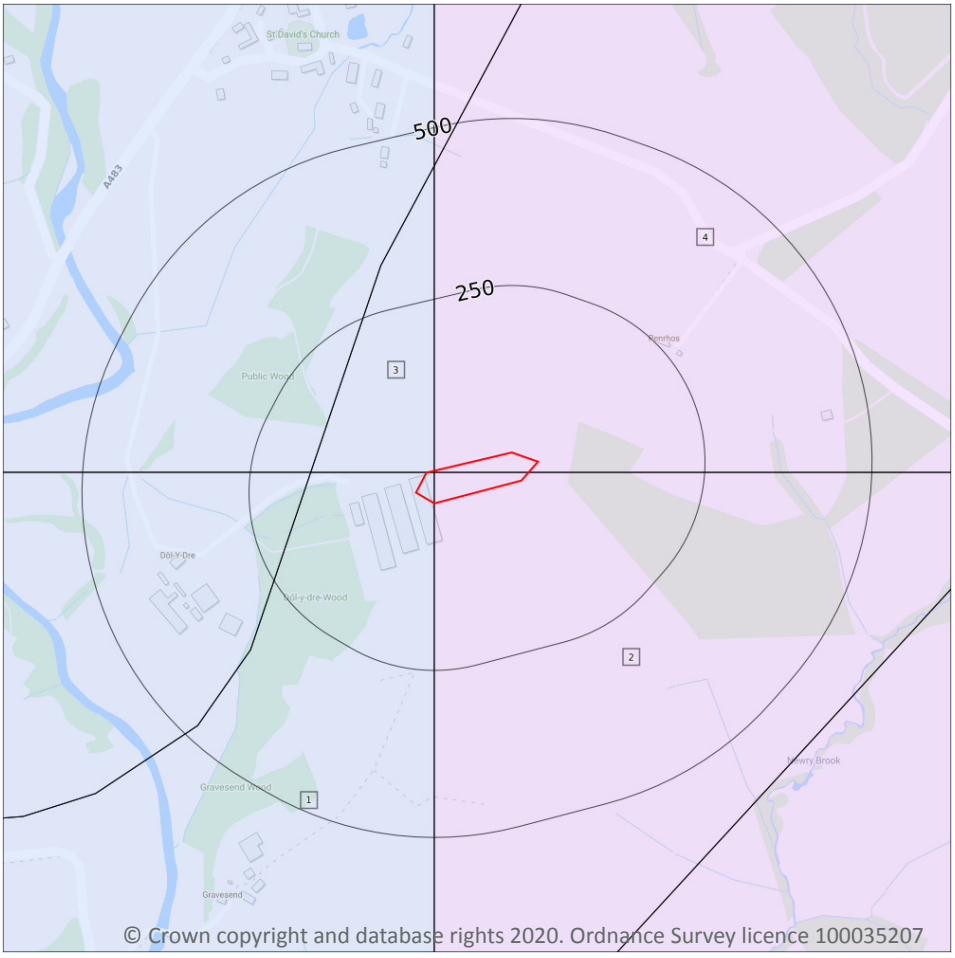
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 28**

ID	Location	Designation	Description
1	**On site**	**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**
2	159m W	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeablehorizons and weathering. These are generally the water-bearing parts of the former non-aquifers

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

Groundwater vulnerability



Site Outline

Search buffers in metres (m)

Superficial vulnerability
- Principal superficial aquifer, high vulnerability
- Secondary superficial aquifer, high vulnerability
- Principal superficial aquifer, medium vulnerability
- Secondary superficial aquifer, medium vulnerability
- Principal superficial aquifer, low vulnerability
- Secondary superficial aquifer, low vulnerability

Bedrock vulnerability
- Principal bedrock aquifer, high vulnerability
- Secondary bedrock aquifer, high vulnerability
- Principal bedrock aquifer, medium vulnerability
- Secondary bedrock aquifer, medium vulnerability
- Principal bedrock aquifer, low vulnerability
- Secondary bedrock aquifer, low vulnerability

Other information
- Unproductive aquifer
- Soluble rock risk
- Local information

6.3 Groundwater vulnerability

Records within 50m	4

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 30**

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

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

6.4 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.

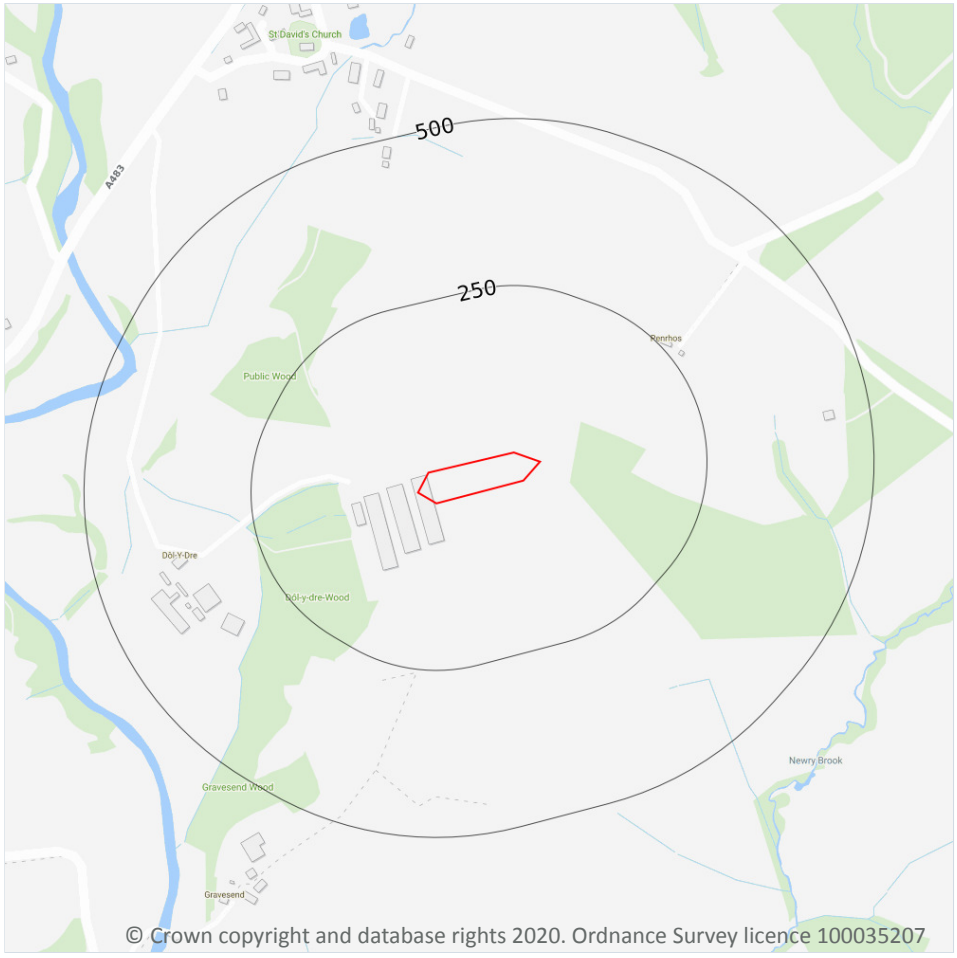
6.5 Groundwater vulnerability- local information

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)

6.6 Groundwater abstractions

Records within 2000m	1

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 32**

ID	Location	Details	
-	794m E	Status: Historical Licence No: 19/55/4/0019 Details: General Farming & Domestic Direct Source: EAW Groundwater Point: BOREHOLE GAERGINANT, LLANDEWI Data Type: Point Name: Nicholls & Son Easting: 311940 Northing: 267890	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: - Expiry Date: - Issue No: 100 Version Start Date: 01/01/1966 Version End Date: -

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

6.7 Surface water abstractions

Records within 2000m	**0**

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.

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

6.8 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.

6.9 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.

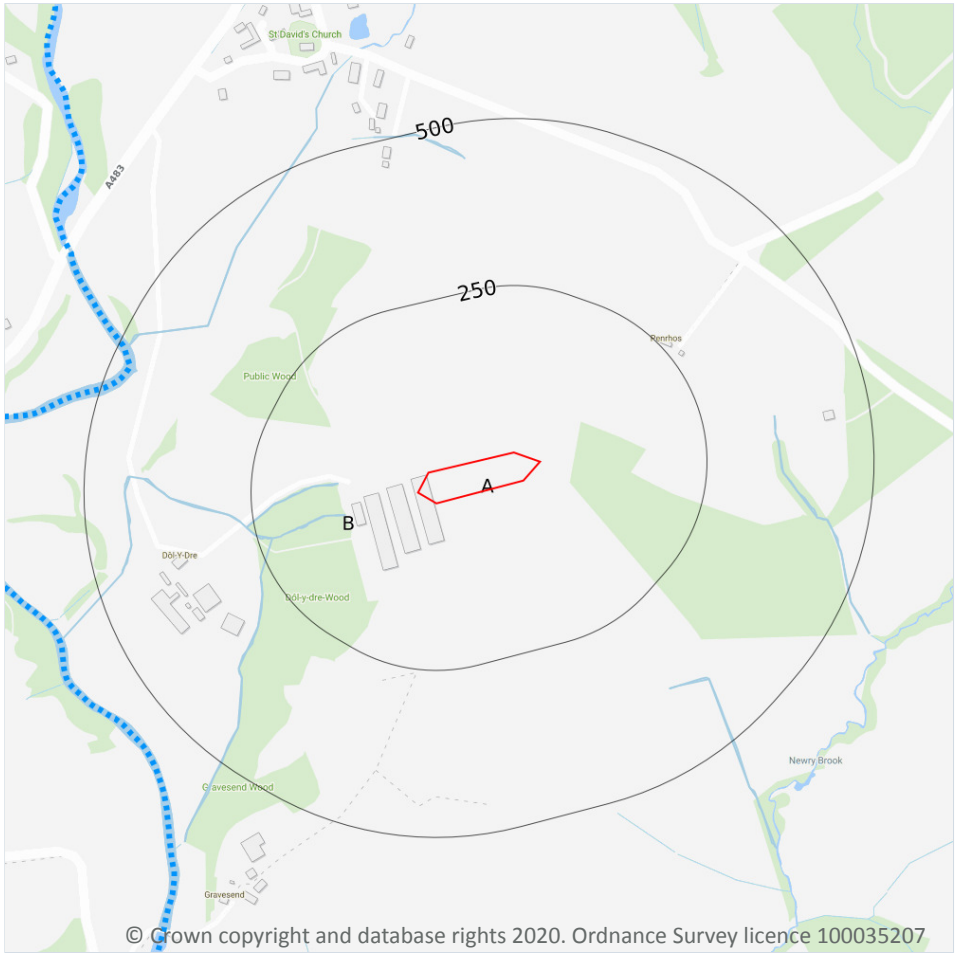
6.10 Source Protection Zones (confined aquifer)

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.

7 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

7.1 Water Network (OS MasterMap)

Records within 250m	8

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 35**

ID	Location	Type of water feature	Ground level	Permanence	Name
B	113m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
B	120m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	129m W	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	142m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	204m W	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	217m W	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
B	228m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	228m W	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

7.2 Surface water features

Records within 250m	**4**

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 35**

This data is sourced from the Ordnance Survey.

7.3 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 35**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
A	**On site**	**River WB catchment**	**Ithon - conf Camddwr Bk to conf R Wye**	**GB109055042270**	**Ithon**	**Wye MC**

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

7.4 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 35**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
8	471m NW	River	Ithon - conf Camddwr Bk to conf R Wye	GB109055042270	Moderate	Good	Moderate	2016

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

7.5 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 35**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
A	**On site**	**Wye Uplands Lower Palaeozoic**	**GB40902G205100**	**Poor**	**Poor**	**Good**	**2016**

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

8 River and coastal flooding

8.1 Risk of Flooding from Rivers and Sea (RoFRaS)

Records within 50m	0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition; 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).

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

8.2 Historical Flood Events

Records within 250m	0

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.

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

8.3 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.

8.4 Areas Benefiting from Flood Defences

Records within 250m	0

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.

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

8.5 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

8.6 Flood Zone 2

Records within 50m	0

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.

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

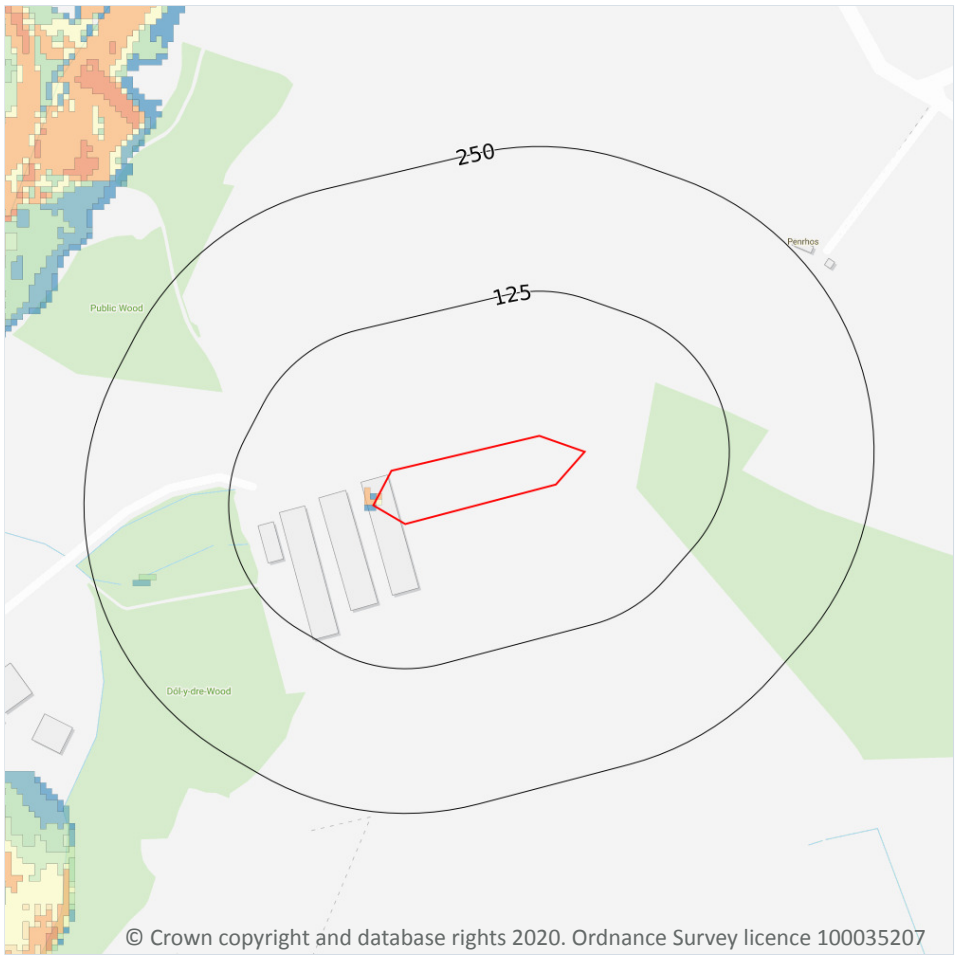
8.7 Flood Zone 3

Records within 50m	0

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.

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

9 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

9.1 Surface water flooding

Highest risk on site	**1 in 30 year, 0.1m - 0.3m**
Highest risk within 50m	**1 in 30 year, 0.1m - 0.3m**

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 41**

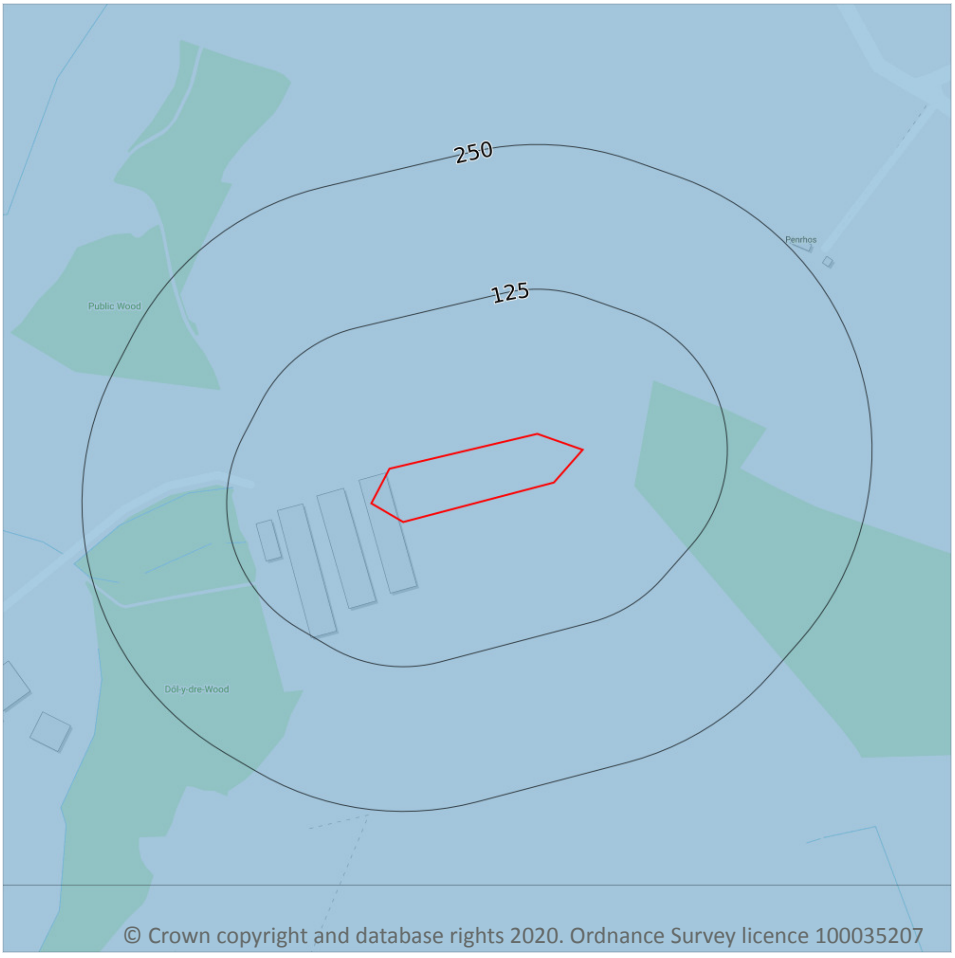
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

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	Between 0.1m and 0.3m
1 in 250 year	Between 0.1m and 0.3m
1 in 100 year	Between 0.1m and 0.3m
1 in 30 year	Between 0.1m and 0.3m

This data is sourced from Ambiental Risk Analytics.

10 Groundwater flooding



Site Outline

Search buffers in metres (m)

High

Moderate - High

Moderate

Low

Negligible

10.1 Groundwater flooding

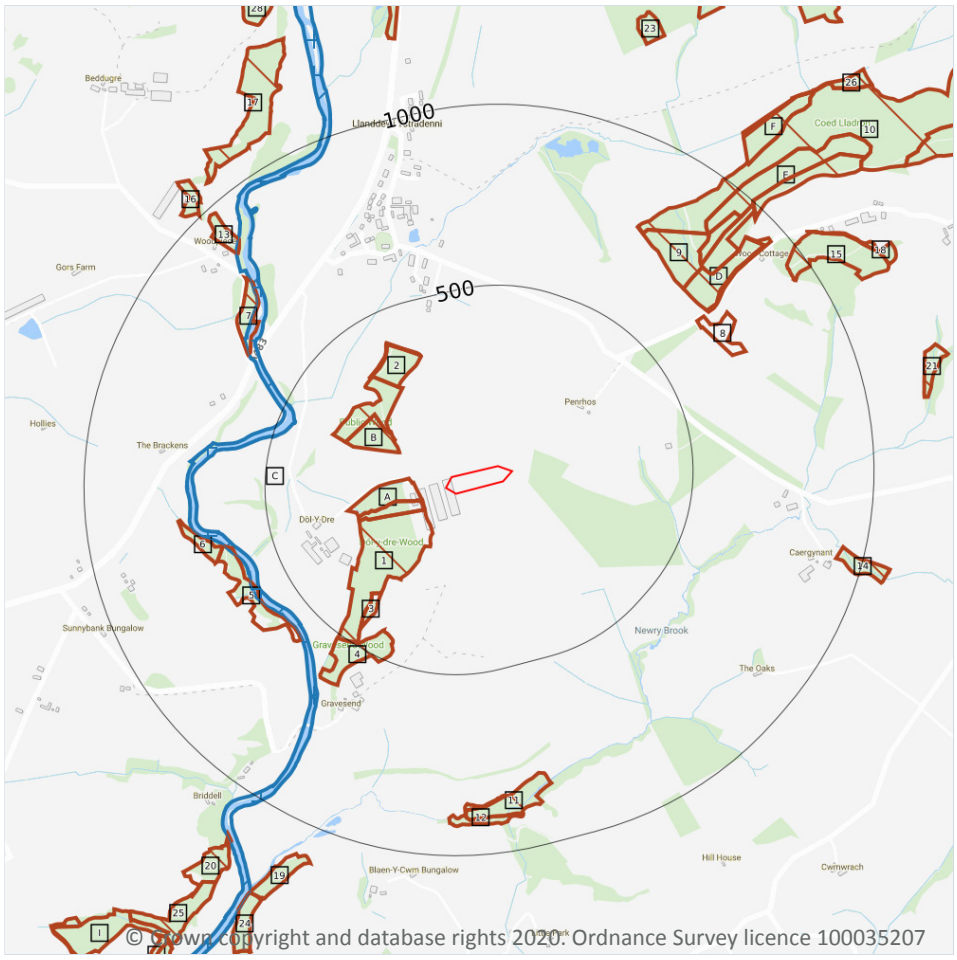
Highest risk on site	**Negligible**
Highest risk within 50m	**Negligible**

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 43**

This data is sourced from Ambiental Risk Analytics.

11 Environmental designations



Site Outline

Search buffers in metres (m)

Sites of Special Scientific Interest (SSSI)

Special Areas of Conservation (SAC)

Designated Ancient Woodland

11.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	2

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 44**

ID	Location	Name	Data source
C	454m NW	River Ithon	Natural Resources Wales

ID	Location	Name	Data source
-	1932m SW	Ithon Valley Woodlands	Natural Resources Wales

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

11.2 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.

11.3 Special Areas of Conservation (SAC)

Records within 2000m	**1**

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.

Features are displayed on the Environmental designations map on **page 44**

ID	Location	Name	Features of interest	Habitat description	Data source
C	454m NW	River Wye / Afon Gwy (Wales)	Estuaries; Intertidal mudflats and sandflats; Atlantic salt meadows; Rivers with floating vegetation often dominated by water-crowfoot; Dry heaths; Very wet mires often identified by an unstable `quaking` surface; Caves not open to the public; Mixed woodland on base-rich soils associated with rocky slopes; Western acidic oak woodland; Bog woodland; Alder woodland on floodplains; Sea lamprey; Brook lamprey; River lamprey; Allis shad; Twaite shad; Atlantic salmon; Bullhead; Freshwater pearl mussel; White-clawed (or Atlantic stream) crayfish; Lesser horseshoe bat; Greater horseshoe bat; Otter.	Improved grassland; Salt marshes, Salt pastures, Salt steppes; Heath, Scrub, Maquis and Garrigue, Phygrana; Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins); Dry grassland, Steppes; Inland rocks, Screes, Sands, Permanent Snow and ice; Humid grassland, Mesophile grassland; Inland water bodies (Standing water, Running water); Broad-leaved deciduous woodland; Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites); Bogs, Marshes, Water fringed vegetation, Fens	Natural Resources Wales

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

11.4 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.

11.5 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.

11.6 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.

11.7 Designated Ancient Woodland

Records within 2000m	92

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 44**

ID	Location	Name	Woodland Type
A	73m SW	Unknown	Ancient Semi Natural Woodland
A	78m SW	Unknown	Ancient Semi Natural Woodland
1	83m SW	Unknown	Plantation on Ancient Woodland Site

ID	Location	Name	Woodland Type
B	159m NW	Unknown	Restored Ancient Woodland Site
B	204m NW	Unknown	Restored Ancient Woodland Site
2	288m NW	Unknown	Restored Ancient Woodland Site
3	342m SW	Unknown	Plantation on Ancient Woodland Site
4	427m SW	Unknown	Ancient Semi Natural Woodland
5	569m SW	Unknown	Ancient Semi Natural Woodland
6	637m W	Unknown	Ancient Semi Natural Woodland
7	654m NW	Unknown	Ancient Semi Natural Woodland
8	656m NE	Unknown	Restored Ancient Woodland Site
D	690m NE	Unknown	Plantation on Ancient Woodland Site
9	692m NE	Unknown	Restored Ancient Woodland Site
D	698m NE	Unknown	Plantation on Ancient Woodland Site
10	750m NE	Unknown	Ancient Semi Natural Woodland
D	770m NE	Unknown	Plantation on Ancient Woodland Site
D	774m NE	Unknown	Plantation on Ancient Woodland Site
11	804m S	Unknown	Ancient Semi Natural Woodland
12	844m S	Unknown	Ancient Semi Natural Woodland
E	851m NE	Unknown	Plantation on Ancient Woodland Site
13	855m NW	Unknown	Restored Ancient Woodland Site
14	927m E	Unknown	Ancient Semi Natural Woodland
15	942m NE	Unknown	Ancient Semi Natural Woodland
E	970m NE	Unknown	Plantation on Ancient Woodland Site
16	1004m NW	Unknown	Ancient Semi Natural Woodland
17	1053m NW	Unknown	Ancient Semi Natural Woodland
18	1062m NE	Unknown	Ancient Semi Natural Woodland
F	1070m NE	Unknown	Restored Ancient Woodland Site
19	1083m S	Unknown	Ancient Semi Natural Woodland
F	1123m NE	Unknown	Restored Ancient Woodland Site

ID	Location	Name	Woodland Type
20	1131m SW	Unknown	Ancient Semi Natural Woodland
21	1157m E	Unknown	Ancient Semi Natural Woodland
22	1215m N	Unknown	Restored Ancient Woodland Site
23	1236m N	Unknown	Ancient Semi Natural Woodland
24	1240m SW	Unknown	Ancient Semi Natural Woodland
25	1261m SW	Unknown	Ancient Semi Natural Woodland
26	1302m NE	Unknown	Restored Ancient Woodland Site
-	1333m N	Unknown	Plantation on Ancient Woodland Site
27	1355m N	Unknown	Ancient Semi Natural Woodland
28	1358m NW	Unknown	Ancient Semi Natural Woodland
-	1366m N	Unknown	Plantation on Ancient Woodland Site
29	1377m NE	Unknown	Plantation on Ancient Woodland Site
H	1386m SW	Unknown	Plantation on Ancient Woodland Site
H	1404m SW	Unknown	Plantation on Ancient Woodland Site
-	1432m N	Unknown	Restored Ancient Woodland Site
I	1449m SW	Unknown	Ancient Semi Natural Woodland
J	1461m SW	Unknown	Ancient Semi Natural Woodland
-	1463m N	Unknown	Restored Ancient Woodland Site
-	1469m N	Unknown	Restored Ancient Woodland Site
J	1469m SW	Unknown	Ancient Semi Natural Woodland
32	1483m NE	Unknown	Ancient Semi Natural Woodland
-	1520m N	Unknown	Ancient Semi Natural Woodland
I	1567m SW	Unknown	Ancient Semi Natural Woodland
-	1594m N	Unknown	Plantation on Ancient Woodland Site
-	1641m S	Unknown	Ancient Semi Natural Woodland
-	1697m N	Unknown	Plantation on Ancient Woodland Site
-	1701m SW	Unknown	Ancient Semi Natural Woodland
-	1712m S	Unknown	Ancient Semi Natural Woodland

ID	Location	Name	Woodland Type
-	1717m W	Unknown	Ancient Semi Natural Woodland
-	1720m N	Unknown	Restored Ancient Woodland Site
-	1785m W	Unknown	Ancient Semi Natural Woodland
-	1793m NW	Unknown	Ancient Semi Natural Woodland
-	1794m NW	Unknown	Plantation on Ancient Woodland Site
-	1799m NE	Unknown	Restored Ancient Woodland Site
-	1822m SE	Unknown	Ancient Semi Natural Woodland
-	1823m SE	Unknown	Ancient Semi Natural Woodland
-	1826m S	Unknown	Ancient Semi Natural Woodland
-	1826m NE	Unknown	Ancient Semi Natural Woodland
-	1838m NE	Unknown	Restored Ancient Woodland Site
-	1846m NW	Unknown	Restored Ancient Woodland Site
-	1859m NE	Unknown	Plantation on Ancient Woodland Site
-	1868m NE	Unknown	Restored Ancient Woodland Site
-	1880m S	Unknown	Ancient Semi Natural Woodland
-	1881m NW	Unknown	Ancient Semi Natural Woodland
-	1891m S	Unknown	Ancient Semi Natural Woodland
-	1900m N	Unknown	Restored Ancient Woodland Site
-	1902m S	Unknown	Ancient Semi Natural Woodland
-	1916m SW	Unknown	Ancient Semi Natural Woodland
-	1916m SW	Unknown	Ancient Semi Natural Woodland
-	1917m SE	Unknown	Restored Ancient Woodland Site
-	1921m E	Unknown	Ancient Semi Natural Woodland
-	1934m NW	Unknown	Ancient Semi Natural Woodland
-	1945m NW	Unknown	Ancient Semi Natural Woodland
-	1947m W	Unknown	Ancient Semi Natural Woodland
-	1952m NE	Unknown	Restored Ancient Woodland Site
-	1963m SE	Unknown	Ancient Semi Natural Woodland

ID	Location	Name	Woodland Type
-	1963m SW	Unknown	Ancient Semi Natural Woodland
-	1964m NW	Unknown	Ancient Semi Natural Woodland
-	1967m W	Unknown	Ancient Semi Natural Woodland
-	1980m S	Unknown	Restored Ancient Woodland Site
-	1987m NW	Unknown	Restored Ancient Woodland Site

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

11.8 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.

11.9 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.

11.10 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.

11.11 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.

11.12 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.

11.13 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.

11.14 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.

11.15 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.

11.16 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

11.17 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.

11.18 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.

12 Visual and cultural designations

12.1 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.

12.2 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.

12.3 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.

12.4 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 English Heritage, Cadw and Historic Environment Scotland.

12.5 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 English Heritage, Cadw and Historic Environment Scotland.

12.6 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 English Heritage, Cadw and Historic Environment Scotland.

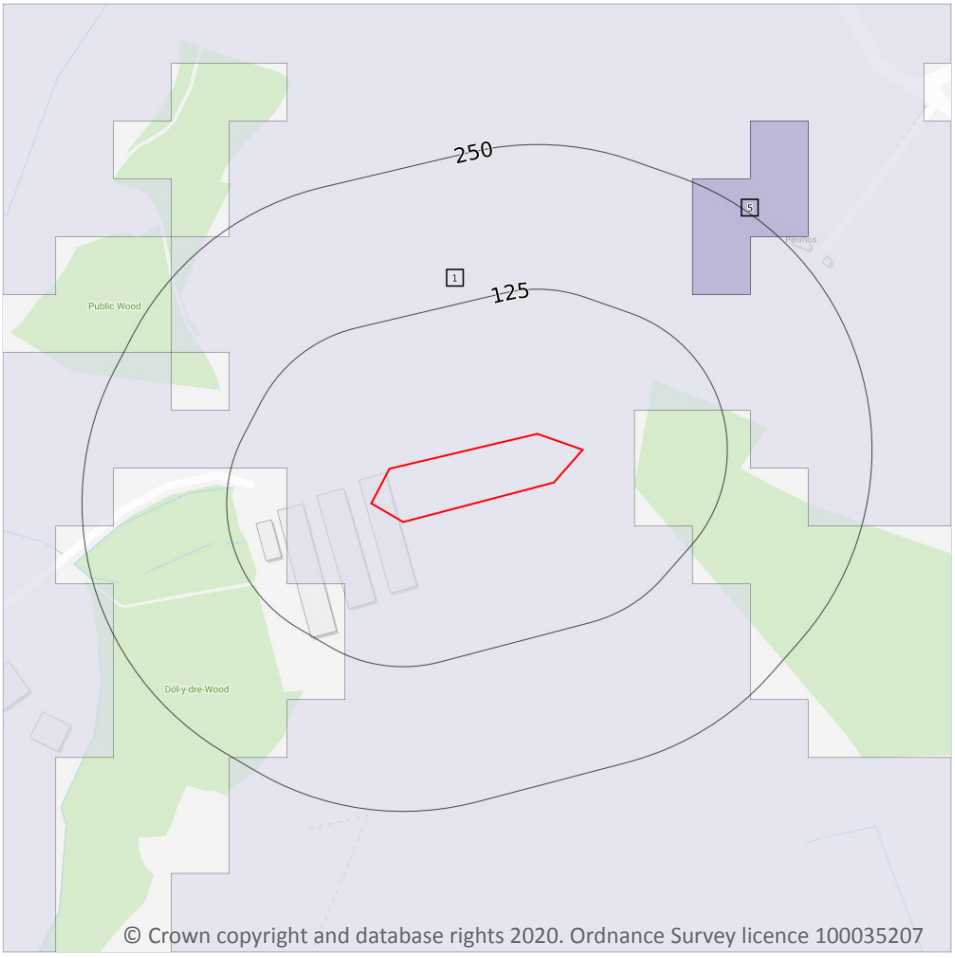
12.7 Registered Parks and Gardens

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 English Heritage, Cadw and Historic Environment Scotland.

13 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

13.1 Agricultural Land Classification

Records within 250m	2

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 56**

ID	Location	Classification	Description
1	**On site**	**Grade 3b**	**Moderate quality agricultural land**
5	164m NE	Grade 4	Poor quality agricultural land

This data is sourced from Natural Resources Wales.

13.2 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.

13.3 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.

13.4 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.

This data is sourced from Natural England.

13.5 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.

14 Habitat designations

14.1 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.

14.2 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.

14.3 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.

14.4 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.

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.

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