HORIZON NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project

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Wylfa Newydd Project

Horizon Nuclear Power Limited

Soils and Geology Baseline Conditions Report

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Contents

Executive Summary

This report presents the baseline condition of soils and geology which may be potentially affected by the proposed activities which Horizon Nuclear Power Wylfa Limited (Horizon) proposes to undertake during construction, operation and decommissioning of the Off-Site Power Station Facilities. It has been prepared to provide a detailed, technical appendix on soils and geology to support the Environmental Statement.

The northern half of the site is currently occupied by a vehicle repair garage and bus and coach depot, with a small section of the A5025 within the western extent of the site boundary. Grassland occupies the southern half of the site. Residential properties are located to the north and southwest and agricultural land to the west, east and south.

The northern half of the site is developed land covered by a layer of hardstanding, where natural soils are anticipated to be absent. The southern half of the site is characterised by grassland. An Agricultural Land Classification (ALC) survey classified a portion of this land as Subgrade 3b (moderate quality); it is expected that the remainder of the area would be assigned the same ALC grade.

According to geological mapping, superficial deposits are absent from the site. The bedrock is predominantly comprised of schist, although small lenses of quartzite are mapped in the east. The bedrock is classified as a Secondary B aquifer (denoting predominantly lower permeability layers). A Category 2 (local importance) Aggregates Safeguarding Area has been identified at the site for quartzitic sandstone, but no evidence of historical mining/mineral extraction has been identified.

A review of historical maps, archive information and observations made during a site walkover resulted in the identification of several potential sources of contamination, related mainly with the garage and repair depot and made ground on the northern part of the site. Potential off-site sources include a sewage works adjacent to the southeast, and a former landfill accepting inert waste located approximately 150m to the northwest.

The conceptual site model indicated that moderate and moderate/low risks may be posed to human health and environmental receptors by land contamination associated with the garage/repair depot and associated made ground. A moderate to low risk may be posed to human health by the sewage works and ground gases associated with made ground. However, it should be noted that based on the risk assessment methodology, moderate/low risk is the lowest possible risk related to ground gases based on the high severity should an incident occur. The majority of the risks relate to the construction-phase, although some would remain during operation.

There are no Regionally Important Geodiversity Sites or geologically designated Sites of Special Scientific Interest within the study area.

1. Introduction

1.1 Background to Wylfa Newydd Project

Chapter A2 (project overview and introduction to the developments) (Application Reference Number: 6.1.2) provides an overview of the Wylfa Newydd Project (the Project), with more detailed information on the Off-Site Power Station Facilities in Chapter E1 (AECC, ESL and MEEG proposed development) (Application Reference Number: 6.5.1).

1.2 Off-Site Power Station Facilities

Horizon would retain a number of specialist vehicles at a location close to, but separate from, the Power Station Site, which would allow them to be rapidly deployed if needed to attend an incident. This facility would be called the Mobile Emergency Equipment Garage (MEEG) and the site may also be used as a marshalling point for support arriving on Anglesey before onward dispatch to the Power Station Site in an emergency situation.

The Power Station would also require facilities for responding to incidents that might arise during its operational phase, should the main Emergency Control Centre not be available for any reason. The proposed Alternative Emergency Control Centre (AECC) would meet this need.

The Environmental Services Laboratory (ESL) is required for the normal operation of the Power Station. The ESL would provide facilities to manage environmental surveys in the local area, including equipment for the analysis of samples.

The proposed location for the MEEG, AECC and ESL, together known as the Off-Site Power Station Facilities, is in Llanfaethlu, approximately 6.1km southwest of the Power Station Site.

1.3 Study area

The potential effects on receptors from the proposed activities relevant to soils and geology are likely to be associated with direct disturbance of ground conditions on-site or the migration of contaminants to/from areas immediately adjacent to the site. As a result, the study area has been limited to a 250m buffer around the site; this is shown on Figure 1.

1.4 Report purpose

This report has been prepared to provide a detailed technical appendix on soils and geology to support the Environmental Statement for the application for development consent. Although the Environmental Statement is aimed at a wide audience, this report is primarily aimed at stakeholders requiring a detailed, technical understanding of the baseline conditions for soils and geology.

1.5 Report scope

This report considers the baseline conditions of soils and geology within the study area.

For the purpose of this report, ‘soils’ should be taken to mean Holocene/recent unconsolidated deposits and artificial geology (e.g. made ground, filled ground, worked ground). ‘Geology’ should be taken to mean both superficial deposits and bedrock geology which may be affected by the development, including both listed and notified sites of geological importance and mineral resources/reserves.

2. Information sources

2.1 Previous assessments

Previous assessments have been undertaken within the study area as part of proposals for the A5025 Highway Improvements; these are set out below:

- *Site 3 – Llanfaethlu Improvements, Task Order 4, A5025 Off-line Highways Improvements Ground Investigation. Factual Report* (Structural Soils Limited, 2016);
- *Stage 1 Scheme Assessment Report* (Mott MacDonald, 2011); and
- *Wylfa 'off-line' Highways Improvement Project; Site 3: Llanfaethlu Improvements Study Preliminary Sources Study Report* (RSK, 2014).

These have been consulted to inform this report but are of limited relevance due to their much wider spatial scope.

2.2 Publicly available information

The following sources of publicly available information have been consulted during the preparation of this report:

- *1:50,000 Scale 'Solid and Drift Geology' Geological Map of Anglesey* (British Geological Survey (BGS), 1974);
- *Geology of Britain Viewer* (BGS, 2017a);
- *Mineral Resource Map of Wales* (BGS and Welsh Assembly Government, 2010);
- *North West Wales Aggregates Safeguarding Map* (BGS and Welsh Assembly Government, 2012a);
- *What's In Your Backyard?* (Environment Agency, 2017);
- *1:250,000 Series Agricultural Land Classification: Wales* (Ministry of Agriculture, Fisheries and Food, 1977);
- *Flood Risk Map* (Natural Resources Wales (NRW), 2017); and
- *Regional Unexploded Bomb Risk: Isle of Anglesey* (Zetica, 2015).

2.3 Site-specific information

The following site-specific reports/data were sourced for the site:

- *Soils Site Report, Full Site Report 5km x 5km. 232670E, 388793N* (National Soil Resources Institute, 2015);
- *Enviroinsight, Geoinsight and Mapinsight* (Groundsure, 2015);
- Letter response to Environmental Search Enquiry ref: ATI-05562a (NRW, 2014); and
- Environmental Search Enquiry: A5025 from Valley to Wylfa (Isle of Anglesey County Council (IACC), 2014).

2.4 Technical consultations

Table 2.1 sets out the technical consultations that have been undertaken to inform the preparation of the soils and geology baseline relevant to the site.

Table 2.1: Stakeholder consultations for soils and geology

Date	Stakeholder	Description of request	Response
October 2014	NRW	Information regarding potential sources of contamination and any other desk study information held in relation to the A5025 Highway Improvements[1].	Information was provided on pollution incidents and other potentially contaminative sources relevant to the study area.
November 2014	Animal and Plant Health Agency	Enquiry regarding animal burial pits for the A5025 and Wylfa Newydd Development Area[1].	No animal burial pits recorded within the study area.
April 2016	GeoMôn	Information regarding non-listed geological features which may be affected.	There are no geological Sites of Special Scientific Interest, Geological Conservation Review sites or Regionally Important Geodiversity Sites within the study area.
April 2016	The IACC	Information regarding mineral resources, potential sources of contamination and any other desk study information held.	The IACC information confirmed that there are no statutory areas of Contaminated Land (Part 2A) and no *Pollution Prevention and Control Act 1999* permit holders within the study area. The IACC identified nine sites within 500m of the site boundary, which may pose a low risk of contamination. Of these, the following are within the study area and are therefore relevant to this report (eastings and northings are provided in parentheses): - Current and historical garage (231669, 387251) - Sewage works (231740, 387088) - Old lime kiln (231523, 387334) - Former quarry (231542, 387222).
April 2016	North Wales Minerals and Waste Planning Team	Request for information regarding mineral resource information on or near the site	The response identified that a Category 2 quartzitic sandstone and/or igneous rock resource was identified on the *North West Wales Aggregates Safeguarding Map* (BGS and Welsh Assembly Government, 2012a).

2.5 Site surveys

On 20 January 2016, site reconnaissance was conducted to inform the baseline assessment of the soils and geology, including identification of any evidence of land contamination or potentially contaminative activities.

In April 2016, a detailed ALC survey was undertaken for the A5025 Off-line Highway Improvements, which included one observation point within the boundary of the Off-Site Power Station Facilities (Reading Agricultural Consultants, 2016). Reference should be made to Section 3.2 for further details.

[1] The search areas for these enquiries include the site and study area.

3. Soil types and quality

Information has been obtained from the National Soil Resources Institute (2015) report presented in Appendix A, and in *Off-line Improvements to the A5025, Anglesey: Agricultural Land Classification and Soil Resources* (Reading Agricultural Consultants, 2016) report as presented in Appendix G7-1 Soils and Geology Baseline Conditions Report (Application Reference Number: 6.7.19), unless otherwise stated.

3.1 Soil types

The northern half of the site is covered by hardstanding, with made ground likely to be encountered near the surface rather than natural soil. However, soils of the Brickfield 2 association are mapped for the southern half of the site (National Soil Resources Institute, 2015 – Appendix A). Table 3.1 details the characteristics of this soil association.

Table 3.1: Characteristics of Brickfield 2 soil association

Characteristic	Description
Source	Drift from Palaeozoic and Mesozoic sandstone and shale.
Composition	Slowly permeable, seasonally waterlogged, fine loamy soil with low natural soil fertility.
Hydrology	Hydrology of soil type Class 24 – Slowly permeable, seasonally waterlogged soils over slowly permeable substrates with negligible storage capacity; minor risk of flooding.
Pollutant leaching potential	Soils in which pollutants are unlikely to penetrate the soil layer either because water movement is largely horizontal or because they have a large ability to attenuate diffuse source pollutants.
Land use	Seasonally wet pastures and woodlands. Dairying and stock rearing on permanent or short-term grassland; some cereals in drier areas.

The Brickfield 2 soil association is also mapped for the majority of the wider study area (land between the site boundary and the 250m buffer), although East Keswick 1 soils are present to the southwest. This soil association is similar to Brickfield 2, although contains soils with better natural drainage.

3.2 Soil quality

The economic resource value of soil is primarily measured by its ability to support agricultural uses. This is quantified by its ALC, which is determined through climatic, topographical and interactive soil limitations. Best and Most Versatile agricultural land equates to Grades 1, 2 and Subgrade 3a of the ALC system and is the most flexible land in terms of the range of crops that can be grown, the level and consistency of yield and the cost of obtaining yield. *Planning Policy Wales* (Edition 9) (Welsh Government, 2016) states that Best and Most Versatile land should be conserved as a finite resource for future use wherever possible, and considerable weight should be given to protecting it because of its special importance.

According to Provisional ALC data for Wales (Ministry of Agriculture, Fisheries and Food, 1977), the study area mainly comprises Grade 3 (good to moderate quality) agricultural land, with Grade 4 (poor quality) land approximately 60m to the northeast. However, these data only provide a high-level indication of land quality for the purposes of strategic assessment; they are not suitable for the evaluation of individual sites.

During the ALC survey for the A5025 Off-line Highway Improvements (Reading Agricultural Consultants, 2016), one auger point was located in the southern half of the site (LFL47). Refer to Appendix G7-1 (Application Reference Number: 6.7.19) for the full report. Local agro-climatic conditions were interpreted from

Meteorological Office data and the area was found to be wet and moderately warm with moderately small to moderate crop moisture deficits and a high number of field capacity days.

Soil texture, stoniness, colour, consistency, structural condition, free carbonate and depth were assessed to a depth of 120cm. Soil wetness class and droughtiness were also determined. Topsoil was found to comprise medium clay loam to a depth of 42cm, with the subsoil identified as clay. The slowly permeable subsoil, combined with climatic factors and medium clay loam topsoil, resulted in a limitation to ALC Subgrade 3b for the observation point.

Although site-specific ALC data are only available for one observation point at the site, it is anticipated that the remainder of the undeveloped parts of the site would be classified as Subgrade 3b if the survey were extended to cover these areas, based on the land use and ALC limitations posed.

Four additional auger points were located within the study area during the A5025 Off-line Highway Improvements ALC survey (Reading Agricultural Consultants, 2016), approximately 50m to 240m from the site. These classified the soils as Grade 5 adjacent to the west, Subgrade 3a adjacent to the southwest up to 220m from the site and Subgrade 3b from 220m to 250m south-southwest of the site.

4. Geology

Information has been obtained from the Groundsure reports presented in Appendix B (Groundsure, 2015), and the BGS mapping (BGS, 1974; 2017a) unless otherwise stated.

4.1 Made ground

Made ground (artificial geology) is not indicated on geological mapping but has been observed in the northern half of the site in the garage/depot area. Observations indicate that the made ground comprises gravel and concrete, however no Ground Investigation information is available to confirm the nature and extent of this material.

Artificial/made ground is not anticipated across the majority of the wider study area, which is mostly agricultural land with the exception of old quarries, an old limekiln and the A5025 road. A trial pit (TPBC17), excavated within the study area to the west of the A5025 as part of the A5025 Off-line Highway Improvements Ground Investigation (Structural Soils Limited, 2016 – see Appendix G7-1 (Application Reference Number: 6.7.19)), recorded made ground in the form of reworked natural material to 0.35m below ground level, which contained a small number of coal and ceramic fragments.

4.2 Superficial geology

Geological mapping suggests that superficial deposits are absent for the majority of the site, although glacial till (Diamicton) is shown to be present in the eastern extent of the site and within the study area to the north and east. Glacial till is typically described as sandy gravelly clay, likely originating from seasonal and post-glacial meltwater streams.

The trial pit TPBC17 encountered glacial till to 3.8m below ground level (when the trial pit was terminated due to instability) comprising sandy gravelly clay with gravel layers.

4.3 Bedrock geology

The regional bedrock geology of the area comprises of the Precambrian to Cambrian Monian Supergroup, a 7km thick sequence of sedimentary, metamorphic and igneous rocks. The Monian Supergroup can be sub-divided into the Gwna Group, the New Harbour Group and the South Stack Formation.

The site is primarily underlain by schist of the Gwna Group. Three lenticular bodies of quartzite also underlie the site, trending in a northeast-southwest direction, and are also part of the Gwna Group. The wider study area is also mainly underlain by schist of the Gwna Group, with another lenticular body of quartzite approximately 50m to the southeast and schist and glaucophane of the Central Anglesey Shear Zone and Berw Shear Zone approximately 50m to the west.

5. Hydrology and hydrogeology

A watercourse is culverted underneath the site and first becomes visible at the site's eastern boundary in a brick-lined channel. The watercourse is a small unnamed tributary of the Afon Llanrhyddlad, flowing into it approximately 30m to the east.

Superficial deposits are indicated to be absent from the site (BGS, 1974). The bedrock of the study area has been classified as a Secondary B aquifer (predominantly lower permeability layers that may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering). No records for water quality were reported within the study area (Groundsure, 2015).

Further details of the hydrology and hydrogeology of the site are provided in Chapter E8 (surface water and groundwater) (Application Reference Number: 6.5.8).

6. Sites of geological importance

6.1 The GeoMôn Geopark

The Isle of Anglesey was included in the European Geopark Network in 2009 as a result of its outstanding geodiversity and geological heritage. The Anglesey Geopark (called the 'GeoMôn Geopark') covers the 720km^2 of the Isle of Anglesey and has approximately 200km of coastline.

The European Geopark Network aims to protect geodiversity, promote geological heritage to the general public and support sustainable economic development of Geopark territories through the development of geological tourism. As a member of the European Geopark Network, it is also included in the Global Geopark Network.

In November 2015, the GeoMôn Geopark was designated as a United Nations Educational, Scientific and Cultural Organisation (UNESCO) Global Geopark at UNESCO's 38th General Conference (UNESCO, 2015). The new designation is intended to raise awareness and promote respect for the environment and integrity of the landscape. The status also expresses governmental recognition of the importance of holistic management of the Geoparks. The designation is not legislative, but the key heritage sites within the Geoparks should be protected under local, regional or national legislation as appropriate. The UNESCO Global Geopark designation is not permanent. A revalidation process exists whereby a thorough re-examination of the Geopark is undertaken every four years, after which the status is either renewed for a further four years, or the management body will be allowed two years to fulfil certain criteria. Should these still not be met after the prescribed period, the park would lose the UNESCO Global Geopark status (UNESCO, 2015).

Both NRW and GeoMôn have responsibilities for protecting geosites. NRW has a statutory responsibility to protect areas notified as geological Sites of Special Scientific Interest and GeoMôn leads on the conservation of Regionally Important Geodiversity Sites within the GeoMôn Geopark. Both organisations work together to protect and promote the sustainable use of Anglesey's geoheritage.

6.2 Sites of geological importance

There are no Regionally Important Geodiversity Sites or geologically designated Sites of Special Scientific Interest within the study area, and no sites have been identified that are likely to be affected by the proposals (Natural England, 2017; Wood, 2007). Consultation with GeoMôn has confirmed this (see Table 2.1).

7. Geological resources

7.1 Minerals

The following sources of information have been used to identify mineral resources within the study area:

- *Mineral Resource Map of Wales* (BGS and Welsh Assembly Government, 2010);
- *North West Wales Aggregates Safeguarding Map* (BGS and Welsh Assembly Government, 2012a);
- *Hard Rock and Sand & Gravel Safeguarding Areas in Ynys Môn* (Capita Symonds, 2010); and
- extract from *BritPits* (BGS, 2017b), provided by the North Wales Minerals and Waste Planning Service.

None of the Mineral Safeguarding Areas identified within the *Hard Rock and Sand & Gravel Safeguarding Areas in Ynys Môn* report or the quarries identified within the BritPits extract are located within the study area. BritPits is a database of surface and underground mineral workings produced by the BGS – BritPits is an abbreviation of British Pits.

A Category 2 Aggregates Safeguarding Area for quartzitic sandstone has been identified for the site (BGS and Welsh Assembly Government, 2012a). Category 2 Aggregates Safeguarding Areas contain resources considered to be of local or regional importance. It is considered likely that this safeguarding area relates to the quartzitic lenses present beneath the site (refer to Section 4.3). Another Category 2 Aggregates Safeguarding Area has been identified for igneous resources approximately 120m to the southwest, which is likely to relate to igneous geology outside of the study area – the safeguarding areas include 200m buffers around bedrock resources (BGS and Welsh Assembly Government, 2012b).

7.2 Mining

No evidence of historical mining/mineral extraction has been identified within the study area (Groundsure, 2015).

8. Land contamination

8.1 Introduction

The preliminary land contamination risk assessment presented below is based on the information sources referenced in Section 2.

8.2 Approach

The process of contamination risk assessment is defined within *Model Procedures for the Management of Land Contamination, Contaminated Land Report 11 (CLR11)* (Department for Environment, Food and Rural Affairs (Defra) and Environment Agency, 2004). A summary of the approach, which has been adopted within this report, is outlined below.

- Hazard identification, which involves establishing contaminant sources and hazard assessment by way of identifying pathways (a route or means by which a receptor can be exposed to, or affected by, a contaminant) and receptors, and identifying where a Potential Pollutant Linkage (PPL) exists. Both hazard identification and assessment stages conclude in development of the conceptual site model.
- Risk estimation, which predicts the likelihood of harm or pollution occurring (probability assessment) and the degree of harm or pollution occurring (consequence assessment). Risk estimation is only undertaken when a PPL exists and has two components:
    1) probability assessment, which relates to whether pollution/harm could occur in the short- and/or long-term; and
    2) consequence assessment, which relates to the magnitude of harm that could occur because of the PPL; that is, the degree of harm or pollution considering the sensitivity of the receptor.
- Risk evaluation, which is the process of deciding whether a risk is acceptable or not, entails the application of evaluation criteria, which may be absolute standards or recommended limit values, for example a health criterion for the intake of a substance.

8.3 Potential sources

A summary of information relevant to potential contamination sources within the study area is presented below.

8.3.1 Historical map review

The historical land use was determined from large and small scale historical OS maps (Groundsure, 2015 – Appendix B) and is presented in Table 8.1; a summary is presented in Section 8.3.2.

Table 8.1: Historical map review

Date	Scale	On-site description	Off-site description (within the wider study area)
1886-1887	1:10,560	The site is comprised of agricultural fields with a section of road (now indicated as the A5025) in the west of the site. A small watercourse flows through the northern part of the site from west to east and off-site into a larger watercourse approx. 30m to the east. A spring is present in the southern half of the site.	The surroundings are rural in nature. Agricultural fields lie to the east, south and west, with a small track and residential properties to the north and a cluster of dwellings to the southwest. These fields contain old quarries approx. 80m and 200m west and northwest of the site respectively, with a pond now present at the former and an old limekiln approx. 180m west of the site. A well is located adjacent to the southwest of the site associated with a neighbouring residential property. A cluster of buildings is shown approx. 210m northwest with a feature labelled ‘pump’ present.

Date	Scale	On-site description	Off-site description (within the wider study area)
1889	1:2,500	No significant changes apparent.	No significant changes apparent.
1899	1:10,560	The spring is now marked as a well.	No significant changes apparent.
1900	1:2,500	No significant changes apparent.	A smithy is now present approx. 10m to the north.
1924	1:2,500	No significant changes apparent.	The pond to the west is no longer annotated, nor is the smithy. The site of a burial ground is indicated approx. 170m to the northeast (although this is an historic feature).
1926	1:10,560	No significant changes apparent.	No significant changes apparent.
1949	1:10,560	A small building is now present in the northwest of the site.	Another residential property has been constructed adjacent to the southwest.
1959	1:10,560	No significant changes apparent.	No significant changes apparent.
1974	1:2,500	A garage is indicated where the small building was previously present, although it is larger in footprint and extends slightly to the east. The road within the west has been upgraded, including widening, and is annotated as the A5025. A pump house is now located adjacent to the well. The field boundaries in the southeast of the site have altered such that they are congruent with the site boundary.	A sewage works is indicated immediately adjacent to the southeast. The well to the southwest is no longer indicated. The pond to the west, which had been absent from maps since 1924 is now indicated once more.
1980	1:10,000	No significant changes apparent.	No significant changes apparent.
1995	1:2,500	The garage has been extended to the southeast and a new larger building has been constructed in the centre of the northern part of the site.	No significant changes apparent.
2002	1:10,000	No significant changes apparent.	No significant changes apparent.
2010	1:10,000	The small watercourse is no longer indicated on the northern part of the site but is still present just beyond the eastern border.	No significant changes apparent.
2014	1:10,000	No significant changes apparent.	No significant changes apparent.

8.3.2 Summary of historical land use

On-site

In the late 19th century, the site comprised agricultural fields, with a small watercourse running through the northern half of the site from west to east and a section of road in the western extent of the site. By 1949, a small building had been constructed in the northwest; this building had been extended by 1974, at which point it was identified as a garage. The road within the west of the site was also upgraded in 1974 when it became the A5025. By 1995, the garage had been extended again and a large building constructed in the centre of the

northern part of the site. The small watercourse running through the north of the site was no longer indicated by 2010 and is likely to have been covered with hardstanding and culverted or incorporated into site drainage. The southern part of the site has remained agricultural land since the earliest available historical mapping, with a well and pump noted until the present day.

Off-site

The early historical maps indicated that the surroundings were largely agricultural. Old quarries and a lime kiln were located to the west. Residential properties were located to the north and southwest. A cluster of buildings was also present in 1889 approximately 230m northwest, with a feature labelled as a pump. This area is identified within the Groundsure Enviroinsight report as being an alcoholic brewing/bottling facility – see Section 8.3.4 for further details.

A smithy was annotated adjacent to the north of the site in 1900 but this was absent from the 1924 map edition onwards. In 1974 a sewage works was identified, located adjacent to the southeast of the site. No significant changes occurred from that point to the present day.

8.3.3 Site reconnaissance

During the site reconnaissance in 2016, the northern half of the site was occupied by a vehicle repair garage and bus and coach park, with the A5025 to the west. The building located at the entrance of the site was signposted as 'Holyhead Truck Services', but the building appeared to be disused or infrequently used at the time of the visit. To the east of this building, a garage with four bays was present, with a small office adjoining and mainly hardstanding areas in which coaches were parked.

A number of disused coaches and buses were present on the eastern extent of the site; hardstanding was absent from this area with grass present. The southern part of the hardstanding area was separated by a barbed wire fence, with entrance through a gate in the west. This area was largely overlain by gravel with grassy areas and mainly contained disused buses, coaches and other vehicles, as well as small piles of seemingly waste material and a skip.

The southern half of the site beyond the garage/depot was occupied by grassland, with mounded earth separating it from the garage/depot area.

8.3.3.2 Features of relevance

The features below were identified during the site reconnaissance within the study area which may be of relevance to land contamination.

On-site

- The larger building in the centre is a working garage containing four bays.
- A diesel pump is located close to the south of this building.
- A series of oil interceptors and drains are present downhill from this pump, the condition of which is unknown.
- A number of disused buses and coaches are present. Many signs of small fuel/oil spills were evident around these and hydrocarbon odours were noted.
- A drain soakaway in the northeastern corner is used to empty the coach latrines and leads into a cess pit on the eastern border.
- An area of rubble containing waste materials (e.g. plastics and metals) was identified in the east of the northern half of the site.
- Mounded earth (potential made ground) borders the northern half of the site to the south and east.
- A skip with burnt materials was located in the southwest of the northern half of the site.

- The drainage system is complex due to various works occurring at different times over the years and the condition of the system is unknown.

Off-site

- The sewage works is slightly uphill of the southern half of the site.
- A new primary school (Ysgol y Llannau) is currently being constructed approximately 120m to the southwest and is expected to open in late 2017.

8.3.4 Regulatory and archive information

(a) Discharge consents

A discharge consent for treated sewage effluent to the Afon Llanrhyddlad was granted to a water company in 1982 and revoked in 2009, approximately 60m east of the site.

(b) Pollution incidents to controlled waters

Three pollution incidents have been recorded within the study area, all 25–50m to the southeast. These were recorded in 2001, 2002 and 2003 and relate to crude sewage discharges of Category 3 (minor) impact to surface water. According to information received from NRW (2014), these were concerned with effluent from the sewage works reaching a local ditch and into the local stream due to cracks in the concrete tanks.

(c) Pollution prevention and control authorisations

No environmental permits have been reported for the study area.

(d) Landfill and waste sites

An historical landfill (Bryn Maethlu) has been reported approximately 150m northwest of the site. Bryn Maethlu Landfill had a waste license granted in 1995 which was surrendered in 2010. The facility contained less than 25,000 tonnes and only accepted inert waste.

(e) Potentially contaminative industries and land uses

The following contemporary industrial sites are of relevance within the study area (Groundsure, 2015):

- the sewage works previously identified; and
- Celtic Spirit Co, a bottling and brewing facility for alcoholic drinks. The source is approximately 230m to the northwest. It should be noted there is no record of any groundwater (or surface water) abstractions within the study area.

(f) Animal burial pits

No burial pits have been recorded within the study area.

(g) Radon

The site is not located within a radon affected area, as less than 1% of properties are above the action level.

(h) Unexploded ordnance

The *Regional Unexploded Bomb Risk: Isle of Anglesey* (Zetica, 2015) identifies that the site is within an area at low risk of encountering unexploded ordnance. This indicates a bombing density of up to 10 bombs per 1,000 acres.

8.3.5 Relevant sources and contaminants of concern

Based upon the above information, the relevant sources and potential contaminants of concern listed below may be present within the study area, either on- or off-site.

On-site

- Garage/repair depot (including on-site observations such as diesel fuel pump, leaks/spills and waste materials) pre-1974 to present: hydrocarbons, solvents, heavy metals, acids, Methyl *tert*-butyl ether, asbestos.
- Made ground (associated with construction and use of garage/depot, A5025 and earth mounds): heavy metals, hydrocarbons, ground gases, asbestos.

Off-site

- Sewage works 1974 to present (including known pollution incidents): heavy metals, inorganics, hydrocarbons, pathogens, treatment chemicals, ground gases, asbestos.
- Historical inert landfill (Bryn Maethlu) 1995 to 2010: heavy metals, hydrocarbons, asbestos and ground gases.

Other potential sources of contamination within the study area, such as the former quarries and bottling plant are considered unlikely to pose a plausible risk of contamination to the site and will therefore not be considered further.

8.4 Receptors

The key receptors located within the study area and their nature, typical activity and exposure routes are described in the tables below.

8.4.1 Human health

The human health receptors relevant to the Off-Site Power Station Facilities are described in Table 8.2.

Table 8.2: Human health receptors

Receptor	Typical activity
Construction workers	All activities involved with the construction of the Off-Site Power Station Facilities. High likelihood of contact with site soils and likely contact with groundwater during works.
Maintenance workers	Routine maintenance work. Likely contact with site soils and low likelihood with groundwater.
Future site users	Future users of the site. Low likelihood of contact with site soils as it is assumed that the site will be predominantly hardstanding.
Adjacent land users	Primarily residential and agricultural land use, also the new primary school approx. 120m to the southwest. May be affected by wind-blown dust/contaminants.

8.4.2 Property

The property receptors relevant to the proposed land use are outlined in Table 8.3.

Table 8.3: Property

Receptor	Typical activity
Domesticated animals	Typically cattle/sheep. Contact with soils on the south of the site and may be

Receptor	Typical activity
	exposed to wind-blown dust/contaminants from the northern half of the site.
Buildings/services	Residential buildings/services within the study area. In contact with site soils below ground.

8.4.3 Controlled waters

The relevant environmental receptors in terms of controlled waters and sensitive ecological sites are set out in Table 8.4.

Table 8.4: Environmental Receptors

Receptor	Description
Groundwater	Secondary B aquifer in bedrock
Surface water	Small watercourse flowing beneath/from boundary of site to Afon Llanrhyddlad in the east

8.5 Pathways

Potential pathways by which the on-site contaminants may affect identified human health and animal receptors within the study area are:

- inhalation;
- ingestion;
- off-site migration of contaminants via airborne dispersion, followed by inhalation; and/or
- direct contact (including dermal contact).

Pathways relevant to controlled waters and property receptors are:

- leaching of contaminants to groundwater;
- migration via surface runoff or via site drainage (northern part of the site);
- direct contact with contaminated soils and groundwater; and/or
- migration of ground gases and vapours into voids within buildings followed by build-up and potential explosion and/or asphyxiation.

Pathways relevant to contaminants once they have entered groundwater/surface water are considered within Chapter E8 (Application Reference Number: 6.5.8) and will not be discussed further here.

8.6 PPLs and risk assessment

Based on the contaminant sources, receptors and pathways outlined above, a number of PPLs have been identified and a conceptual site model has been developed. Using guidance within CLR11 (Defra and Environment Agency, 2004) and *Contaminated Land Risk Assessment: A Guide to Good Practice* (C552) (Rudland *et al*., 2001) a qualitative risk assessment has been undertaken to assess the significance of each PPL using Tables 8.5 to 8.8.

Table 8.5: Consequence of occurrence (severity)

Classification	Human health	Controlled waters	Buildings/services	Crops/livestock
Severe	Short-term (acute) risk to human health. Concentrations present likely to result in "significant harm" as defined by Part 2A of the *Environmental Protection Act 1990*.	Substantial pollution of water resources such that 'significant pollution' or 'significant possibility of pollution' of controlled waters as defined by Part 2A of the *Environmental Protection Act 1990* is being caused.	Catastrophic damage to buildings, structures or the environment, including building collapse.	Major damage or harm to crops/livestock, which is likely to result in irreversible or substantial adverse change.
Medium	Chronic damage to human health. Concentrations present that could result in significant harm.	Pollution of water resources such that there is a measurable (but not significant) reduction in water resources compared to the water quality standards.	Significant damage to buildings, structures or the environment making it unsafe to occupy, or damage that may impair a scheduled ancient monument.	Significant damage or harm to crops/livestock that could endanger the long-term functioning of the asset.
Mild	Slight short-term health effects to humans. Exposure to human health unlikely to lead to significant harm.	Measureable reduction in water quality compared to baseline.	Minor damage to sensitive buildings, structures, services or the environment.	Minor or short-lived damage or harm to crops/livestock.
Minor	Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc.)	Insubstantial pollution to water resources compared to baseline.	Easily repairable effects of damage to buildings or structures	Insignificant damage or harm to crops/scheme.

Table 8.6: Estimation of probability (likelihood)

Classification	Definition
High likelihood	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.
Likely	There is a pollutant linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period that such an event

	would take place, and is even less likely in the shorter term.
Unlikely	There is a pollutant linkage but circumstances are such that it is improbable that an event would occur even in the very long term.

Table 8.7: Risk ratings

Risk matrix		Consequence of occurrence (severity)			
		Severe	Medium	Mild	Minor
Probability (likelihood)	High likelihood	Very high	High	Moderate	Moderate/ low
	Likely	High	Moderate	Moderate/ low	Low
	Low likelihood	Moderate	Moderate/ low	Low	Very low
	Unlikely	Moderate/ low	Low	Very low	Very low

Table 8.8: Risk definition

Risk	Risk description
Very high	There is a high likelihood of the event occurring and having severe consequences. If the risk is realised it is likely to result in a substantial liability.
High	It is likely that an event with medium or even severe consequences could arise. If the risk is realised it may result in a substantial liability.
Moderate	It is possible that an event could occur and it is either unlikely and consequences may be severe or if it were to occur it is likely that consequences would be relatively mild. Investigation would normally be required to clarify the risk and determine the potential liability.
Low risk	It is possible that an event could occur but it is likely that the consequences would be mild at worst.
Very low	It is unlikely that an event could occur, and if it happened the consequences are likely to be mild at worst.

The conceptual site model and risk assessment is presented in Table 8.9.

Table 8.9: PPLs

Source	Potential contaminants	Pathway	Receptor	Consequence of occurrence	Likelihood of occurrence	Potential risk	Comments
On-site sources							
Soils and groundwater: Garage/depot	- Hydrocarbons - Solvents - Heavy metals - Acid - MTBE - Asbestos	Ingestion, inhalation, dermal contact	Construction workers Maintenance workers	Medium	Likely	Moderate	Garage has been operational for a long period of time. Hardstanding limits the pathways in some areas but it is probable that cracks and drains may have provided conduits for contamination to the soils and groundwater beneath the site; cohesive superficial deposits are likely to be absent, elevating the risk to groundwater. Drainage system may discharge to surface water off-site; condition of oil interceptors is unknown. Evidence of hydrocarbon spills encountered during walkover and waste materials evident.
		Ingestion, inhalation, dermal contact	Future site users	Medium	Low likelihood	Moderate/low	
		Ingestion, inhalation of wind-blown dust/contaminants	Adjacent land users (human health and property receptors (grazing animals))	Medium	Low likelihood	Moderate/low	
		Migration of contaminants to surface water off-site	Surface water (small watercourse feeding into Afon Llanrhyddlad)	Mild	Likely	Moderate/low	
		Leaching of contaminants through the soil to the aquifer	Secondary B aquifer	Mild	Likely	Moderate/low	
Soils and groundwater: Potential made ground	- Heavy metals - Hydrocarbons - Asbestos	Ingestion, inhalation, dermal contact	Construction workers Maintenance workers	Medium	Low likelihood	Moderate/low	Made ground has been observed at the surface of the site, but its composition and extent is currently unknown.
		Ingestion, inhalation, dermal contact	Future site users	Medium	Unlikely	Low	
		Ingestion, inhalation of wind-blown dust/contaminants	Adjacent land users (human health and domesticated animals)	Medium	Low likelihood	Moderate/low	
		Migration of contaminants to surface water off-site	Surface water (small watercourse feeding into Afon Llanrhyddlad)	Mild	Low likelihood	Low	
		Leaching of contaminants through the soil to the aquifer	Secondary B aquifer	Mild	Low likelihood	Low	
	- Ground gases	Accumulation of ground gases within enclosed spaces leading to potential risk of asphyxiation and/or explosion.	Human health Buildings (on-site and off-site)	Severe	Unlikely	Moderate/low	
Off-site sources							
Soils and groundwater: Sewage works	- Hydrocarbons - Heavy metals - Inorganic ions - Pathogens - Treatment chemicals - Asbestos - Ground gases	Migration of contaminants on-site and ingestion, inhalation, dermal contact	Construction workers Maintenance workers	Medium	Low likelihood	Moderate/low	The sewage works is uphill of the southern half of the site so groundwater may flow towards the site, but it is considered more likely that it drains to the stream which flows from the site.
		Migration of contaminants on-site and ingestion, inhalation, dermal contact	Future site users	Medium	Low likelihood	Moderate/low	
		Migration of contaminants through soil to aquifer beneath site	Secondary B aquifer	Mild	Low likelihood	Low	

Source	Potential contaminants	Pathway	Receptor	Consequence of occurrence	Likelihood of occurrence	Potential risk	Comments
Soils and groundwater: Historical landfill	- Heavy metals - Hydrocarbons	Migration of contaminants on-site and ingestion, inhalation, dermal contact	Construction workers	Medium	Unlikely	Low	The landfill is uphill of the site so groundwater may flow towards the site, but the landfill only accepted inert waste at low quantities so the contaminative potential of the source is likely to be low.
			Maintenance workers				
		Migration of contaminants on-site and ingestion, inhalation, dermal contact	Future site users	Medium	Unlikely	Low	
		Migration of contaminants through soil to aquifer beneath site	Secondary B aquifer	Mild	Unlikely	Very low	
	- Ground gases	Accumulation of ground gases within enclosed spaces leading to potential risk of asphyxiation and/or explosion.	Human health	Severe	Unlikely	Moderate/low	
			Buildings				

8.7 Discussion

The preliminary risk assessment indicates that the risks to human health (construction workers, maintenance workers and future site users) are generally likely to be moderate/low or low. However, the risk is elevated to moderate for construction workers in relation to potential contact with made ground associated with the garage/depot, as it is considered likely that this made ground will have been impacted by contamination as a result of vehicle repair and maintenance activities.

Moderate/low risks were identified for the small watercourse and the aquifer in the bedrock from potential contamination associated with the garage/depot. Moderate/low risks were also identified from the generation of ground gases from made ground and the historical landfill which may affect buildings or human health. It should be noted that moderate/low is lowest possible risk outcome using the above risk assessment methodology for ground gases, given the potential severity of outcome should an event occur.

8.8 Uncertainty analysis

An uncertainty evaluation has been undertaken to inform the requirement for further assessment.

8.8.1 Source uncertainties

No Ground Investigation data are available for the site, and thus the sources identified represent those which can be identified from a desk-based review. There remains the potential for additional contamination sources to be present which have not been identified herein. For instance, historical mapping indicates the presence of buildings on the site as early as 1949, but the buildings are not indicated as a garage until 1974. The nature of the buildings up to that point is therefore unknown, and other potential contamination sources to those listed above may be present.

8.8.2 Pathway uncertainties

Without Ground Investigation data for the site, it is not possible to accurately assess the potential for the exposure of human health or property receptors (either on- or off-site) to contaminants or to consider the likelihood of migration of contaminants to underlying groundwater.

8.9 Next steps

An intrusive Ground Investigation would be completed prior to construction to provide information on the presence and/or extent of contamination on the northern part of the site. Appropriate analysis and risk assessment of soil, soil leachate and groundwater results would be used to further refine the conceptual site model. If the need for remediation is identified, a remediation strategy, followed by a remediation implementation plan, would be prepared in accordance with the requirements of CLR11 (Defra and Environment Agency, 2004). Any remediation would be designed to mitigate risks from contamination and reduce effects to receptors during construction and operation.

9. Glossary

Acronym	Definition
AECC	Alternative Emergency Control Centre
ALC	Agricultural Land Classification
BGS	British Geological Survey
CLR11	Contaminated Land Report 11
Defra	Department for Environment, Food and Rural Affairs
ESL	Environmental Survey Laboratory
IACC	Isle of Anglesey County Council
MEEG	Mobile Emergency Equipment Garage
NRW	Natural Resources Wales
PPL	Potential Pollutant Linkage
UNESCO	United Nations Educational, Scientific and Cultural Organisation

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11. Limitations

The potential remains for the presence of unknown, unidentified, or unforeseen surface and sub-surface contamination. Any additional evidence of such potential site contamination would require appropriate surface and sub-surface exploration and testing. The findings of this report were developed in a manner consistent with a level of care and skill normally exercised by members of the environmental science and engineering profession currently practising under similar conditions.

A number of the findings and conclusions presented in this report are based on information provided by third parties and/or historical records, which Horizon Nuclear Power Wylfa Limited has relied on in good faith. Jacobs accepts no responsibility for any deficiency, misstatements, or inaccuracy contained in this report as a result of errors, omissions or misstatements of said third parties or from information obtained from these.

If new information is obtained or developed during future work (which may include excavations, borings or other studies), Jacobs should be requested to re-evaluate the conclusions of this report, and to provide amendments as required.

Figures

FIGURE 1

Legend

- Off-Site Power Station Facilities
- Study area

N
W E
S

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
0	JUN 17	Initial Issue	AD	CC	KY	RB

Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT
BASELINE CONDITION REPORT

Drawing Title: SOILS AND GEOLOGY STUDY AREA

Scale @ A3	1:3,000	DO NOT SCALE
Jacobs No.	60PO8077	
Client No.		

Drawing No.: 60PO8077_DCO_BCR_OSF_01

0 25 50 100 150 200 250 metres

Appendix A. National Soil Resources Institute report

National Soil Resources Institute

Cranfield UNIVERSITY

Soils Site Report

Full Soil Report

National Grid Reference: SH3267088793
Easting: 232670
Northing: 388793
Site Area: 5km x 5km

Prepared by
authorised user:
Joanne Jeffreys
Jacobs

2 March 2015

Citations

Citations to this report should be made as follows:

National Soil Resources Institute (2015) Full Soils Site Report for location 232670E, 388793N, 5km x 5km, National Soil Resources Institute, Cranfield University. Accessed via https://www.landis.org.uk/sitereporter/.

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About this report

This Soils Site Report identifies and describes the properties and capacities of the soil at your specified location as recorded in the 1:250,000 scale National Soil Map for England and Wales. It has been produced by Cranfield University's National Soil Resources Institute.

The National Soil Map represents the most accurate comprehensive source of information about the soil at the national coverage in England and Wales. It maps the distribution of soil mapping units (termed soil associations) which are defined in terms of the main soil types (or soil series) that were recorded for each soil association during field soil survey. Each soil association is named after its principal soil series and these bear the location name from where they were first described (e.g. Windsor). Each of these soil associations have differing environmental characteristics (physical, chemical and biological) and it is by mapping these properties that the range of thematic maps in this report have been produced.

Soil types and properties vary locally, as well as at the landscape scale. It is not possible to identify precisely the soil conditions at a specific location without first making a site visit. We have therefore provided you with information about the range of soil types we have identified at and around your selected location. Schematic diagrams are also provided to aid accurate identification of the soil series at your site.

Whilst an eight-figure national grid reference should be accurate to within 100m, a single rural Postcode can cover a relatively large geographical area. Postcodes can therefore be a less precise basis for specifying a location. The maps indicate the bounded area the reports relate to.

Your Soils Site Report will enable you to:

- identify the soils most likely to be present at and immediately around your specified location;
- understand the patterns of soil variation around your location and how these correlate with changes in landscape;
- identify the nature and properties of each soil type present within the area;
- understand the relevant capacities and limitations of each of the soils and how these might impact on a range of factors such as surface water quality.

For more information visit www.landis.org.uk/reports

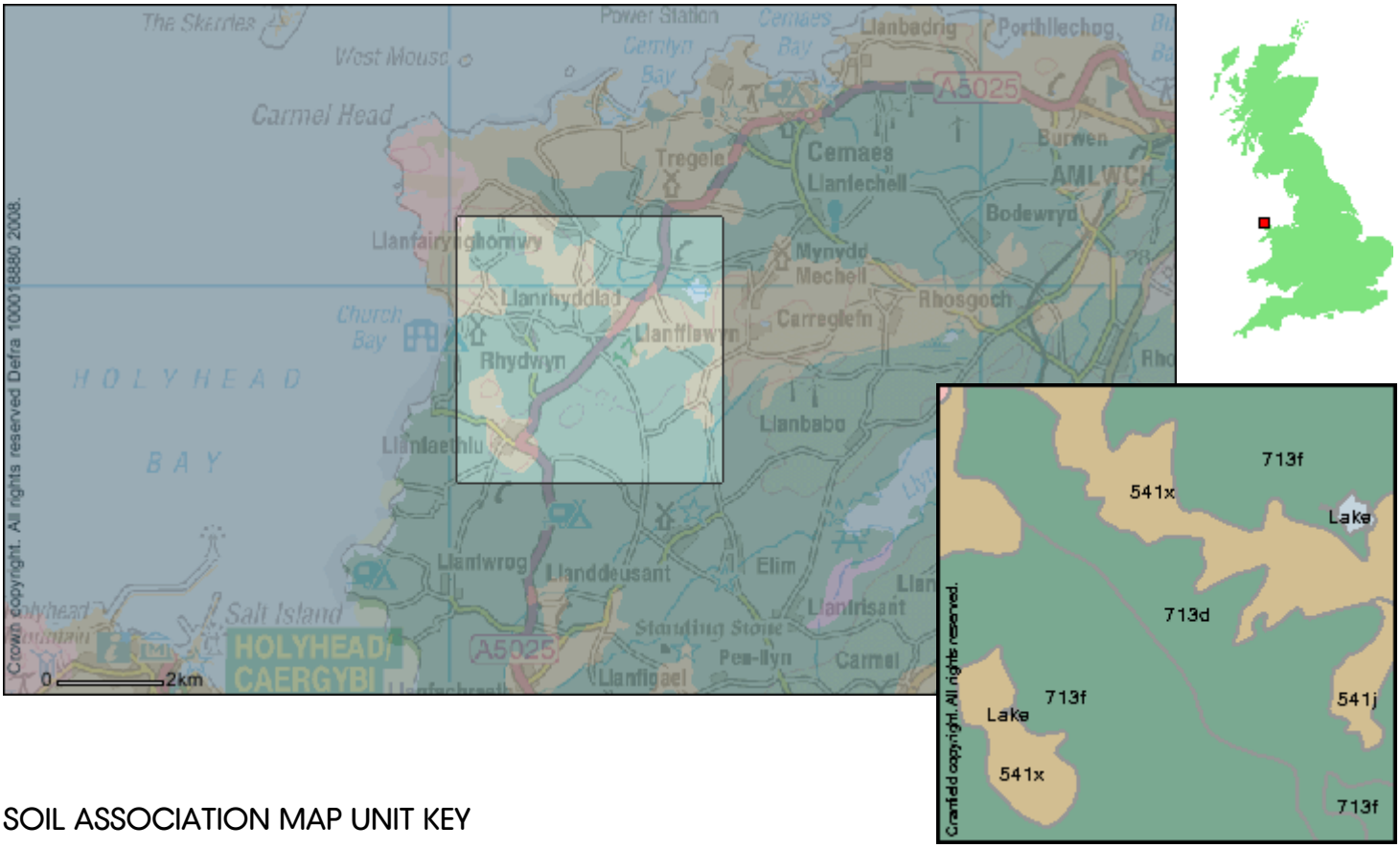
Table of Contents

1. SOIL THEMATIC MAPS

This section contains a series of maps of the area surrounding your selected location, based on the 1:250,000 scale National Soil Map, presenting a number of thematic maps relating to the characteristics of the soils. These provide an overview of the nature and condition of the local soil conditions. It is these conditions that may be used to infer the response of an area to certain events (with the soil as a receptor), such as pollution contamination from a chemical spill, or an inappropriate pesticide application and the likelihood of these materials passing though the soil to groundwater. Other assessments provide an insight into the way a location may impact, by corrosive attack or ground movement, upon structures or assets within the ground, for example building or engineering foundations or pipes and street furniture.

Soil is a dynamic environment with many intersecting processes, chemical, physical and biological at play. Even soils 'sealed' over by concrete and bitumen are not completely dormant. The way soils respond to events and actions can vary considerably according to the properties of the soil as well as other related factors such as land-use, vegetation, topography and climate. There are many threats facing our national soil resource today and forthcoming legislation such as the proposed Soil Framework Directive (SFD) (COM(2006) 232) will seek to identify measures aimed towards soil protection and ensuring the usage of soils in the most sustainable way. This report is therefore a useful snapshot of the soil properties for your given area, providing a summary of a broad range of ground conditions.

1a. SOILS - SPATIAL DISTRIBUTION



SOIL ASSOCIATION MAP UNIT KEY

DENBIGH 1 541j
Well drained fine loamy and fine silty soils over rock.

EAST KESWICK 1 541x
Deep well drained fine loamy soils and similar soils with slowly permeable subsoils and slight seasonal waterlogging.

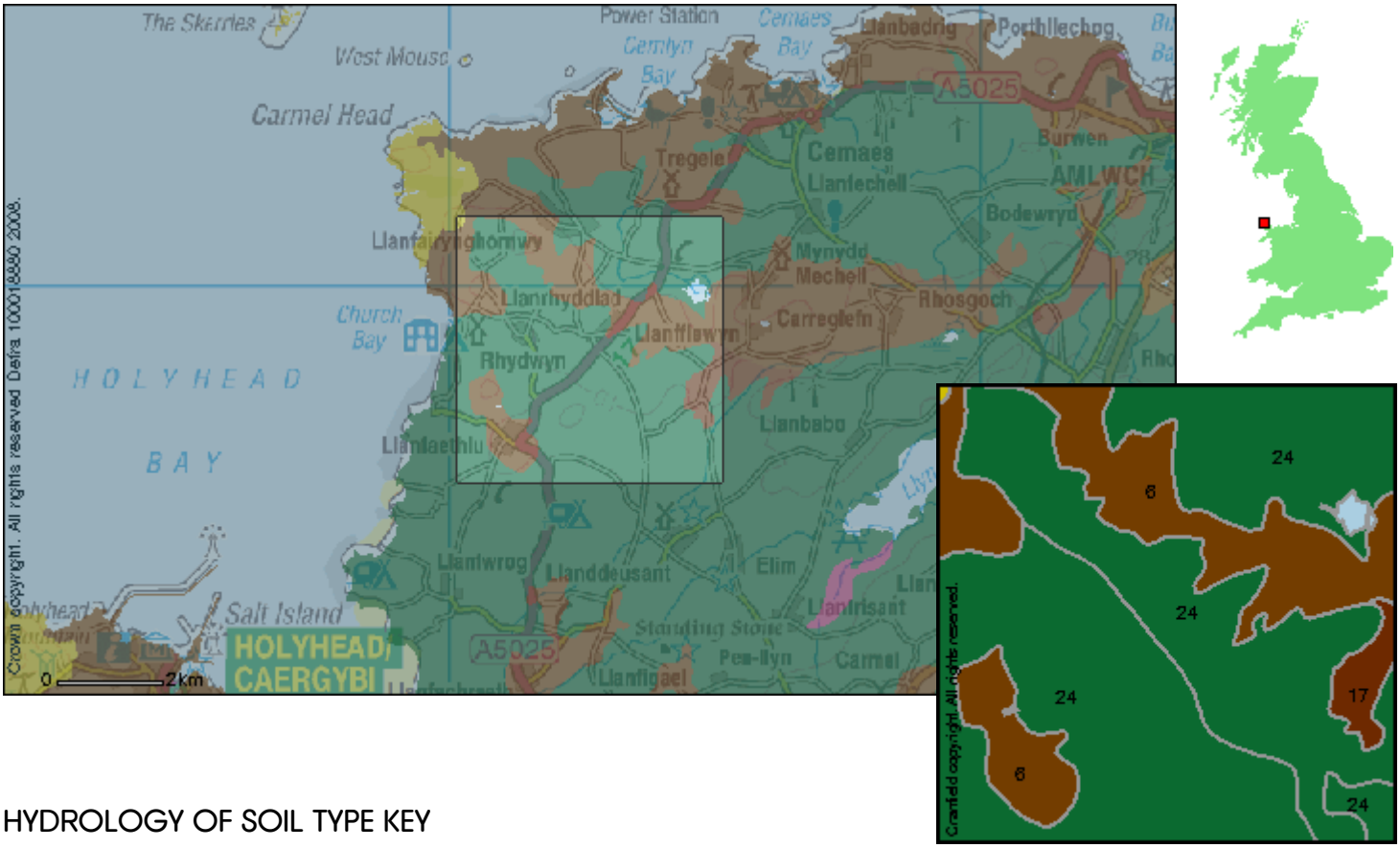
ANGLEZARKE 631a
Well drained very acid coarse loamy soils over sandstone with a bleached subsurface horizon.

CEGIN 713d
Slowly permeable seasonally waterlogged fine silty and clayey soils.

BRICKFIELD 2 713f
Slowly permeable seasonally waterlogged fine loamy soils.

Soil associations represent a group of soil series (soil types) which are typically found occurring together, associated in the landscape (Avery, 1973; 1980; Clayden and Hollis, 1984). Soil associations may occur in many geographical locations around the country where the environmental conditions are comparable. For each of these soil associations, a collection of soil types (or soil series) are recorded together with their approximate proportions within the association. Soil associations have codes as well as textual names, thus code '554a' refers to the 'Frilford' association. Where a code is prefixed with 'U', the area is predominantly urbanised (e.g. 'U571v'). The soil associations for your location, as mapped above, are described in more detail in Section 2: Soil Association Descriptions.

1b. HYDROLOGY OF SOIL TYPE (HOST)



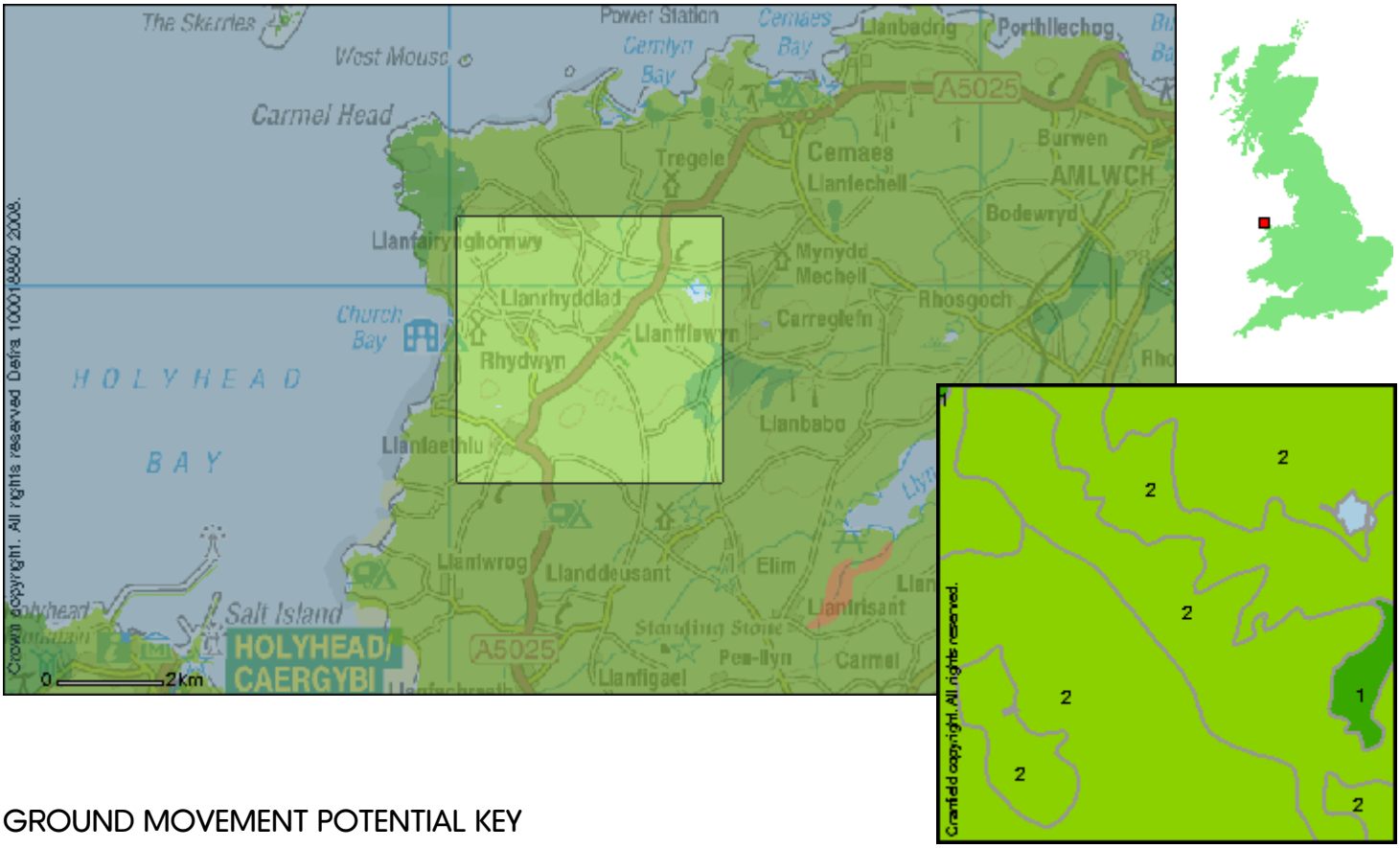
HYDROLOGY OF SOIL TYPE KEY

- 17 - *Relatively free draining soils with a large storage capacity over hard impermeable rocks with no storage capacity*
- 24 - *Slowly permeable, seasonally waterlogged soils over slowly permeable substrates with negligible storage capacity*
- 4 - *Free draining permeable soils on hard but fissured rocks with high permeability but low to moderate storage capacity*
- 6 - *Free draining permeable soils in unconsolidated loams or clays with low permeability and storage capacity*

HOST CLASS DESCRIPTION

The Hydrology of Soil Types (HOST) classification describes the dominant pathways of water movement through the soil and, where appropriate, the underlying substrate. Eleven drainage models are defined according to the permeability of the soil and its substrate and the depth to a groundwater table, where one is present (Boorman et al,1995). These are further subdivided into 29 HOST classes to which all soil series have been assigned. These classes identify the way soil water flows are partitioned, with water passing over, laterally through, or vertically down the soil column. Analysis of the river hydrograph and the extent of soil series for several hundred gauged catchments allowed mean values for catchment hydrological variables to be identified for each HOST class, The HOST classification is widely used to predict river flows and the frequency and severity of flood events and also to model the behaviour of diffuse pollutants (Hollis et al, 1995).

1c. GROUND MOVEMENT POTENTIAL



GROUND MOVEMENT POTENTIAL KEY

- 1 - *Very low*
- 2 - *Low*
- 3 - *Moderate*
- 4 - *High*
- 5 - *Very high*

* If a High class is starred, a 'Very High' ground movement potential is likely to be achieved if these soils are drained to an effective depth of at least two metres.

GROUND MOVEMENT POTENTIAL DESCRIPTION

Clay-related ground movement is the most widespread cause of foundation failure in the UK and is linked to seasonal swelling and shrinkage of the clay. The content of clay within the soils of your selected area has therefore a direct bearing upon the likelihood of ground movement.

Among the inorganic particles that constitute the solid component of any soil, clay particles are the smallest and defined as being <0.002 mm - equivalent spherical diameter (esd) in size. Clay particles occur in most kinds of soil but they only begin to exert a predominant influence on the behaviour of the whole soil where there is more than 35 per cent (by weight) of clay-sized material present.

Because clay particles are very small and commonly platy in shape they have an immense surface area onto which water can be attracted, relative to the total volume of the soil material. In addition to surface attraction or inter-crystalline absorption of water, some clay minerals, those with three layers of atoms (most other kinds of clay have only two layers of atoms) are able to absorb and hold additional water between these layers. It is these types of clay mineral, which are widespread in British soils and commonly known as *smectites* that have the greatest capacity to shrink and swell.

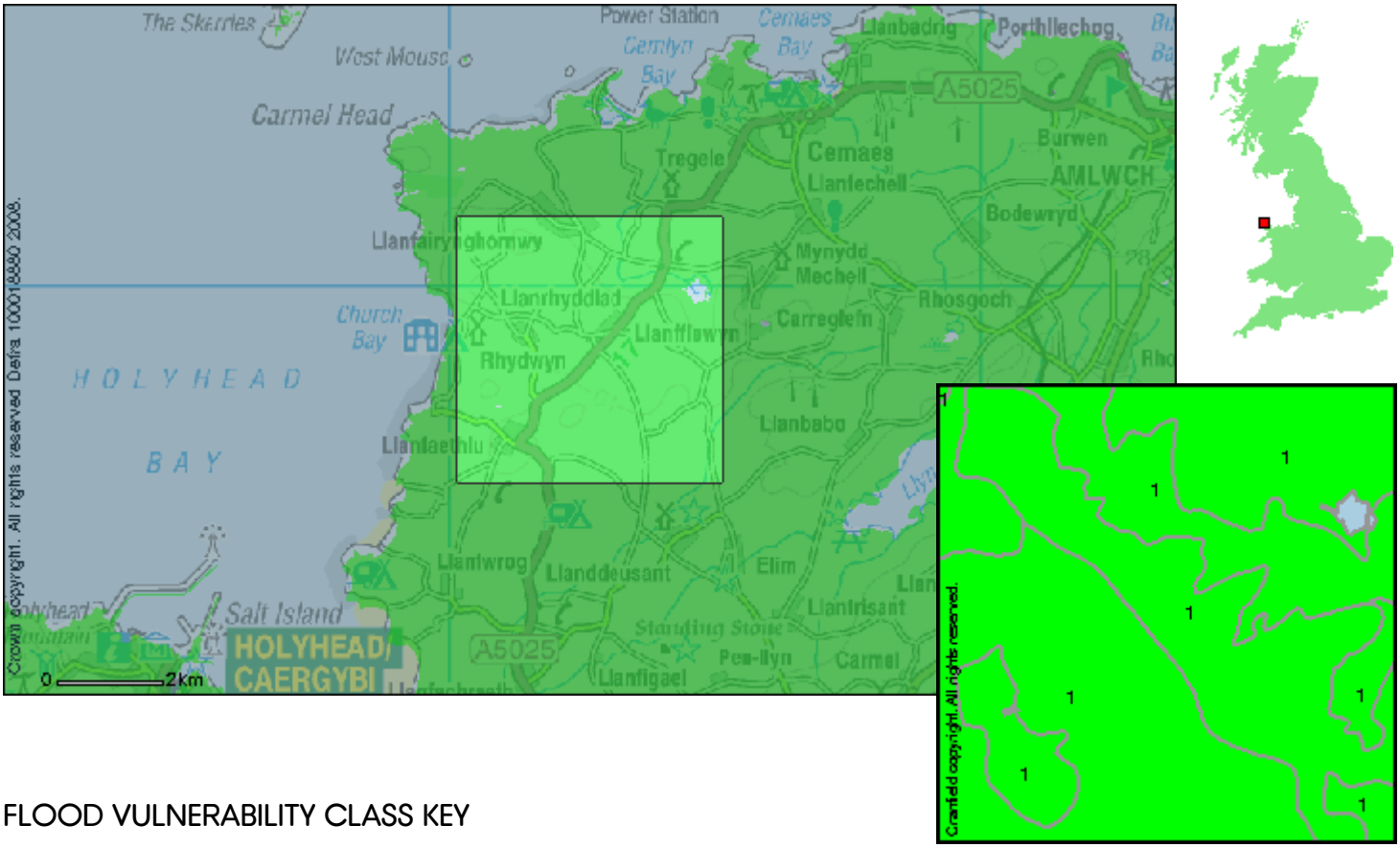
In a natural undisturbed condition, the moisture content of deep subsoil clay does not change greatly through the year and consequently there are no changes in volume leading to shrinkage and swelling. However, when clays are exposed at or near the ground surface and especially when vegetation is rooting in them seasonal moisture and volume changes can be dramatic. Plants and trees transpire moisture from the soil to support their growth and transfer necessary nutrients into their structures. Surface evaporation

also takes place from soil and plant structures, and the combination of evaporation from surfaces and transpiration by plants and trees is termed *evapotranspiration*. Thus, the layer of soil material down to 2m depth into which plants will root is critical when assessing the vulnerability of land to subsidence.

Whenever soil moisture is continuously being replenished by rainfall, the soil moisture reserves will be unaffected by the removal of moisture by plants as there is no net loss. However, in many parts of Britain, particularly in the south and east, summer rainfall is small and is exceeded by evapotranspiration. Water reserves are then not sufficiently replenished by rainfall and so a soil moisture deficit develops. The water removed from a clayey soil by evapotranspiration leads to a reduction in soil volume and the consequent shrinkage causes stress in the soil materials leading in turn to stress on building foundations that are resting in the soil (Hallett, et al, 1994).

The foundations themselves may then move and thus cause damage to building structures. This problem can be exacerbated by the fact that the soil beneath the structure may not dry out uniformly, so that any lateral pressure exerted on the building foundation is made effectively greater. This assessment identifies the likelihood of soil conditions being prone to ground movement given these other factors.

1d. FLOOD VULNERABILITY



FLOOD VULNERABILITY CLASS KEY

0 - *Major risk*

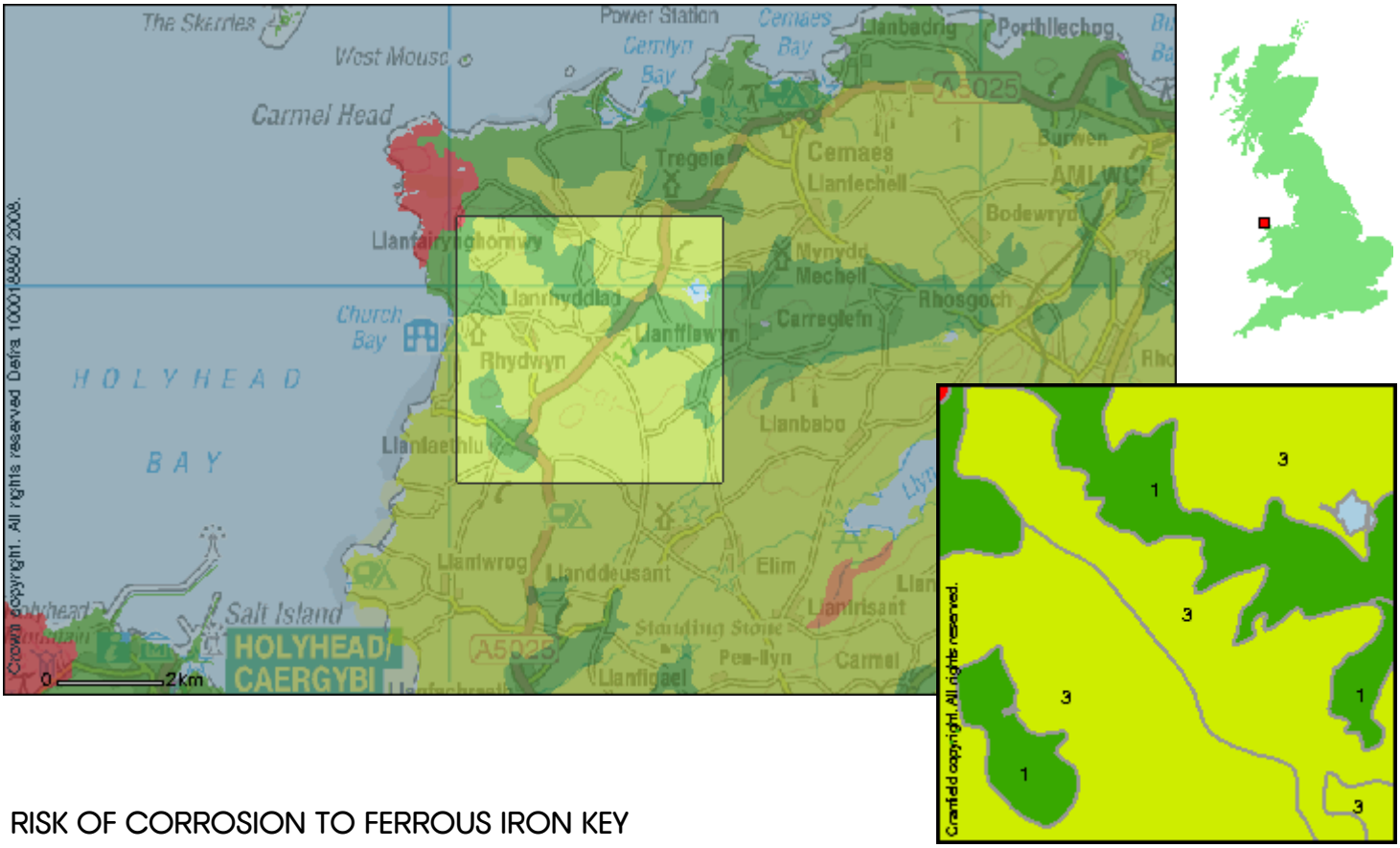
1 - *Minor risk*

FLOOD VULNERABILITY DESCRIPTION

The inundation of properties by flood water can occur in a number of circumstances. Surface run-off can collect on low-lying land from upslope following heavy rainfall. More commonly rivers, lakes and/or the sea extend beyond their normal limits as a result of prolonged or intense rainfall, unusually high tides and/or extreme wind events. Water damage to properties and their contents is compounded by the deposition of sediment suspended in the flood waters. The spatial distribution of such waterborne sediment (or alluvium as defined in soil science) is one basis upon which land that has been subject to historical flooding can be mapped, and this forms a basis for present-day flooding risk assessment.

Both riverine and marine alluvium are identified as distinct soil parent materials within the British soil classifications. Combining soil map units that are dominated by soil series developed in alluvium across Great Britain identifies most of the land that is vulnerable to flooding. This assessment does not account for man-made flood defence measures, showing instead the areas where once water has stood.

1e. RISK OF CORROSION TO FERROUS IRON



RISK OF CORROSION TO FERROUS IRON KEY

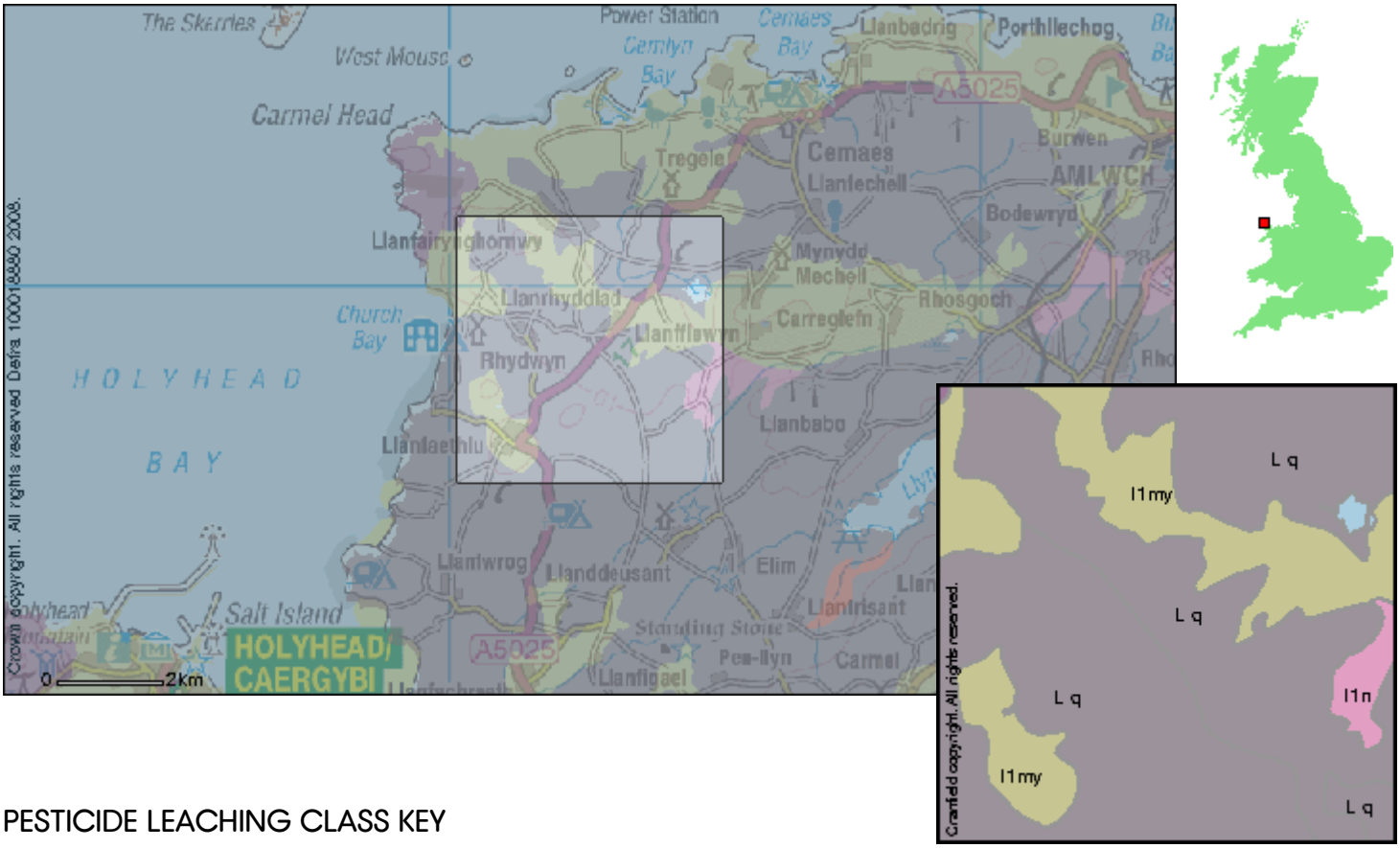
- 1 - *Non-aggressive*
- 2 - *Slightly Aggressive*
- 3 - *Moderately Aggressive*
- 4 - *Highly Aggressive*
- 5 - *Very highly Aggressive*
- 6 - *Impermeable Rock*

* If a class is starred, it is assumed that there are moderate amounts of sulphate in the soil. If there is abundant sulphate present, the soil may be one class more aggressive. Conversely, if there is very little sulphate, the soil may be one class less aggressive to buried ferrous iron.

RISK OF CORROSION TO FERROUS IRON DESCRIPTION

Buried iron pipes and other infrastructure corrode at rates that are influenced by soil conditions (Jarvis and Hedges, 1994). Soil acidity, sulphide content, aeration and wetness all influence the corrosivity of the soil. These factors are used to map 5 major classes of relative corrosivity.

1f. PESTICIDE LEACHING RISK



PESTICIDE LEACHING CLASS KEY

- H3df - *Moderately shallow soil over fissured hard rock with deep groundwater*
- I1my - *Deep loamy soil; groundwater at moderate depth*
- I1n - *Deep loamy soils over hard non-porous rocks - no groundwater present*
- L q - *Impermeable soils over soft substrates of low or negligible storage capacity that sometimes conceal groundwater bearing rocks at depth*

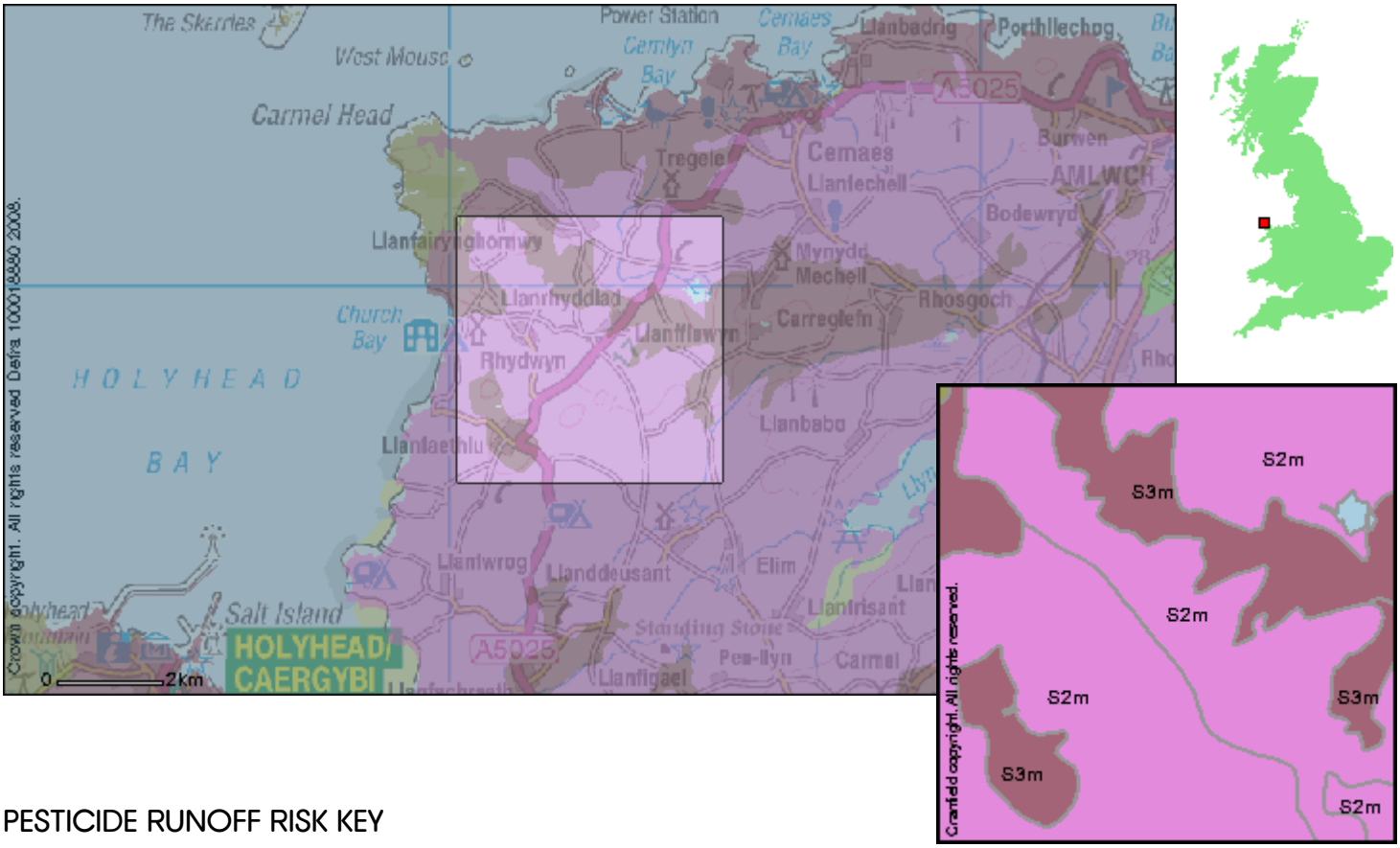
PESTICIDE LEACHING CLASS DESCRIPTION

The natural permeability and water regime of soils are influential in determining the fate and behaviour of pesticides applied to the crop and soil surface (Hollis et al, 1995). A system of vulnerability assessment was devised as part of the national system for Policy and Practice for the Protection of Groundwater. This divided soils into three primary vulnerability classes.

H - Soils of high leaching capacity with little ability to attenuate non-adsorbed pesticide leaching which leave underlying groundwater vulnerable to pesticide contamination.
I – Soils of intermediate leaching capacity with a moderate ability to attenuate pesticide leaching.
L - Soils of low leaching capacity through which pesticides are unlikely to leach.

The primary classes have been further subdivided into nearly forty subclasses. These subclasses, with their descriptions, are mapped above. These classes do not account for differences in land cultivation, which can also have a significant impact on pesticide behaviour.

1g. PESTICIDE RUNOFF RISK



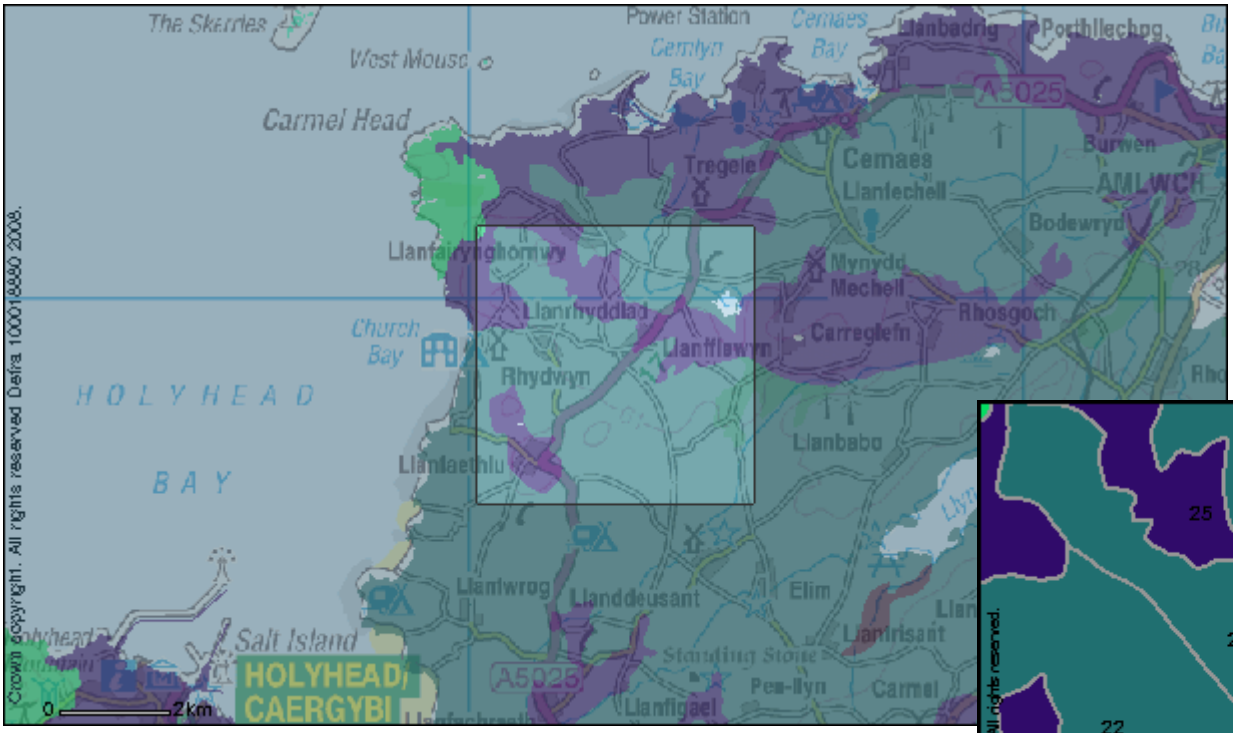
PESTICIDE RUNOFF RISK KEY

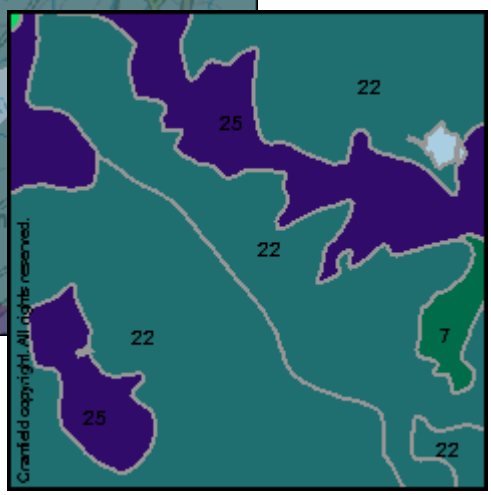
- S2m - *Soils with high run-off potential but moderate adsorption potential*
- S3m - *Soils with moderate run-off potential and moderate adsorption potential*
- S4m - *Soils with low run-off potential and moderate adsorption potential*

PESTICIDE RUNOFF RISK DESCRIPTION

The physical properties and natural water regime of soils influence the speed and extent of lateral water movement over and through the soil at different depths (Hollis et al, 1995). At as result, soils can be classed according to the potential for pesticide run-off. Five runoff potential classes are identified for mineral soils and a further two for peat soils. The mineral soil classes are further subdivided according to the potential for pesticide adsorption.

1h. HYDROGEOLOGICAL ROCK TYPE





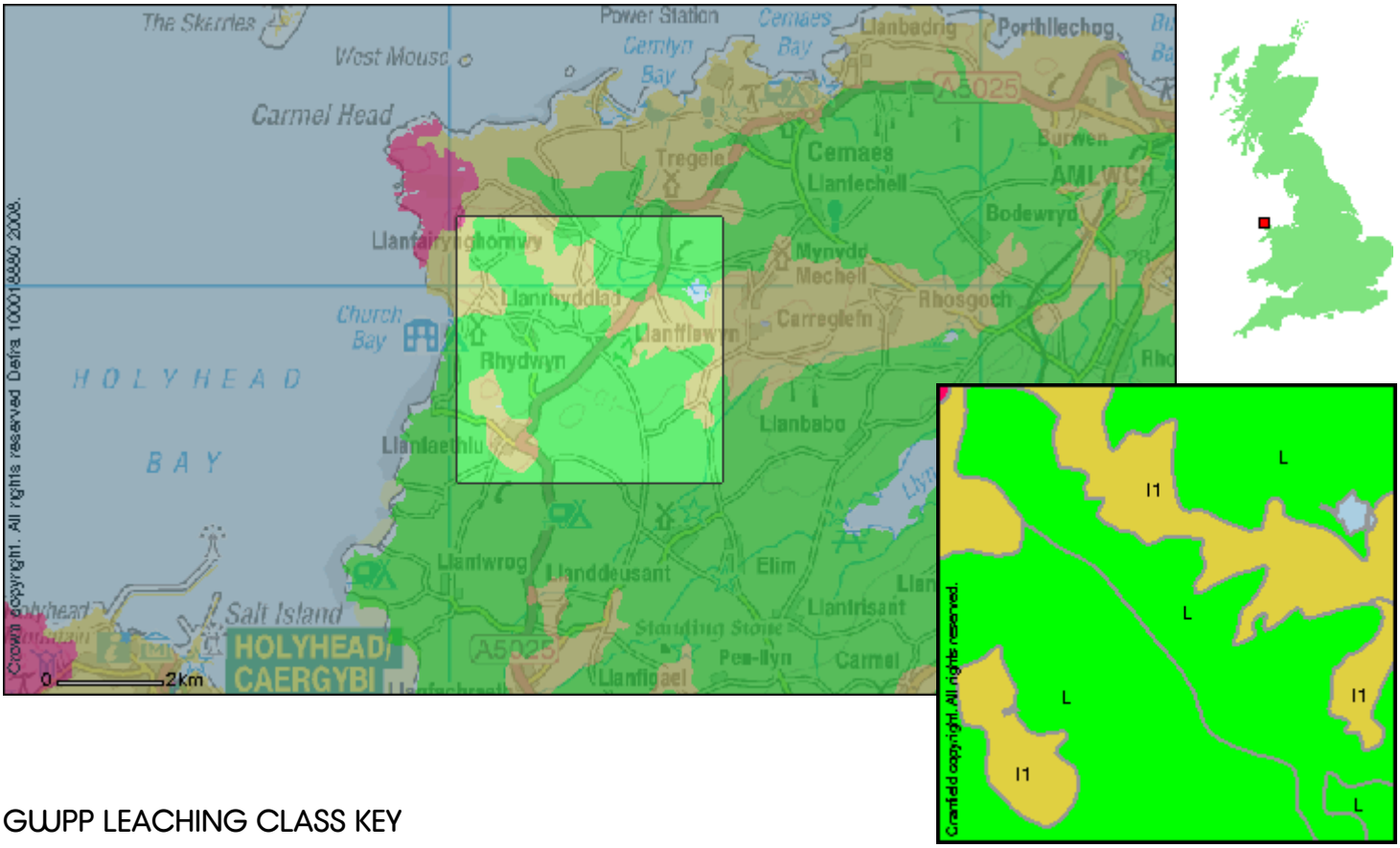
HYDROGEOLOGICAL ROCK TYPE KEY

- 13 - *hard fissured sandstones*
- 22 - *till and compact Head*
- 25 - *loamy drift*
- 7 - *hard, but deeply shattered non-arenaceous rocks*

HYDROGEOLOGICAL ROCK TYPE DESCRIPTION

The hydrogeological classification of the soil parent materials provides a framework for distinguishing between soil substrates according to their general permeability and whether they are likely to overlie an aquifer. Every soil series has been assigned one of the 32 substrate classes and each of these is characterised according to its permeability (being characterised as permeable, slowly permeable or impermeable). For further information, see Boorman et al (1995).

1i. GROUND WATER PROTECTION POLICY (GWPP) LEACHING



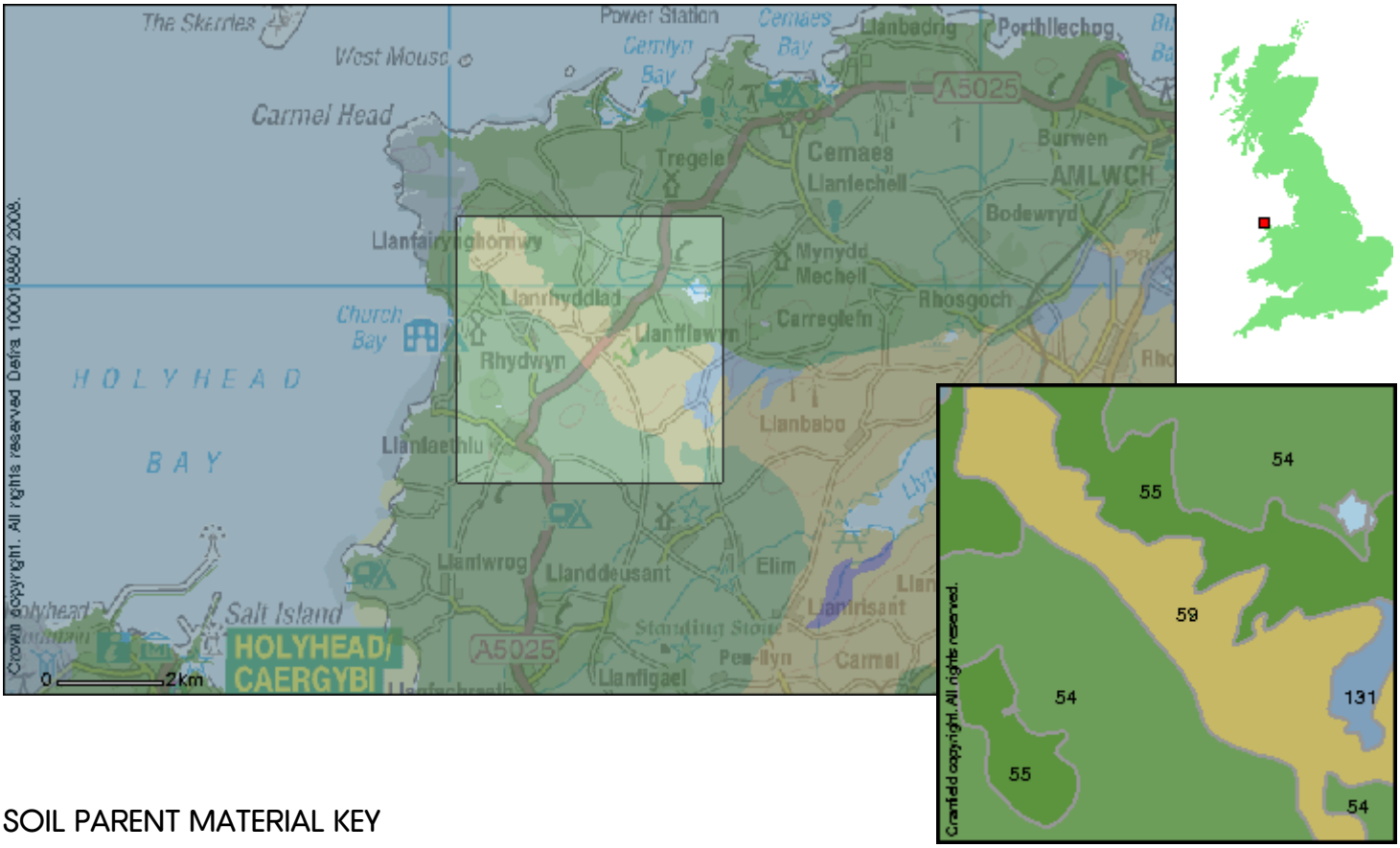
GWPP LEACHING CLASS KEY

- H3 - *Coarse textured or moderately shallow soils of high leaching potential, which readily transmit non-adsorbed pollutants and liquid discharges but which have some ability to attenuate adsorbed pollutants because of their relatively large organic matter or clay content*
- I1 - *Soils of intermediate leaching potential which have a moderate ability to attenuate a wide range of diffuse source pollutants but in which it is possible that some non-adsorbed diffuse source pollutants and liquid discharges could penetrate the soil layer*
- L - *Soils in which pollutants are unlikely to penetrate the soil layer either because water movement is largely horizontal or because they have a large ability to attenuate diffuse source pollutants*

GWPP LEACHING CLASS DESCRIPTION

The Ground Water Protection Policy classes describe the leaching potential of pollutants through the soil (Hollis, 1991; Palmer et al, 1995). The likelihood of pollutants reaching ground water is described. Different classes of pollutants are described, including liquid discharges adsorbed and non-adsorbed pollutants.

1j. SOIL PARENT MATERIAL



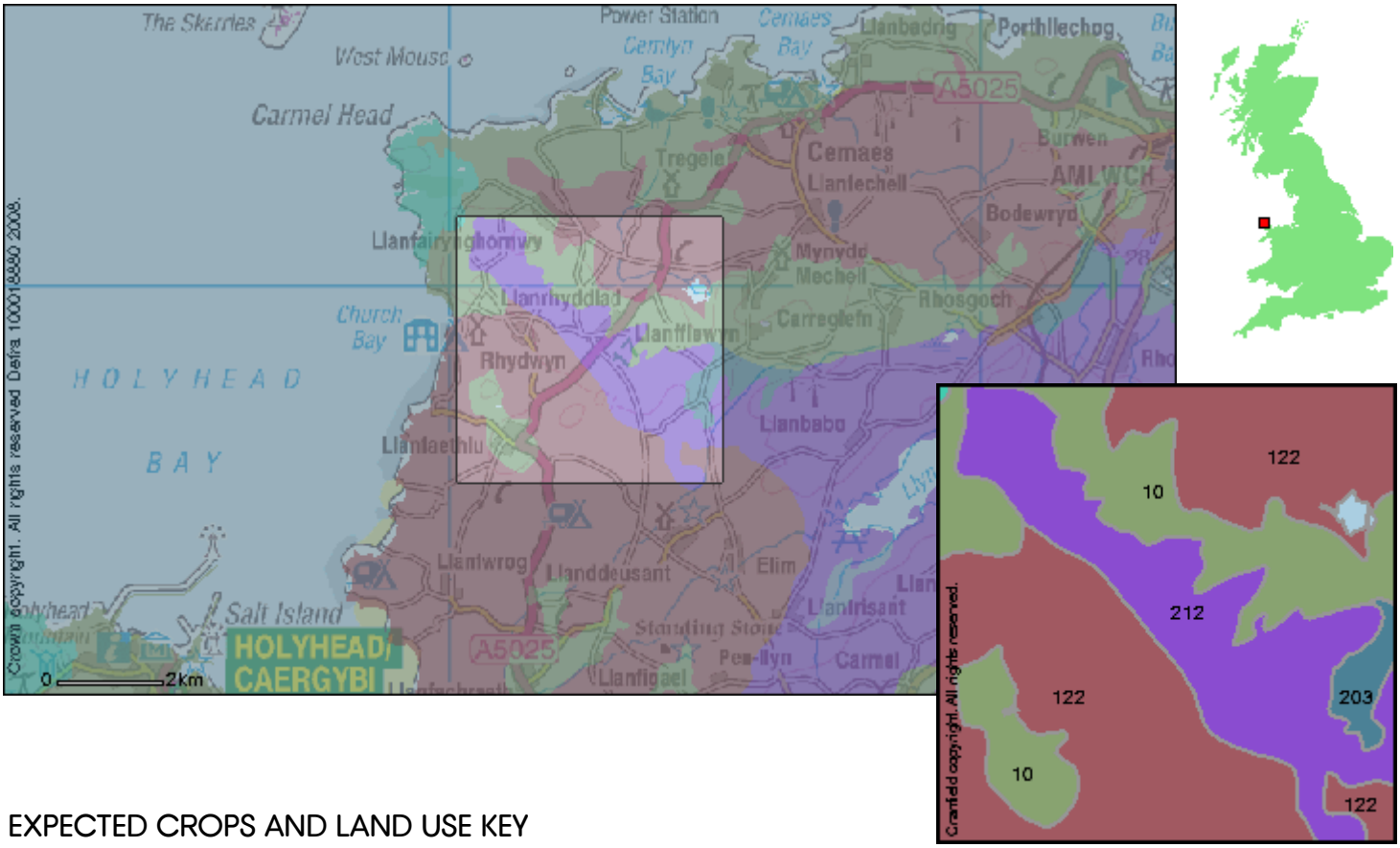
SOIL PARENT MATERIAL KEY

- 124 - *Palaeozoic and Mesozoic sandstone*
- 131 - *Palaeozoic slaty mudstone and siltstone*
- 54 - *Drift from Palaeozoic and Mesozoic sandstone and shale*
- 55 - *Drift from Palaeozoic sandstone and shale*
- 59 - *Drift from Palaeozoic slaty mudstone and siltstone*

SOIL PARENT MATERIAL DESCRIPTION

Along with the effects of climate, relief, organisms and time, the underlying geology or 'parent material' has a very strong influence on the development of the soils of England and Wales. Through weathering, rocks contribute inorganic mineral grains to the soils and thus exhibit control on the soil texture. During the course of the creation of the national soil map, soil surveyors noted the parent material underlying each soil in England and Wales. It is these general descriptions of the regional geology which is provided in this map.

1k. EXPECTED CROPS AND LAND USE



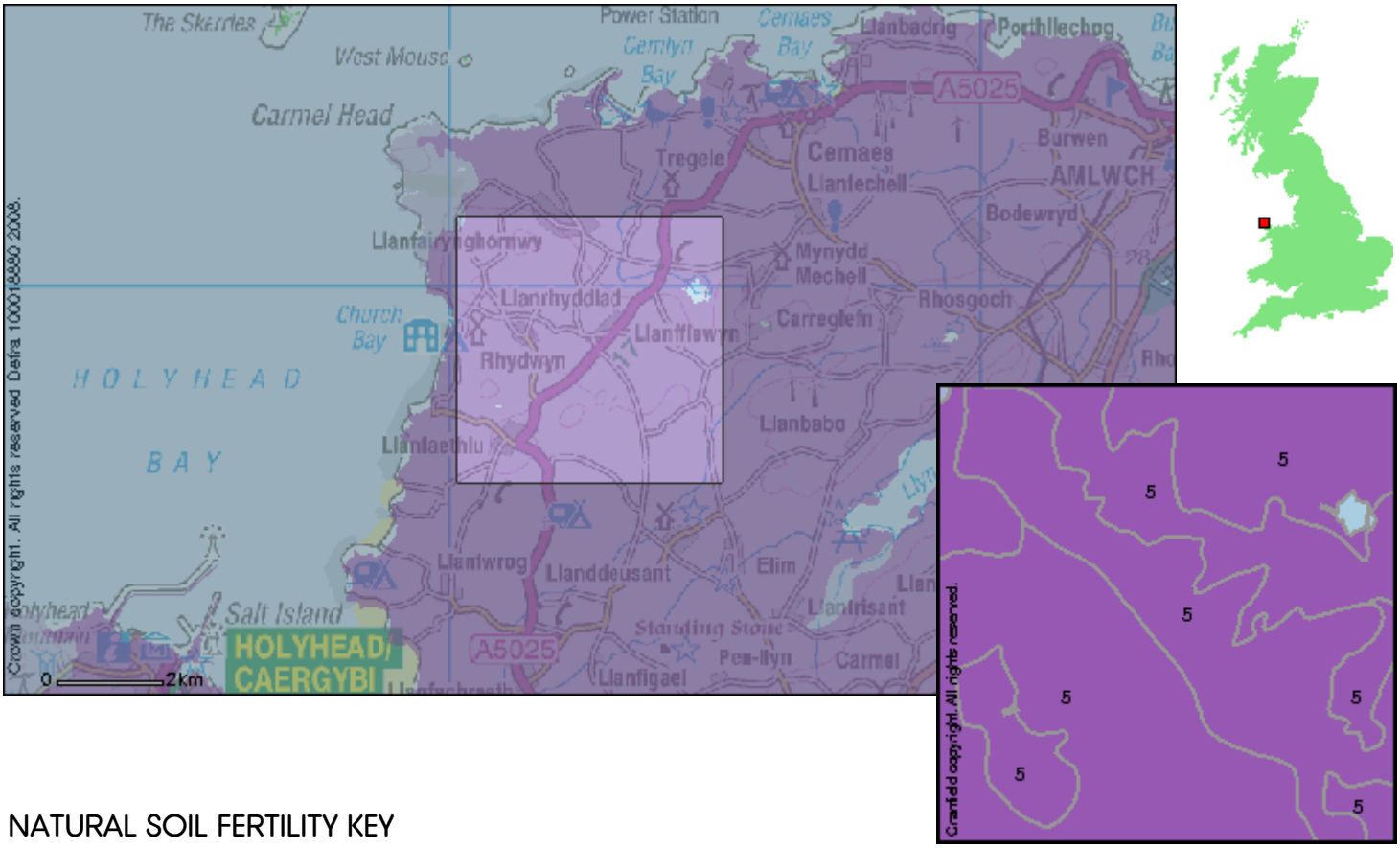
EXPECTED CROPS AND LAND USE KEY

- 10 - *Cereals and grassland in the Northern Region; stock rearing on permanent grassland in Wales.*
- 122 - *Dairying and stock rearing on permanent or short term grassland; some cereals in drier areas.*
- 148 - *Dry moorland habitats of poor grazing value; coniferous woodland; recreation.*
- 203 - *Stock rearing in uplands, dairying and some cereals in moist lowlands; coniferous and deciduous woodland and rough*
- 212 - *Stock rearing on permanent grassland dairying on lower ground.*

EXPECTED CROPS AND LAND USE DESCRIPTION

Individual soils are commonly associated with particular forms of land cover and land use. Whilst the soil surveyors were mapping the whole of England and Wales, they took careful note of the range of use to which the land was being put. This map shows the most common forms of land use found on each soil unit.

11. NATURAL SOIL FERTILITY



NATURAL SOIL FERTILITY KEY

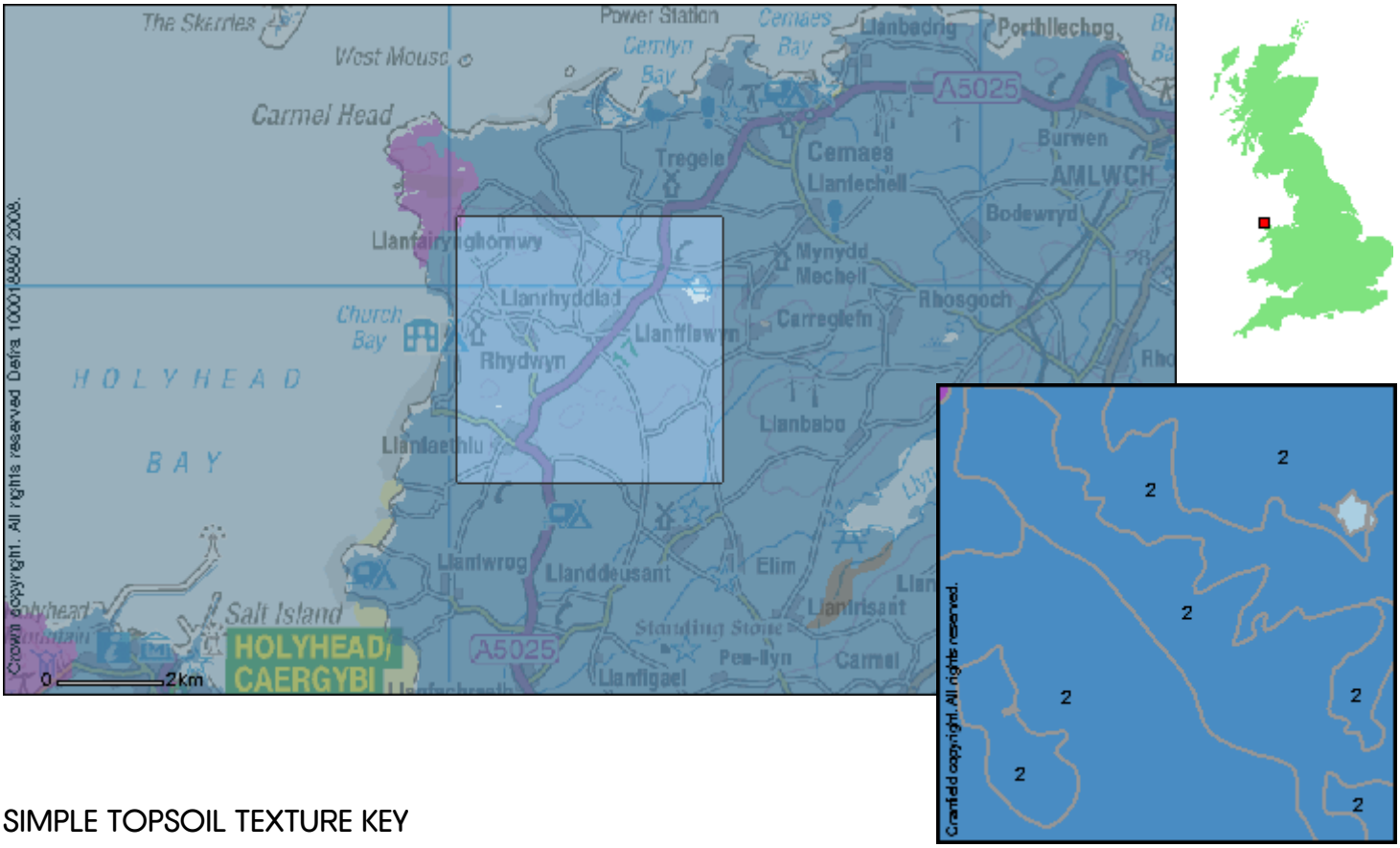
12 - *Very low*

5 - *Low*

NATURAL SOIL FERTILITY DESCRIPTION

Soil fertility can be greatly altered by land management especially through the application of manures, lime and mineral fertilisers. What is shown in this map, however, is the likely natural fertility of each soil type. Soils that are very acid have low numbers of soil-living organisms and support heathland and acid woodland habitats. These are shown as of very low natural fertility. Soils identified as of low natural fertility are usually acid in reaction and are associated with a wide range of habitat types. The moderate class contains neutral to slightly acid soils, again with a wide range of potential habitats. Soil of high natural fertility are both naturally productive and able to support the base-rich pastures and woodlands that are now rarely encountered. Lime-rich soils contain chalk and limestone in excess, and are associated with downland, herb-rich pastures and chalk and limestone woodlands.

1m. SIMPLE TOPSOIL TEXTURE



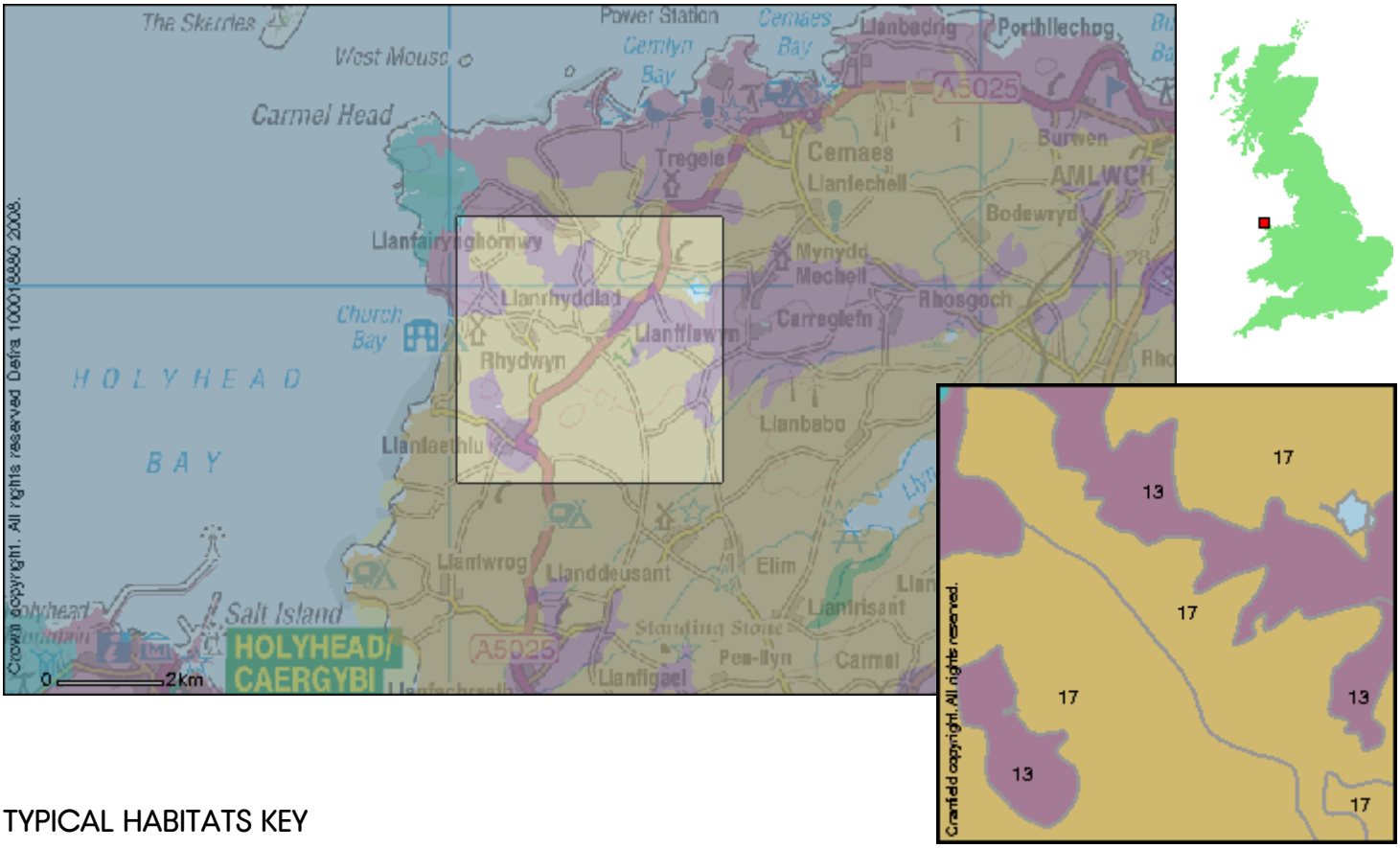
SIMPLE TOPSOIL TEXTURE KEY

- 1 - *Clayey*
- 2 - *Loamy*
- 3 - *Peaty*
- 4 - *Sandy*

SIMPLE TOPSOIL TEXTURE DESCRIPTION

Soil texture is a term used in soil science to describe the physical composition of the soil in terms of the size of mineral particles in the soil. Specifically, we are concerned with the relative proportions of sand, silt and clay. Soil texture can vary between each soil layer or horizon as one moves down the profile. This map indicates the soil texture group of the upper 30 cm of the soil. 'Light' soils have more sand grains and are described as sandy, while 'heavy' soils have few sand grains but a lot of extremely small particles and are described as clayey. Loamy soils have a mix of sand, silt and clay-sized particles and are intermediate in character. Soils with a surface layer that is dominantly organic are described as Peaty. A good understanding of soil texture can enable better land management.

1n. TYPICAL HABITATS



TYPICAL HABITATS KEY

12 - *Mostly lowland dry heath communities*

13 - *Neutral and acid pastures and deciduous woodlands; acid communities such as bracken and gorse in the uplands*

17 - *Seasonally wet pastures and woodlands*

TYPICAL HABITATS DESCRIPTION

There is a close relationship between vegetation and the underlying soil. Information about the types of broad habitat associated with each soil type is provided in this map. Soil fertility, pH, drainage and texture are important factors in determining the types of habitats which can be established. Elevation above sea level and sometimes even the aspect - the orientation of a hillslope - can affect the species present. This map does not take into account the recent land management or any urban development, but provides the likely natural habitats assuming good management has been carried out.

2. SOIL ASSOCIATION DESCRIPTIONS

The following pages describe the following soil map units, (soil associations), in more detail.

DENBIGH 1 541j
Well drained fine loamy and fine silty soils over rock.

EAST KESWICK 1 541x
Deep well drained fine loamy soils and similar soils with slowly permeable subsoils and slight seasonal waterlogging.

ANGLEZARKE 631a
Well drained very acid coarse loamy soils over sandstone with a bleached subsurface horizon.

CEGIN 713d
Slowly permeable seasonally waterlogged fine silty and clayey soils.

BRICKFIELD 2 713f
Slowly permeable seasonally waterlogged fine loamy soils.

The soil associations are described in terms of their texture and drainage properties and potential risks may be identified. The distribution of the soils across England and Wales are provided. Further to this, properties of each association's component soil series are described in relation to each other. Lastly, schematic diagrams of each component series are provided for greater understanding and in-field verification purposes.

DENBIGH 1 (541j)

Well drained fine loamy and fine silty soils over rock.

a. General Description

Well drained fine loamy and fine silty soils over rock. Some similar soils with slowly permeable subsoils and slight seasonal waterlogging. Shallow soils and some bare rock locally. some bare rock locally.
The major landuse on this association is defined as stock rearing in uplands, dairying and some cereals in moist lowlands; coniferous and deciduous woodland and rough grazing on steep slopes.

b. Distribution (England & Wales)

The DENBIGH 1 association covers 4630km² of England and Wales which accounts for 3.06% of the landmass. The distribution of this association is shown in Figure 1. Note that the yellow shading represents a buffer to highlight the location of very small areas of the association.

c. Comprising Soil Series

Multiple soil series comprise a soil association. The soil series of the DENBIGH 1 association are outlined in Table 1 below. In some cases other minor soil series are present at a particular site, and these have been grouped together under the heading 'OTHER'. We have endevoured to present the likelihood of a minor, unnamed soil series occuring in your site in Table 1.

Schematic diagrams of the vertical soil profile of the major constituent soil series are provided in Section D to allow easier identification of the particular soil series at your site.

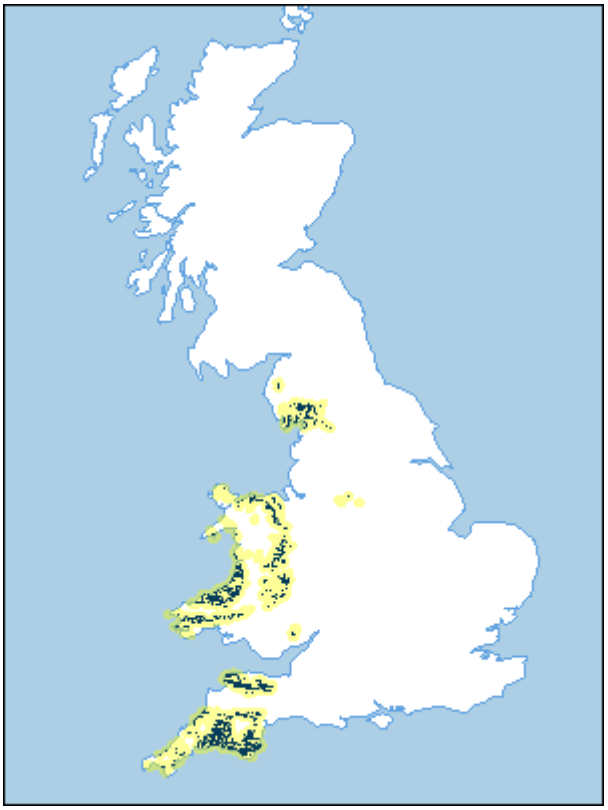


Figure 1. Association Distribution

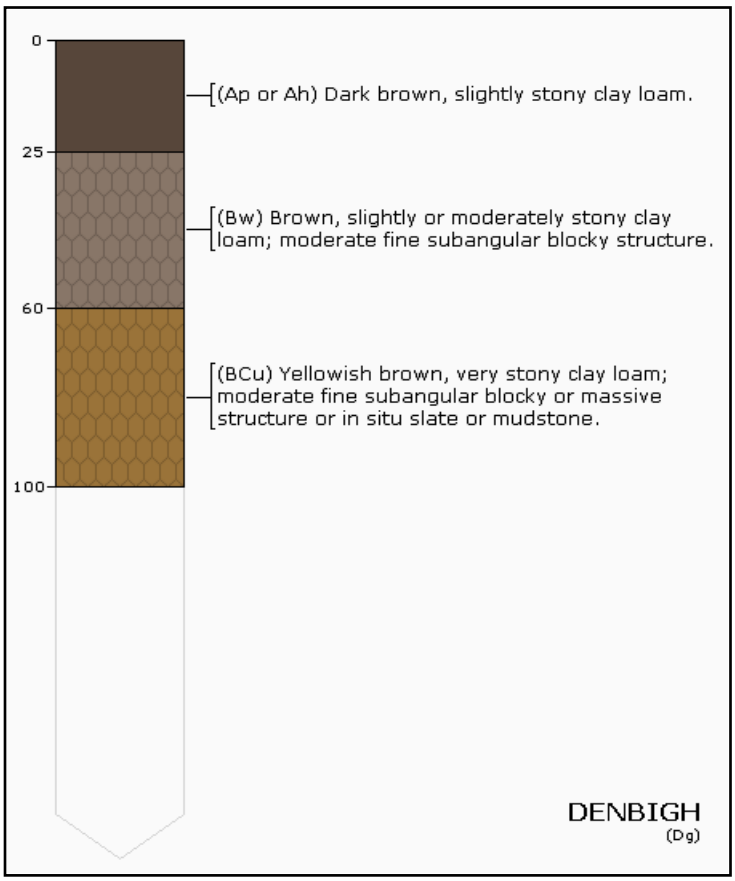
Soil Series	Description	Area %
DENBIGH (Dg)	medium loamy material over lithoskeletal mudstone and sandstone or slate	40%
BARTON (BT)	medium silty material over lithoskeletal siltstone	10%
POWYS (Ph)	loamy lithoskeletal mudstone and sandstone or slate	10%
SANNAN (Sn)	medium silty drift with siliceous stones	10%
MANOD (Mj)	medium loamy material over lithoskeletal mudstone and sandstone or slate	5%
OTHER	other minor soils	25%

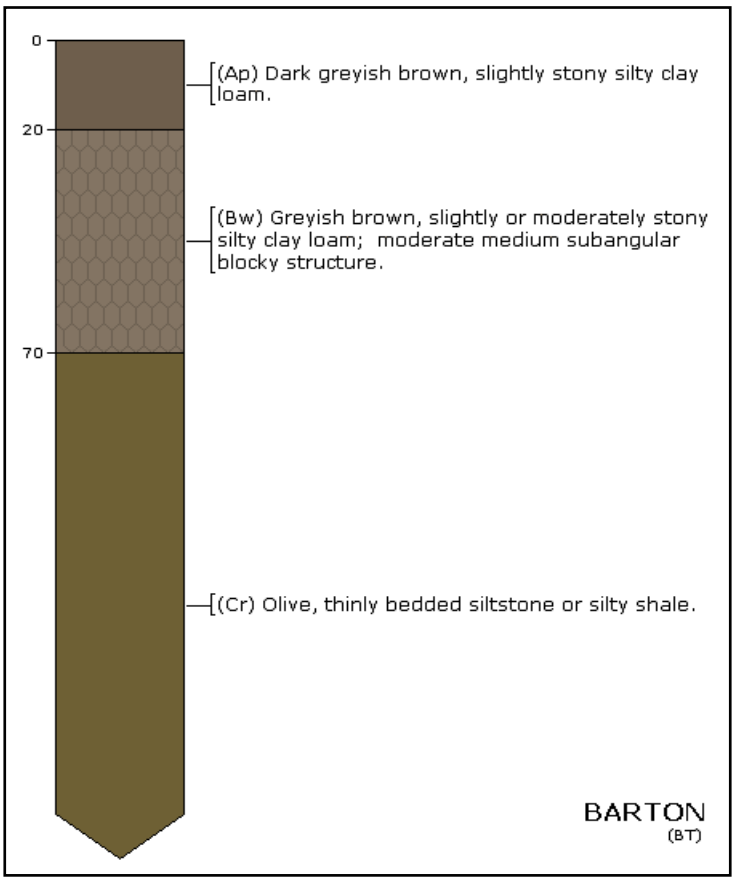
Table 1. The component soil series of the DENBIGH 1 soil association. Because absolute proportions of the comprising series in this association vary from location to location, the national proportions are provided.

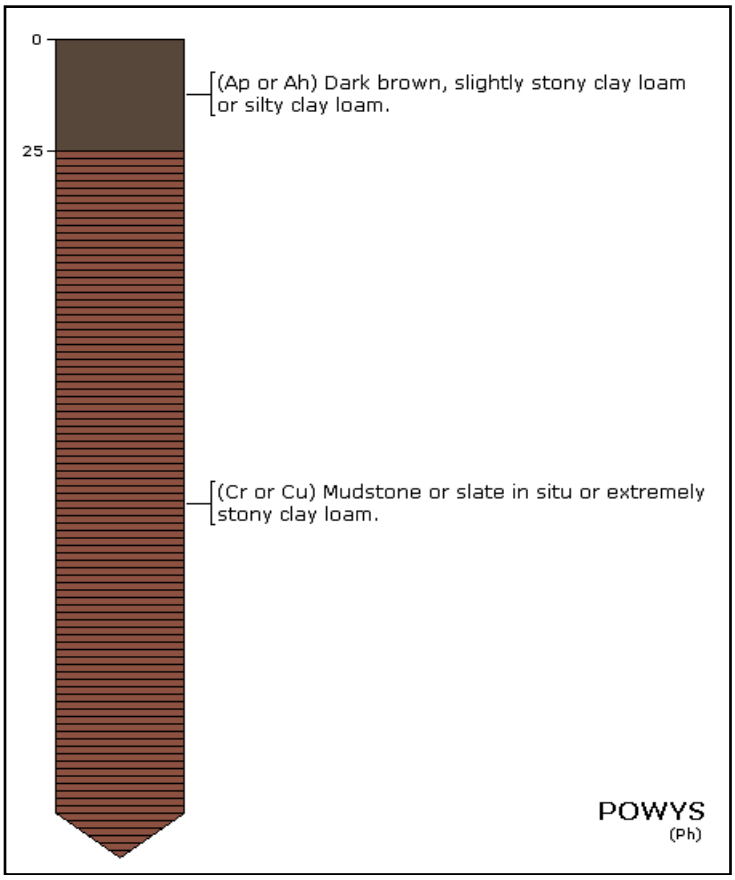
DENBIGH 1 (541j)

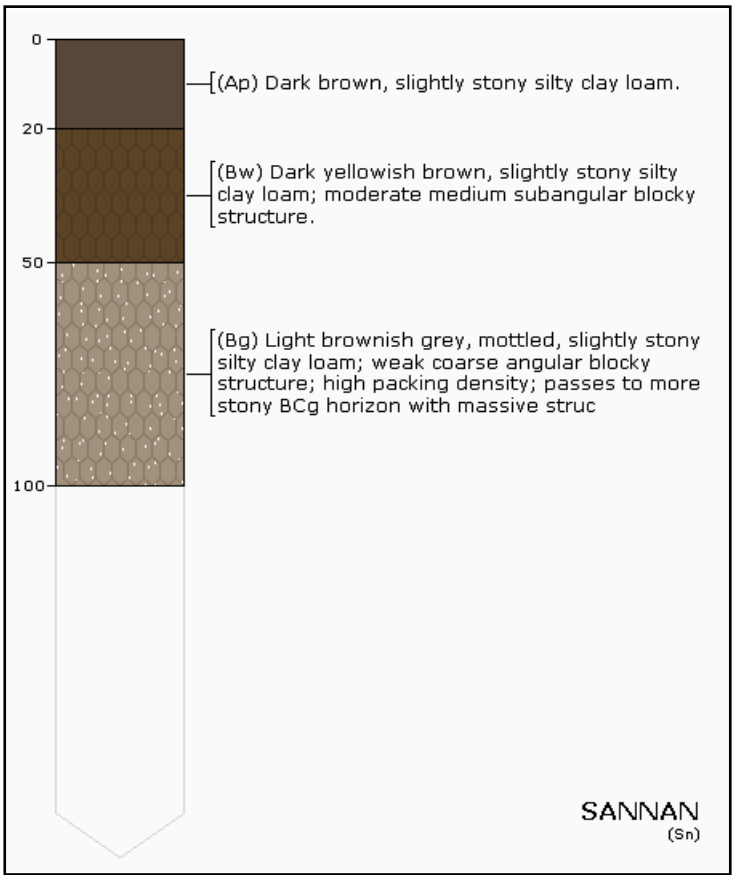
Well drained fine loamy and fine silty soils over rock.

d. DENBIGH 1 Component Series Profiles





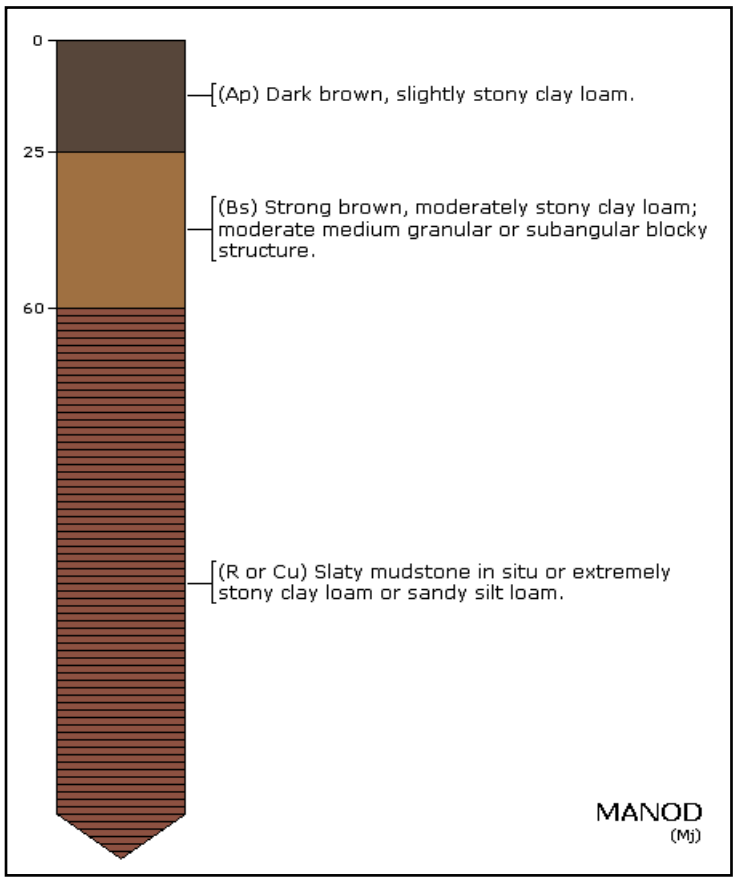




DENBIGH 1 (541j)

Well drained fine loamy and fine silty soils over rock.

d. DENBIGH 1 Component Series Profiles continued



DENBIGH 1 (541j)

Well drained fine loamy and fine silty soils over rock.

e. Soil Properties

This section provides graphical summaries of selected attribute data available for the component series in this association. The blue bars of the graphs presented in this section describe the range of property values for all soils across England and Wales. Superimposed on these graphs are the values for the component soil series in this association. This has been done to provide the reader with an understanding of where each property for each series sits within the national context.

Soil Series	Description	Area %
DENBIGH (Dg)	medium loamy material over lithoskeletal mudstone and sandstone or slate	40%
BARTON (BT)	medium silty material over lithoskeletal siltstone	10%
POWYS (Ph)	loamy lithoskeletal mudstone and sandstone or slate	10%
SANNAN (Sn)	medium silty drift with siliceous stones	10%
MANOD (Mj)	medium loamy material over lithoskeletal mudstone and sandstone or slate	5%
OTHER	other minor soils	25%

Table 1. The component soil series of the DENBIGH 1 soil association. Because absolute proportions of the comprising series in this association vary from location to location, the national proportions are provided.

e(i). Soil Depth Information and Depths to Important Layers

Depth to rock A mean depth to bedrock or very stony rubble which has been assigned to each soil series based on observed and recorded soil profiles.

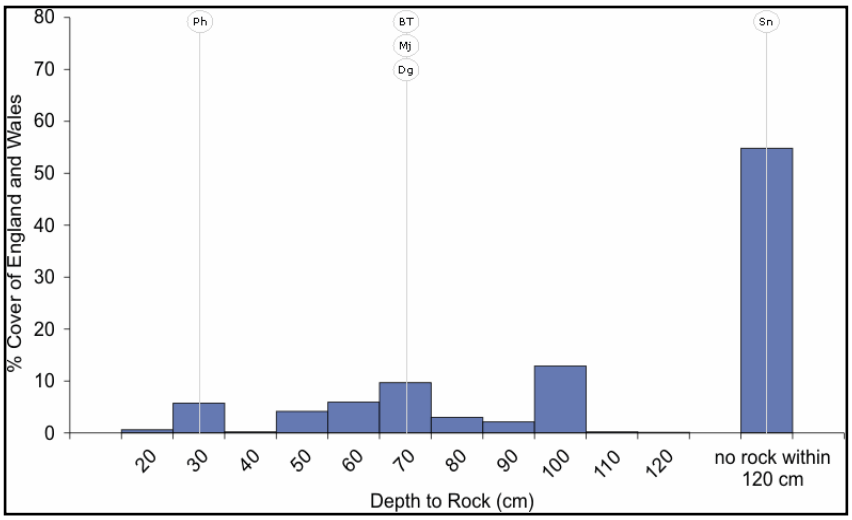


Figure 2. Depth of soil to Rock

Depth to gleying, the presence of grey and ochreous mottles within the soil, is caused by intermittent waterlogging. A mean depth to gleying has been assigned to each soil series based on observed and recorded soil profiles. The definition of a gleyed layer is designed to equate with saturation for at least 30 days in each year or the presence of artificial drainage.

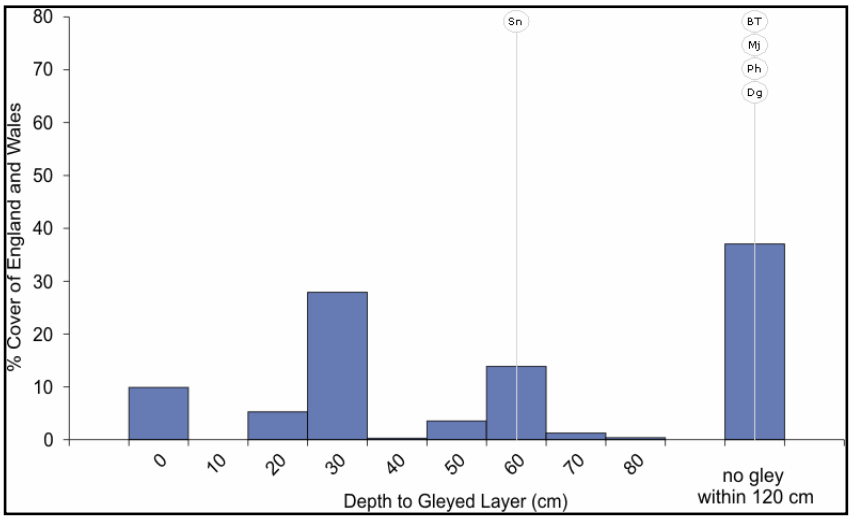


Figure 3. Depth of Soil to Gleying

DENBIGH 1 (541j)

Well drained fine loamy and fine silty soils over rock.

e(i). Soil Depth Information and Depths to Important Layers continued

Depth to slowly permeable layer (downward percolation) A mean depth to a layer with lateral hydraulic conductivity of <10 cm per day has been assigned to each soil series based on observed and recorded soil profiles. Such layers can be defined in terms of their particular soil textural and structural conditions and impede downward percolation of excess soil water. This causes periodic saturation in the overlying soil, reduced storage capacity and therefore increased hydrological response to rainfall events.

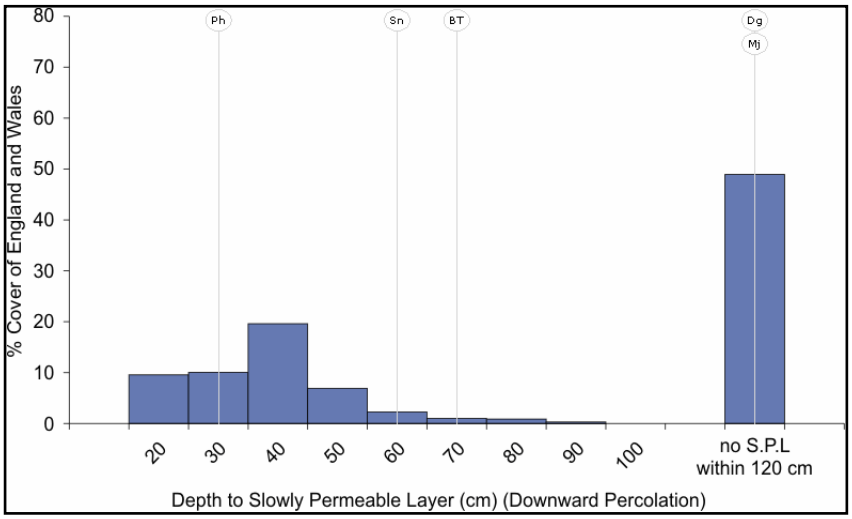


Figure 4. Depth to slowly permeable layer (downward percolation)

Depth to Slowly Permeable Layer (upward diffusion) A mean depth to the bottom of a layer with lateral hydraulic conductivity of <10 cm per day has been assigned to each soil series based on observed and recorded soil profiles. Such layers can be defined in terms of their particular soil textural and structural conditions and impede upward diffusion of water and gasses.

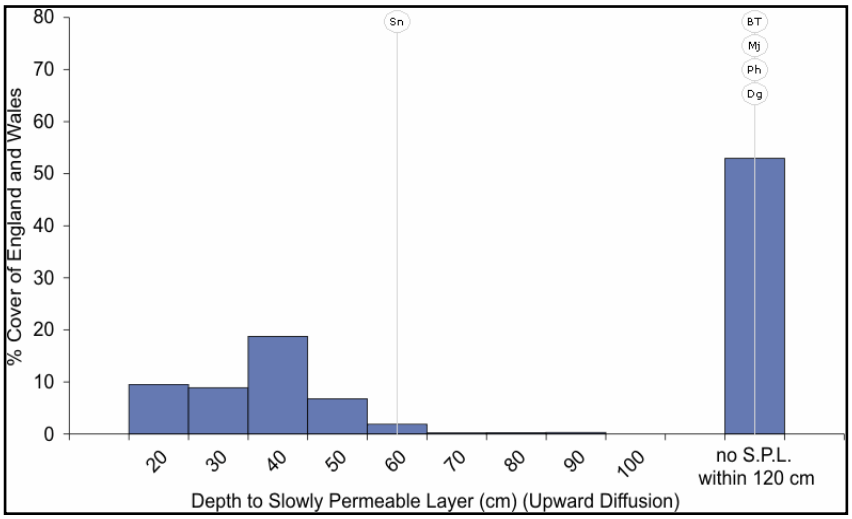


Figure 5. Depth to Slowly Permeable Layer (upward diffusion)

DENBIGH 1 (541j)

Well drained fine loamy and fine silty soils over rock.

e(ii). Soil Hydrological Information

Integrated air capacity (IAC) is the total coarse pore space (>60 μm diameter) to 1 m depth. This size of pore would normally be air-filled when the soil is fully moist but not waterlogged. A large IAC means that the soil is well aerated. This will encourage root development and, provided near surface soil structure is well developed, will allow rainfall to percolate into the ground thus mitigating against localised flooding.

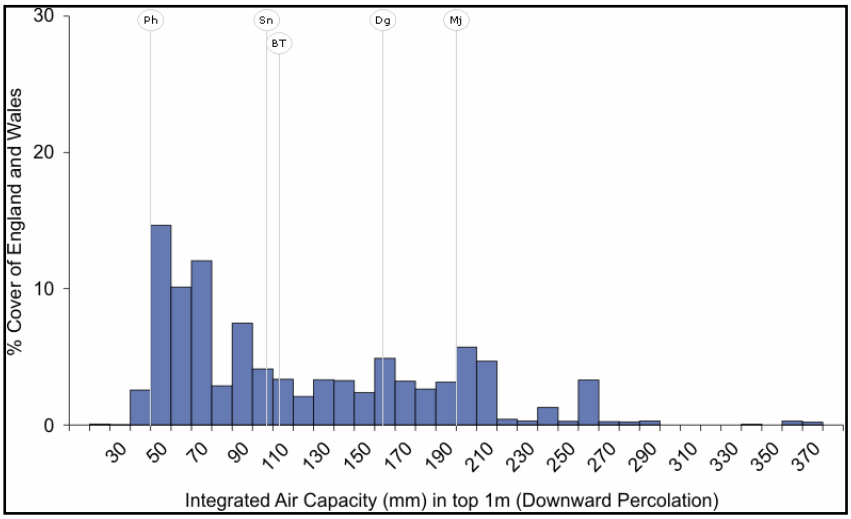


Figure 6. Integrated Air Capacity

Standard Percentage Runoff (SPR) is the percentage of rainfall that causes the short-term increase in flow seen at a catchment outlet following a storm event. The values associated with individual soil series have been calculated from an analysis of the relationships between flow data and the soils present within the catchment for several hundred gauged catchments.

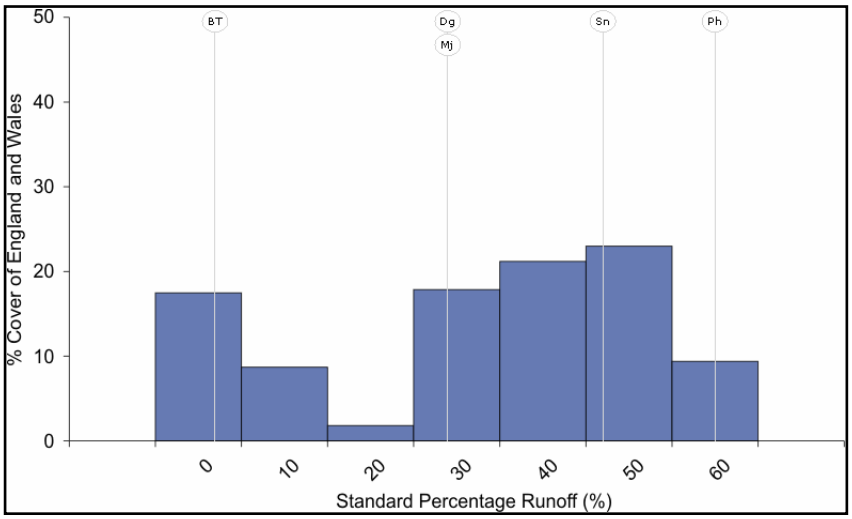


Figure 7. Standard Percentage Runoff

Base flow index is calculated from daily river flow data and expresses the volume of base flow of a river as a fraction of the total flow volume. The values associated with individual soil series have been calculated from an analysis of the relationships between flow data and the soils present within the catchment for several hundred gauged catchments.

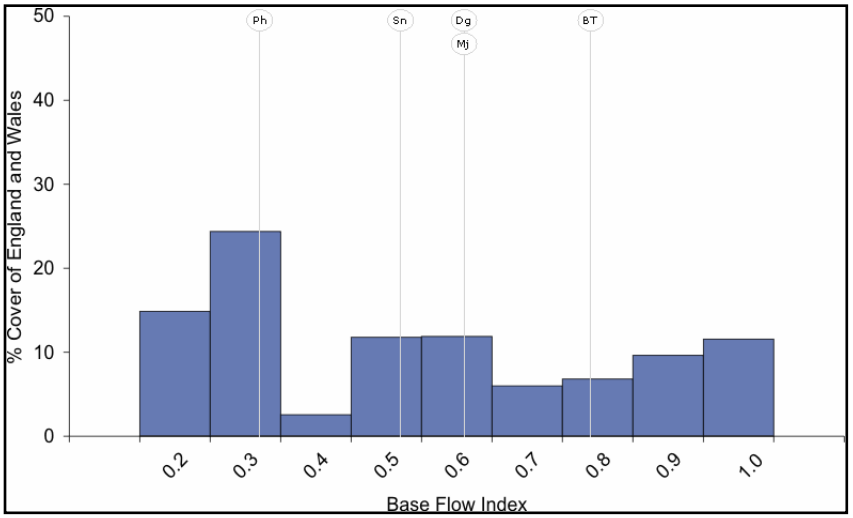


Figure 8. Base Flow Index

DENBIGH 1 (541j)

Well drained fine loamy and fine silty soils over rock.

e(iii). Available Water Content

Available water content for plants varies depending on a number of factors, including the rooting depth of the plants. Described below are differing available water contents for cereals, sugar beet, grass and potato crops, as well as a generic available water value to 1 m depth.

Available water (by crop) Available water content to 1 m for the specified soil series between suctions of 5 and 1500kPa.

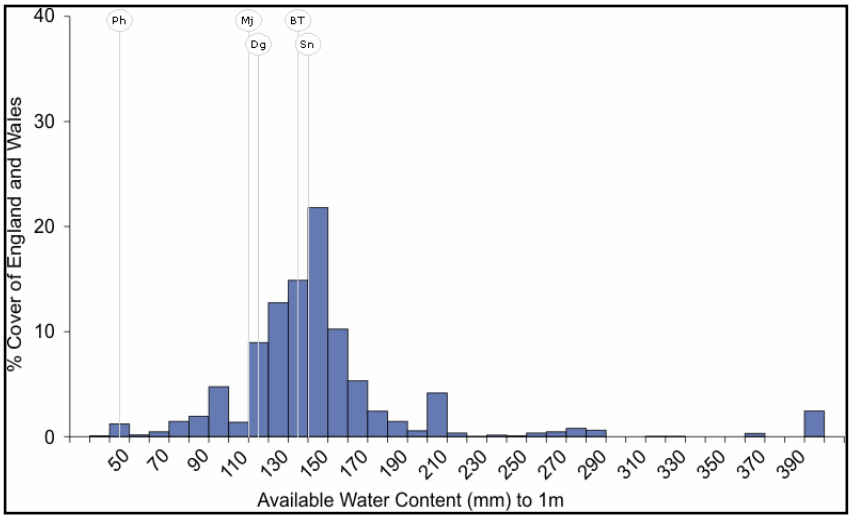


Figure 9. Available Water (by crop)

Available water for grass represents the water that is available to a permanent grass sward that is able to root to 100cm depth.

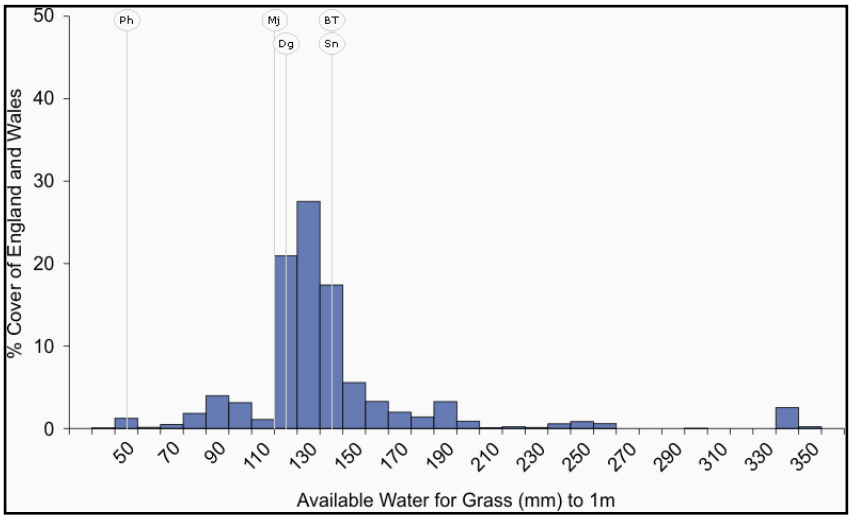


Figure 10. Available Water for Grass

DENBIGH 1 (541j)

Well drained fine loamy and fine silty soils over rock.

e(iii). Available Water Content continued

Available water for cereal represents the water that is available to a cereal crop that is able to root to 120cm depth.

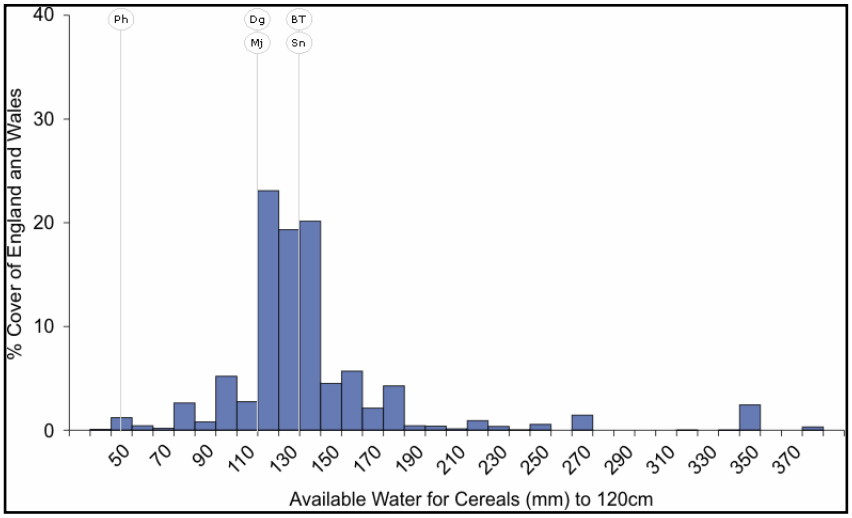


Figure 11. Available Water for Cereal

Available water for Sugar Beet represents the water that is available to a sugar beet crop that is able to root to 140cm depth.

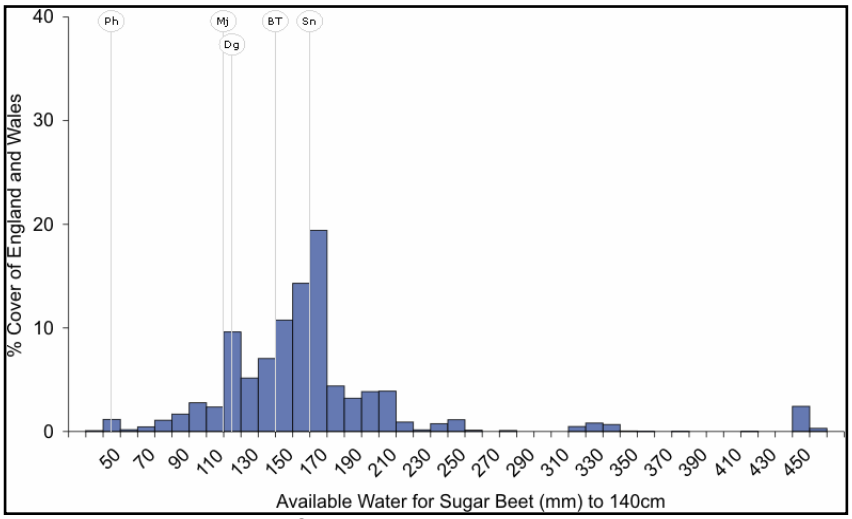


Figure 12. Available Water for Sugar Beet

Available water for Potatoes represents the water that is available to a potato crop that is able to root to 70cm depth.

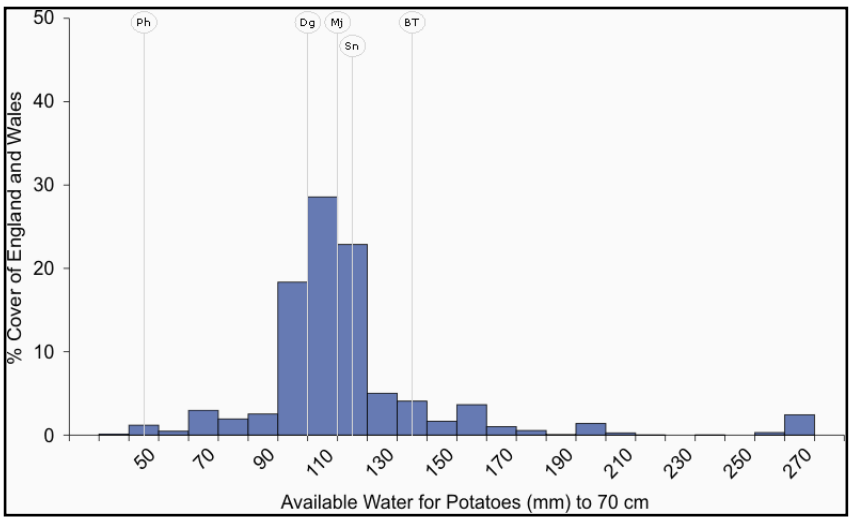


Figure 13. Available Water for Potatoes

EAST KESWICK 1 (541x)

Deep well drained fine loamy soils and similar soils with slowly permeable subsoils and slight seasonal waterlogging.

a. General Description

Deep well drained fine loamy soils and similar soils with slowly permeable subsoils and slight seasonal waterlogging. Some coarse loamy soils affected by groundwater.
The major landuse on this association is defined as cereals and grassland in the northern region; stock rearing on permanent grassland in wales.

b. Distribution (England & Wales)

The EAST KESWICK 1 association covers 804km² of England and Wales which accounts for 0.53% of the landmass. The distribution of this association is shown in Figure 14. Note that the yellow shading represents a buffer to highlight the location of very small areas of the association.

c. Comprising Soil Series

Multiple soil series comprise a soil association. The soil series of the EAST KESWICK 1 association are outlined in Table 2 below. In some cases other minor soil series are present at a particular site, and these have been grouped together under the heading 'OTHER'. We have endevoured to present the likelihood of a minor, unnamed soil series occuring in your site in Table 2.

Schematic diagrams of the vertical soil profile of the major constituent soil series are provided in Section D to allow easier identification of the particular soil series at your site.

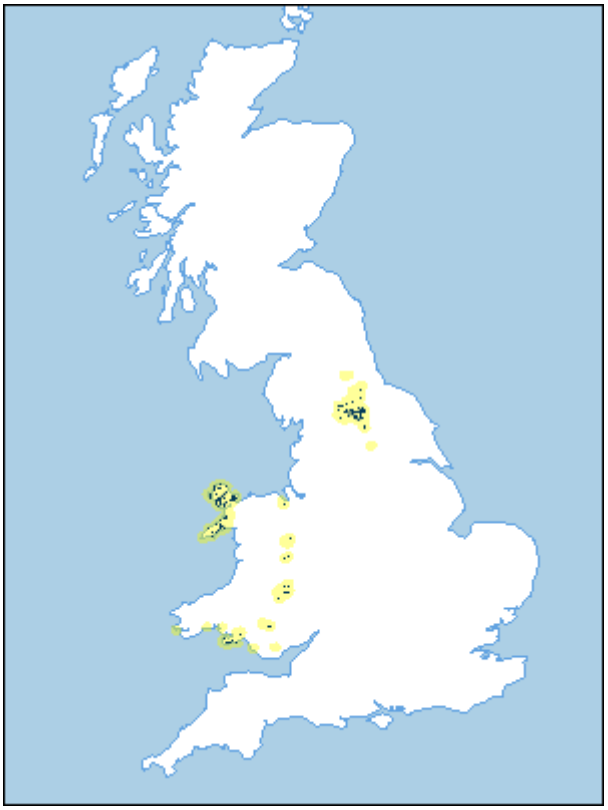


Figure 14. Association Distribution

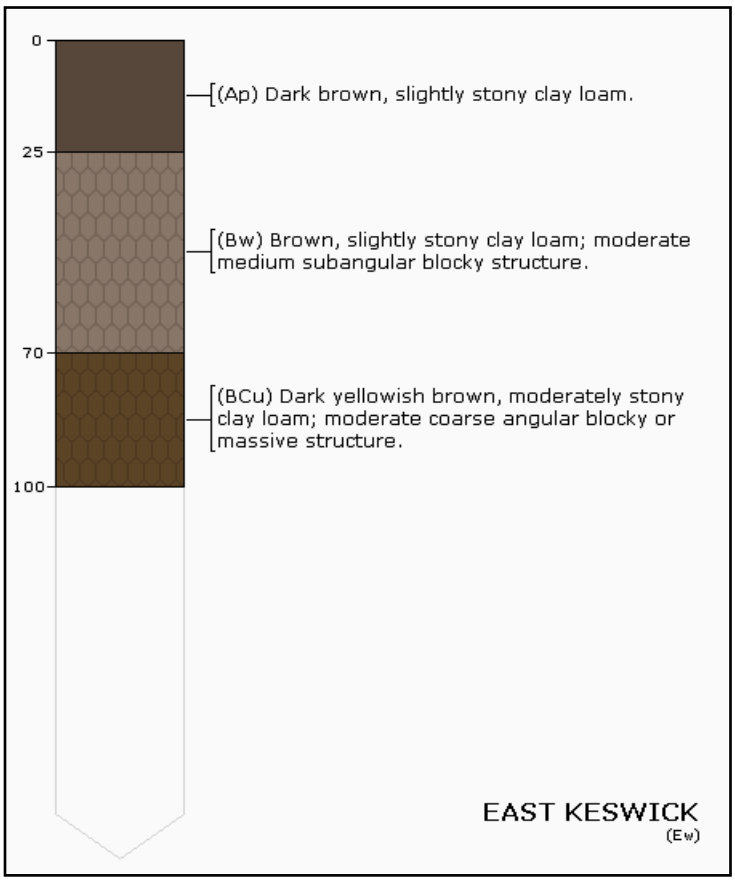
Soil Series	Description	Area %
EAST KESWICK (Ew)	medium loamy drift with siliceous stones	45%
NERCWYS (Nc)	medium loamy drift with siliceous stones	30%
ARROW (aO)	light loamy drift with siliceous stones	10%
OTHER	other minor soils	15%

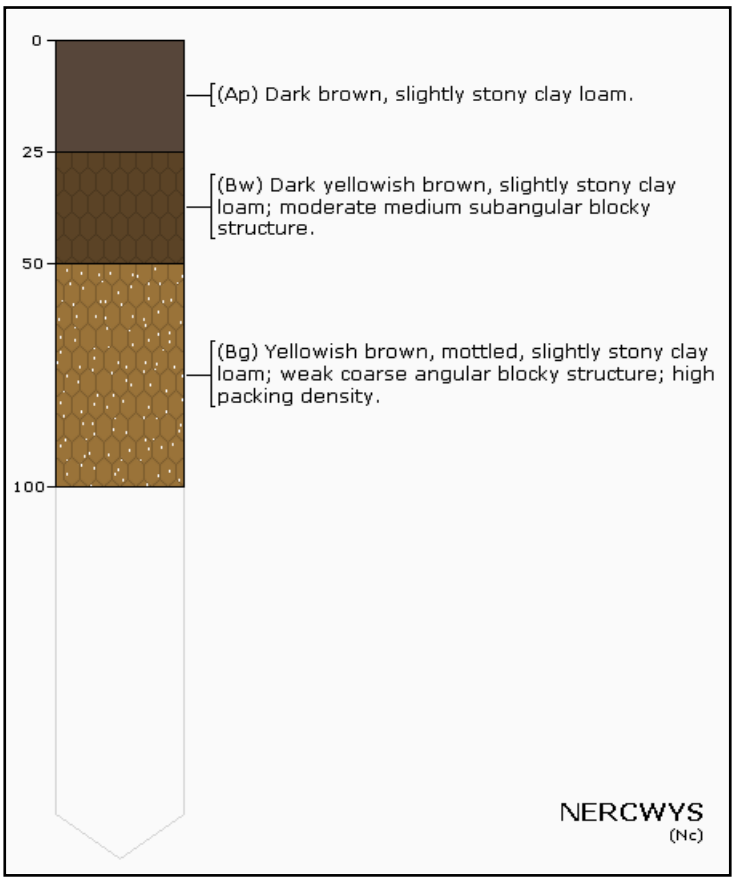
Table 2. The component soil series of the EAST KESWICK 1 soil association. Because absolute proportions of the comprising series in this association vary from location to location, the national proportions are provided.

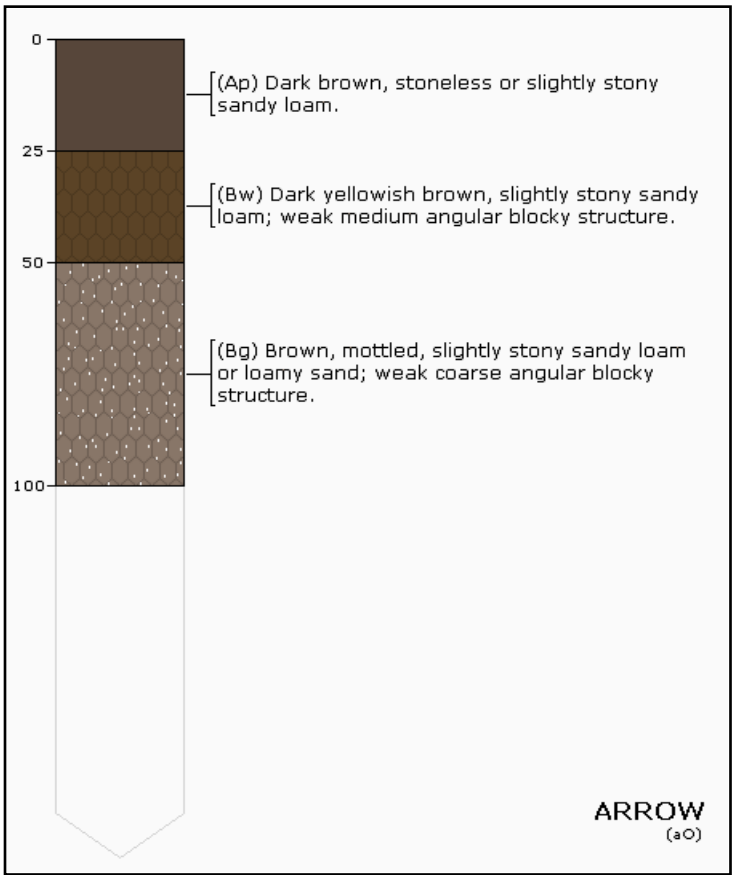
EAST KESWICK 1 (541x)

Deep well drained fine loamy soils and similar soils with slowly permeable subsoils and slight seasonal waterlogging.

d. EAST KESWICK 1 Component Series Profiles







EAST KESWICK 1 (541x)

Deep well drained fine loamy soils and similar soils with slowly permeable subsoils and slight seasonal waterlogging.

e. Soil Properties

This section provides graphical summaries of selected attribute data available for the component series in this association. The blue bars of the graphs presented in this section describe the range of property values for all soils across England and Wales. Superimposed on these graphs are the values for the component soil series in this association. This has been done to provide the reader with an understanding of where each property for each series sits within the national context.

Soil Series	Description	Area %
EAST KESWICK (Ew)	medium loamy drift with siliceous stones	45%
NERCWYS (Nc)	medium loamy drift with siliceous stones	30%
ARROW (aO)	light loamy drift with siliceous stones	10%
OTHER	other minor soils	15%

Table 2. The component soil series of the EAST KESWICK 1 soil association. Because absolute proportions of the comprising series in this association vary from location to location, the national proportions are provided.

e(i). Soil Depth Information and Depths to Important Layers

Depth to rock A mean depth to bedrock or very stony rubble which has been assigned to each soil series based on observed and recorded soil profiles.

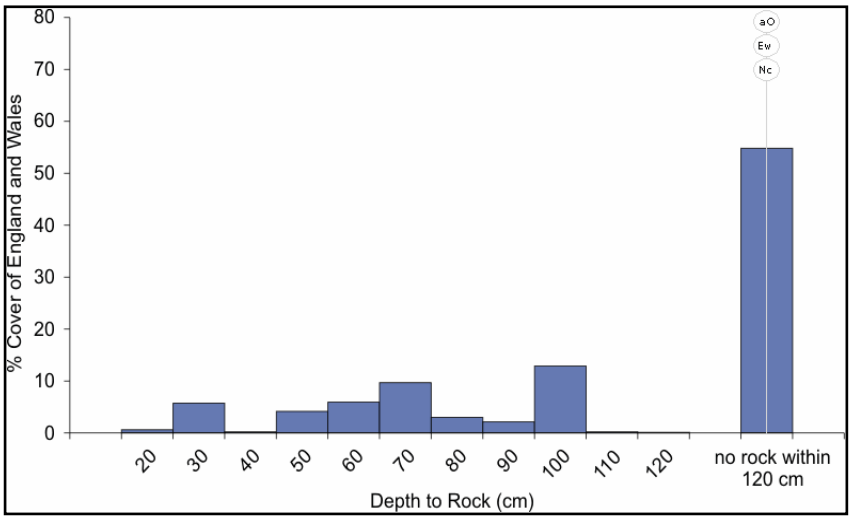


Figure 15. Depth of soil to Rock

Depth to gleying, the presence of grey and ochreous mottles within the soil, is caused by intermittent waterlogging. A mean depth to gleying has been assigned to each soil series based on observed and recorded soil profiles. The definition of a gleyed layer is designed to equate with saturation for at least 30 days in each year or the presence of artificial drainage.

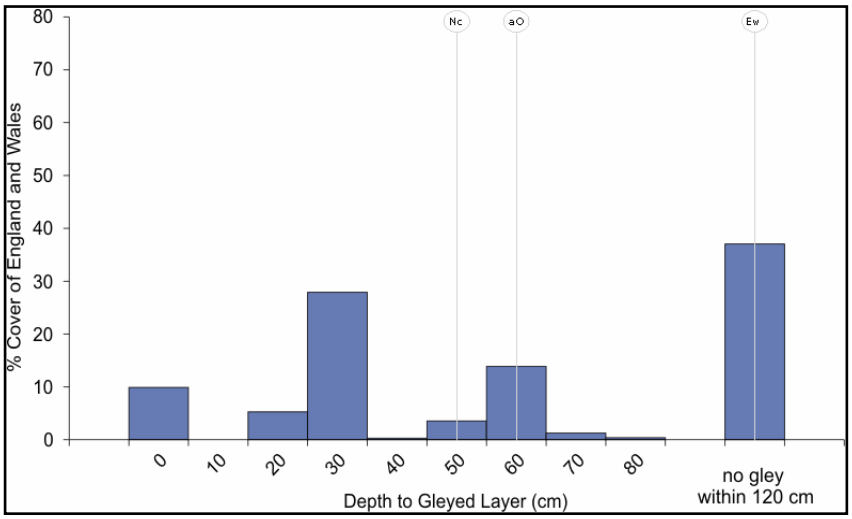


Figure 16. Depth of Soil to Gleying

EAST KESWICK 1 (541x)

Deep well drained fine loamy soils and similar soils with slowly permeable subsoils and slight seasonal waterlogging.

e(i). Soil Depth Information and Depths to Important Layers continued

Depth to slowly permeable layer (downward percolation) A mean depth to a layer with lateral hydraulic conductivity of <10 cm per day has been assigned to each soil series based on observed and recorded soil profiles. Such layers can be defined in terms of their particular soil textural and structural conditions and impede downward percolation of excess soil water. This causes periodic saturation in the overlying soil, reduced storage capacity and therefore increased hydrological response to rainfall events.

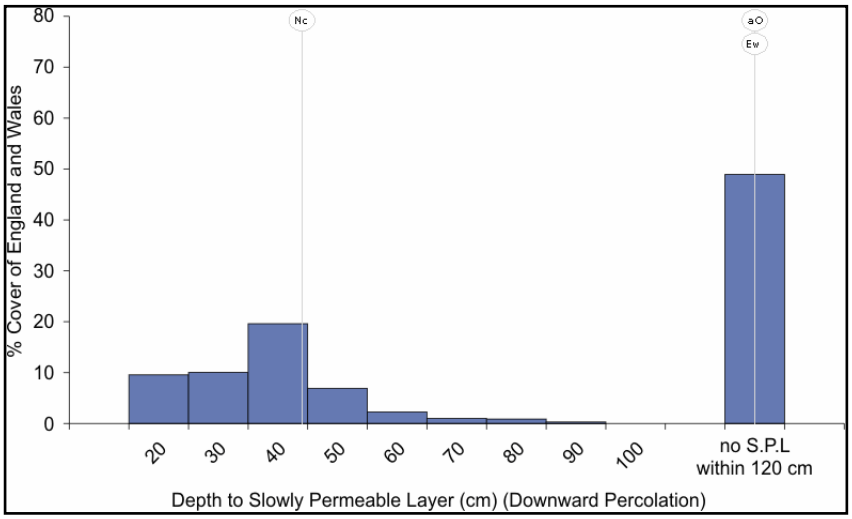


Figure 17. Depth to slowly permeable layer (downward percolation)

Depth to Slowly Permeable Layer (upward diffusion) A mean depth to the bottom of a layer with lateral hydraulic conductivity of <10 cm per day has been assigned to each soil series based on observed and recorded soil profiles. Such layers can be defined in terms of their particular soil textural and structural conditions and impede upward diffusion of water and gasses.

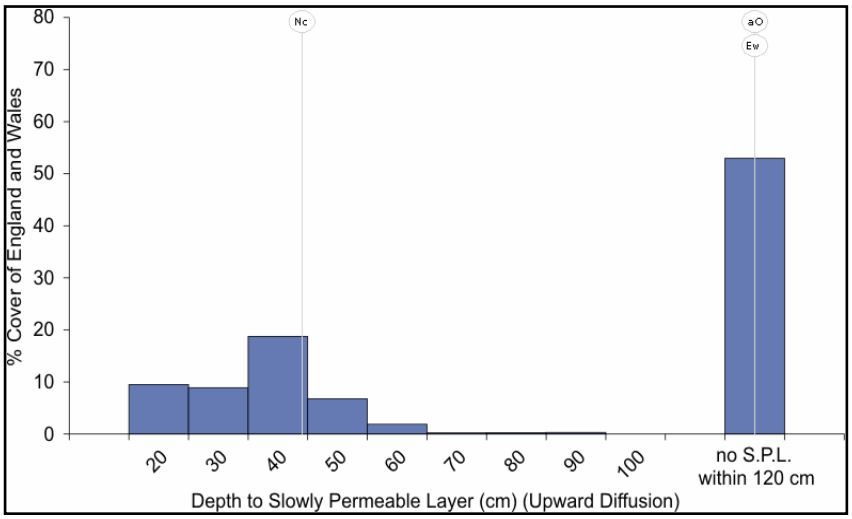


Figure 18. Depth to Slowly Permeable Layer (upward diffusion)

EAST KESWICK 1 (541x)

Deep well drained fine loamy soils and similar soils with slowly permeable subsoils and slight seasonal waterlogging.

e(ii). Soil Hydrological Information

Integrated air capacity (IAC) is the total coarse pore space (>60 μm diameter) to 1 m depth. This size of pore would normally be air-filled when the soil is fully moist but not waterlogged. A large IAC means that the soil is well aerated. This will encourage root development and, provided near surface soil structure is well developed, will allow rainfall to percolate into the ground thus mitigating against localised flooding.

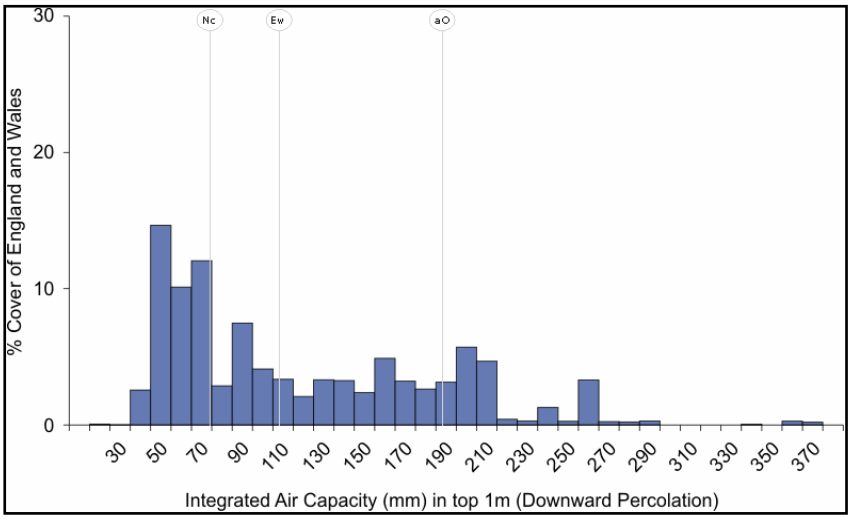


Figure 19. Integrated Air Capacity

Standard Percentage Runoff (SPR) is the percentage of rainfall that causes the short-term increase in flow seen at a catchment outlet following a storm event. The values associated with individual soil series have been calculated from an analysis of the relationships between flow data and the soils present within the catchment for several hundred gauged catchments.

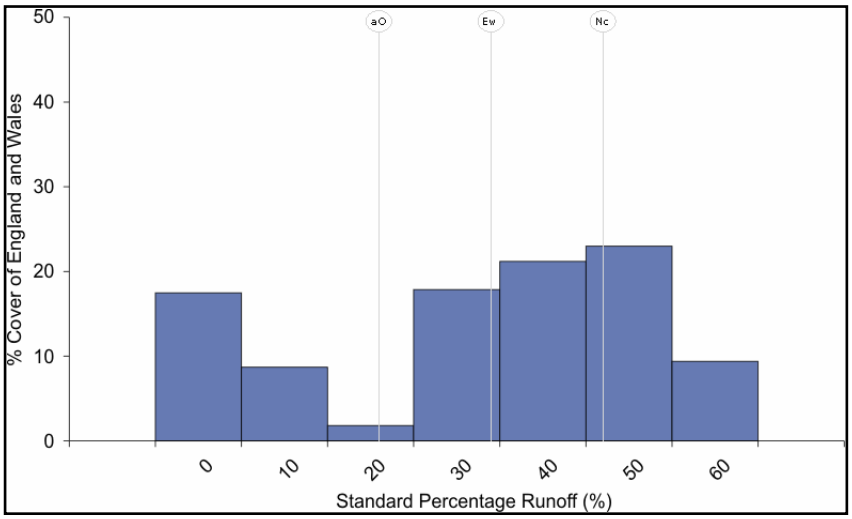


Figure 20. Standard Percentage Runoff

Base flow index is calculated from daily river flow data and expresses the volume of base flow of a river as a fraction of the total flow volume. The values associated with individual soil series have been calculated from an analysis of the relationships between flow data and the soils present within the catchment for several hundred gauged catchments.

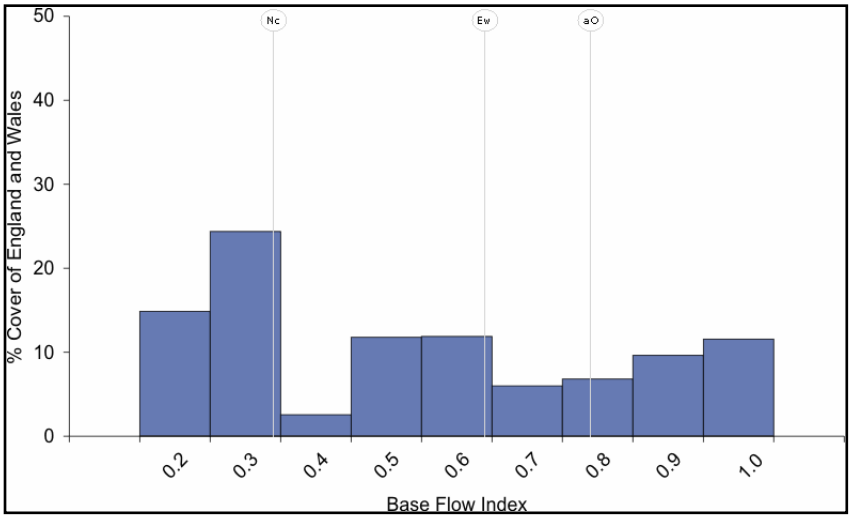


Figure 21. Base Flow Index

EAST KESWICK 1 (541x)

Deep well drained fine loamy soils and similar soils with slowly permeable subsoils and slight seasonal waterlogging.

e(iii). Available Water Content

Available water content for plants varies depending on a number of factors, including the rooting depth of the plants. Described below are differing available water contents for cereals, sugar beet, grass and potato crops, as well as a generic available water value to 1 m depth.

Available water (by crop) Available water content to 1 m for the specified soil series between suctions of 5 and 1500kPa.

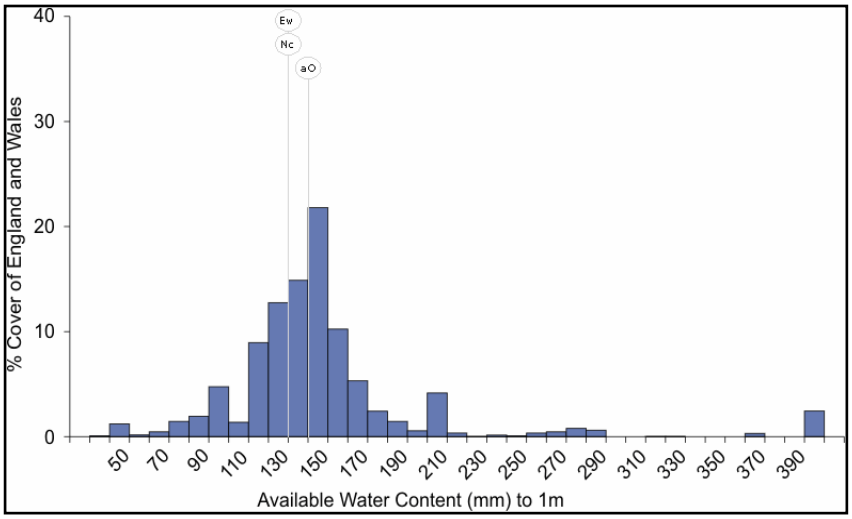


Figure 22. Available Water (by crop)

Available water for grass represents the water that is available to a permanent grass sward that is able to root to 100cm depth.

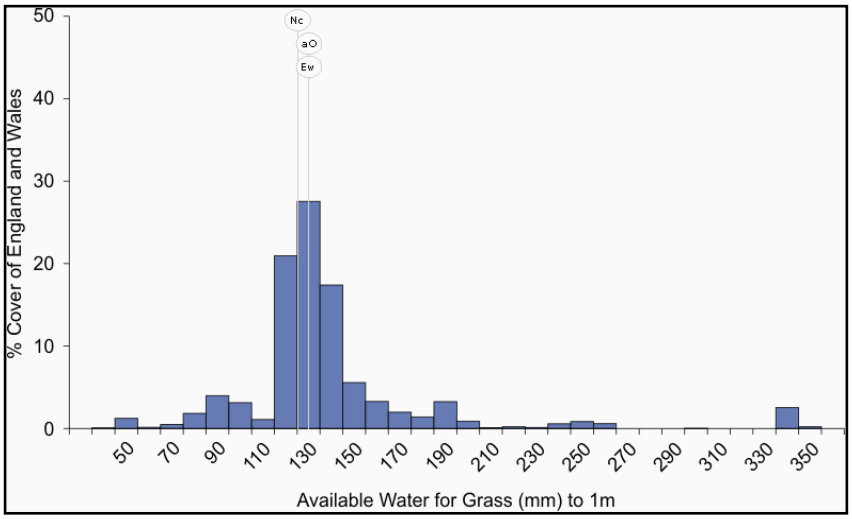


Figure 23. Available Water for Grass

EAST KESWICK 1 (541x)

Deep well drained fine loamy soils and similar soils with slowly permeable subsoils and slight seasonal waterlogging.

e(iii). Available Water Content continued

Available water for cereal represents the water that is available to a cereal crop that is able to root to 120cm depth.

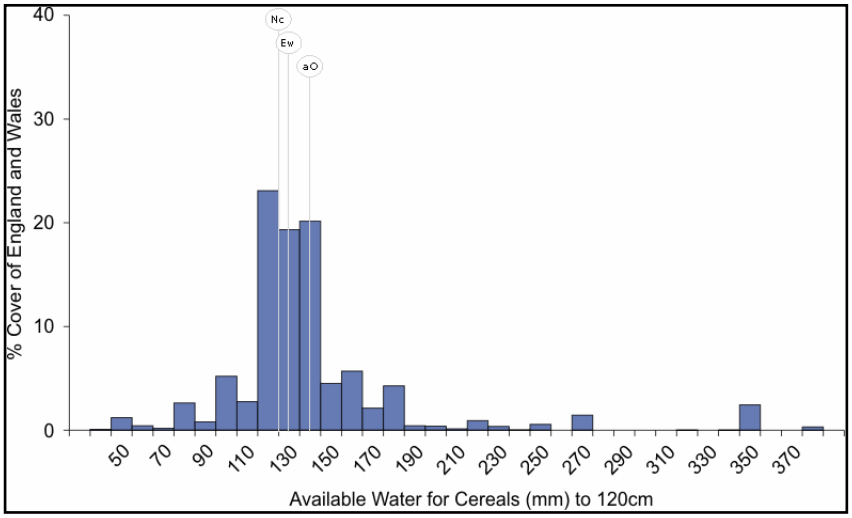


Figure 24. Available Water for Cereal

Available water for Sugar Beet represents the water that is available to a sugar beet crop that is able to root to 140cm depth.

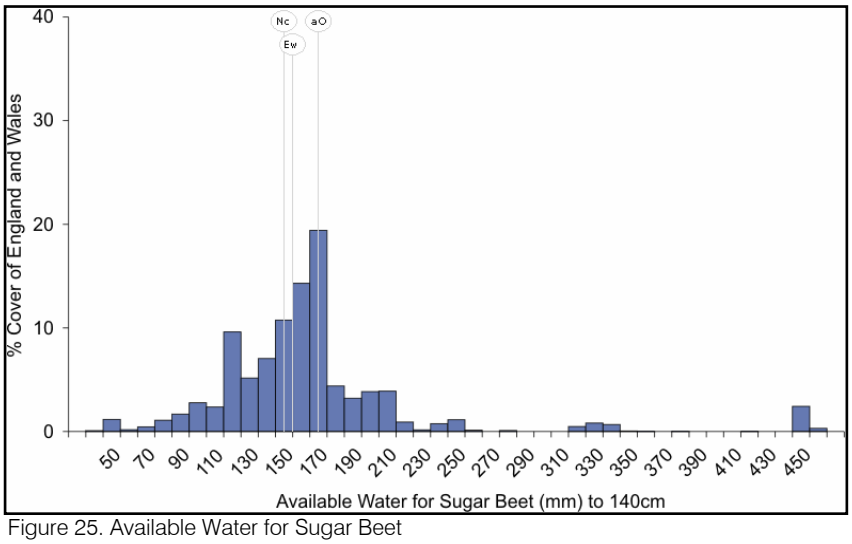


Figure 25. Available Water for Sugar Beet

Available water for Potatoes represents the water that is available to a potato crop that is able to root to 70cm depth.

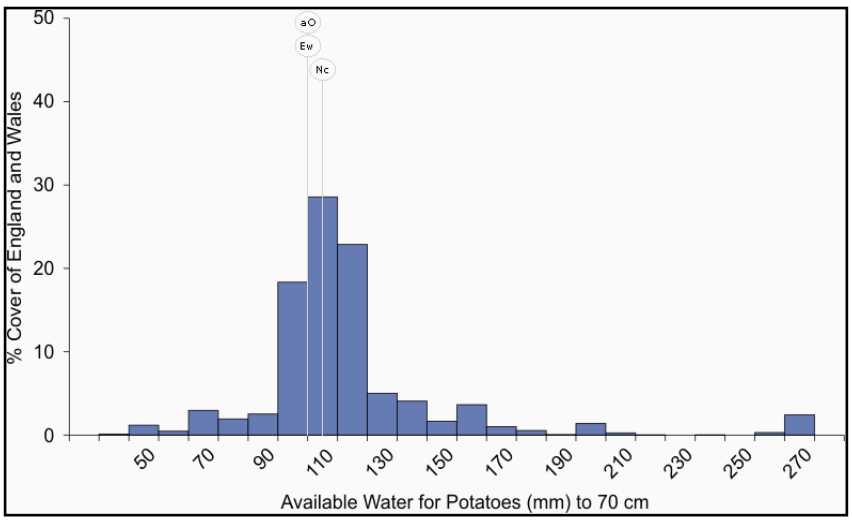


Figure 26. Available Water for Potatoes

ANGLEZARKE (631a)

Well drained very acid coarse loamy soils over sandstone with a bleached subsurface horizon.

a. General Description

Well drained very acid coarse loamy soils over sandstone with a bleached subsurface horizon. Some shallow soils with a peaty or humose surface horizon. Rocks and boulders locally.
The major landuse on this association is defined as dry moorland habitats of poor grazing value; coniferous woodland; recreation.

b. Distribution (England & Wales)

The ANGLEZARKE association covers 437km² of England and Wales which accounts for 0.29% of the landmass. The distribution of this association is shown in Figure 27. Note that the yellow shading represents a buffer to highlight the location of very small areas of the association.

c. Comprising Soil Series

Multiple soil series comprise a soil association. The soil series of the ANGLEZARKE association are outlined in Table 3 below. In some cases other minor soil series are present at a particular site, and these have been grouped together under the heading 'OTHER'. We have endevoured to present the likelihood of a minor, unnamed soil series occuring in your site in Table 3.

Schematic diagrams of the vertical soil profile of the major constituent soil series are provided in Section D to allow easier identification of the particular soil series at your site.

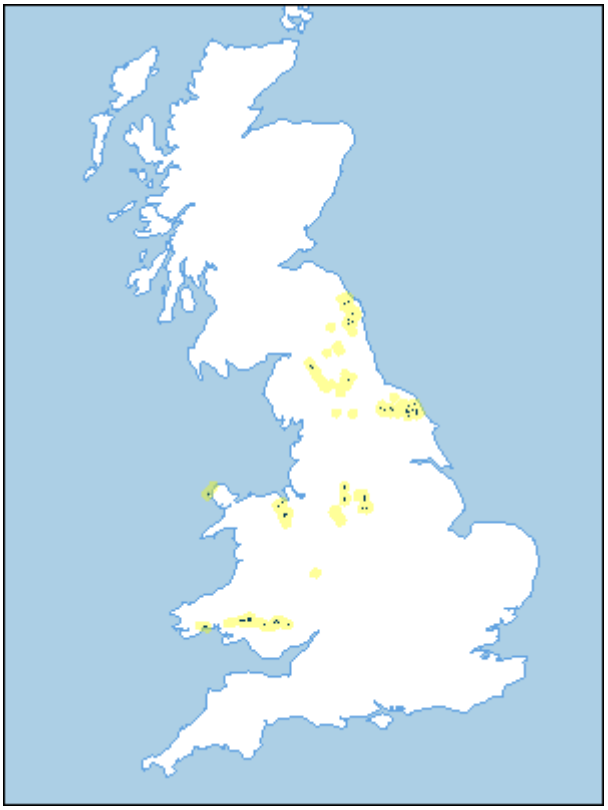


Figure 27. Association Distribution

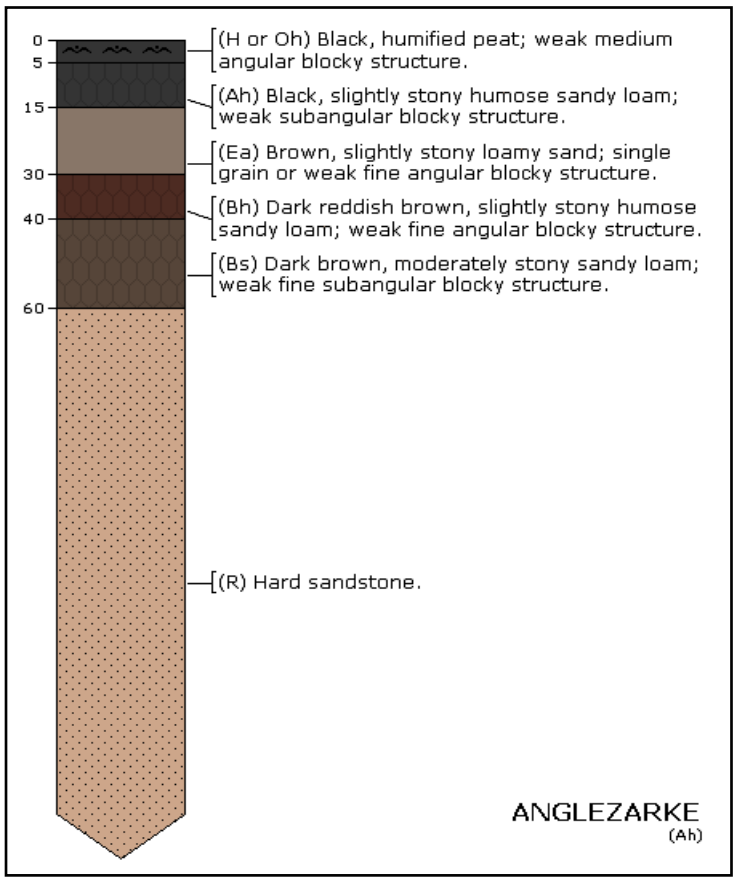
Soil Series	Description	Area %
ANGLEZARKE (Ah)	light loamy material over lithoskeletal sandstone	60%
REVIDGE (rV)	loamy or peaty lithoskeletal sandstone	40%

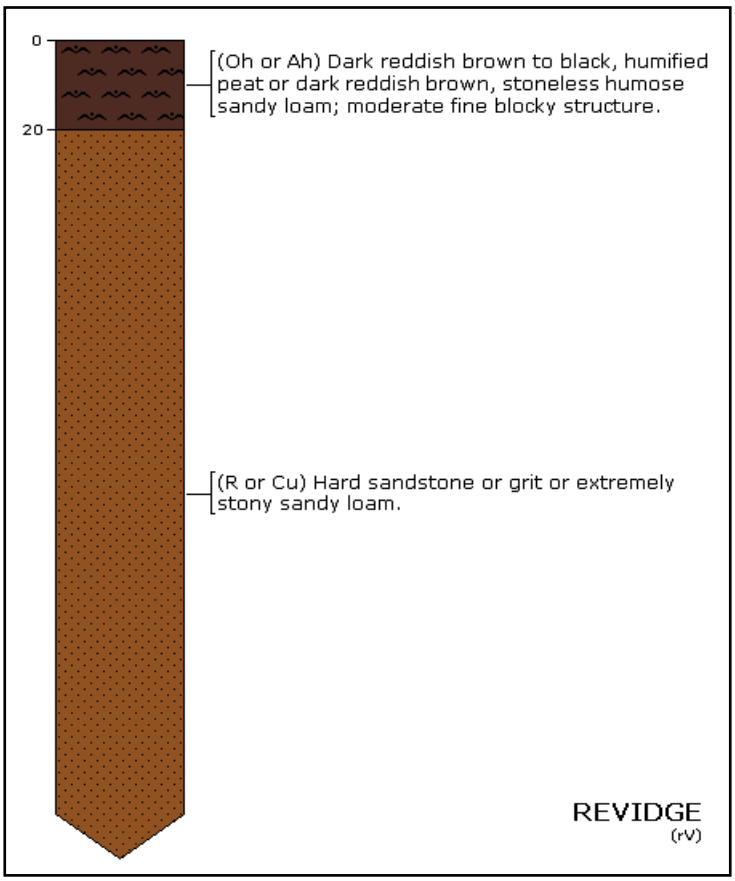
Table 3. The component soil series of the ANGLEZARKE soil association. Because absolute proportions of the comprising series in this association vary from location to location, the national proportions are provided.

ANGLEZARKE (631a)

Well drained very acid coarse loamy soils over sandstone with a bleached subsurface horizon.

d. ANGLEZARKE Component Series Profiles





ANGLEZARKE (631a)

Well drained very acid coarse loamy soils over sandstone with a bleached subsurface horizon.

e. Soil Properties

This section provides graphical summaries of selected attribute data available for the component series in this association. The blue bars of the graphs presented in this section describe the range of property values for all soils across England and Wales. Superimposed on these graphs are the values for the component soil series in this association. This has been done to provide the reader with an understanding of where each property for each series sits within the national context.

Soil Series	Description	Area %
ANGLEZARKE (Ah)	light loamy material over lithoskeletal sandstone	60%
REVIDGE (rV)	loamy or peaty lithoskeletal sandstone	40%

Table 3. The component soil series of the ANGLEZARKE soil association. Because absolute proportions of the comprising series in this association vary from location to location, the national proportions are provided.

e(i). Soil Depth Information and Depths to Important Layers

Depth to rock A mean depth to bedrock or very stony rubble which has been assigned to each soil series based on observed and recorded soil profiles.

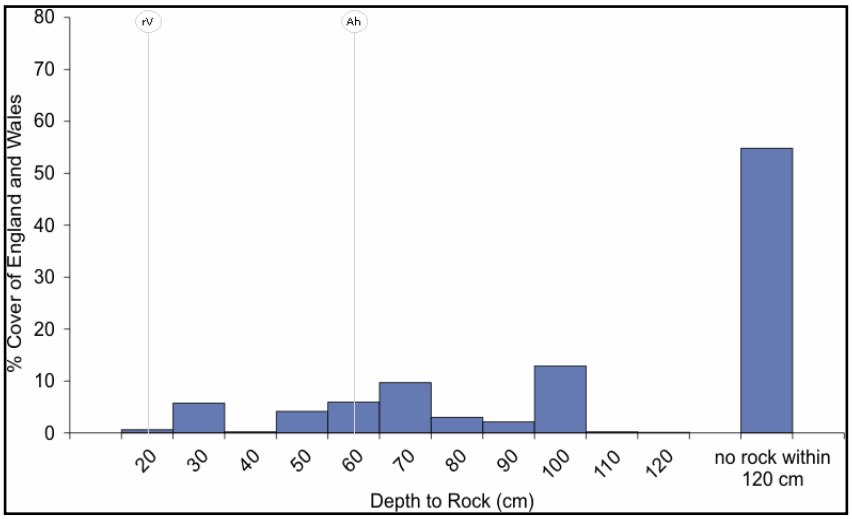


Figure 28. Depth of soil to Rock

Depth to gleying, the presence of grey and ochreous mottles within the soil, is caused by intermittent waterlogging. A mean depth to gleying has been assigned to each soil series based on observed and recorded soil profiles. The definition of a gleyed layer is designed to equate with saturation for at least 30 days in each year or the presence of artificial drainage.

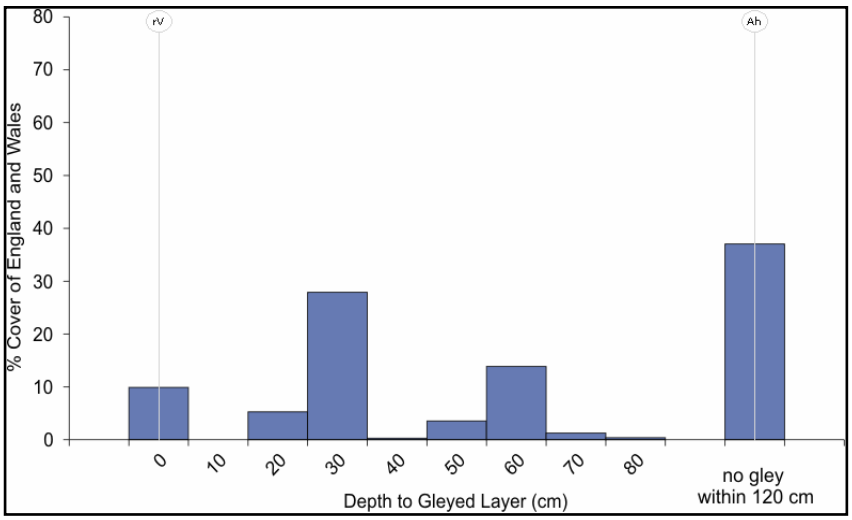


Figure 29. Depth of Soil to Gleying

ANGLEZARKE (631a)

Well drained very acid coarse loamy soils over sandstone with a bleached subsurface horizon.

e(i). Soil Depth Information and Depths to Important Layers continued

Depth to slowly permeable layer (downward percolation) A mean depth to a layer with lateral hydraulic conductivity of <10 cm per day has been assigned to each soil series based on observed and recorded soil profiles. Such layers can be defined in terms of their particular soil textural and structural conditions and impede downward percolation of excess soil water. This causes periodic saturation in the overlying soil, reduced storage capacity and therefore increased hydrological response to rainfall events.

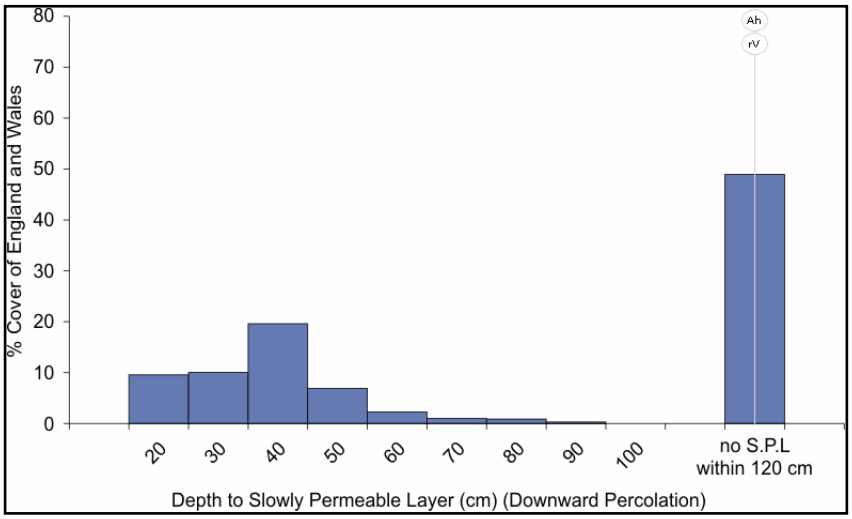


Figure 30. Depth to slowly permeable layer (downward percolation)

Depth to Slowly Permeable Layer (upward diffusion) A mean depth to the bottom of a layer with lateral hydraulic conductivity of <10 cm per day has been assigned to each soil series based on observed and recorded soil profiles. Such layers can be defined in terms of their particular soil textural and structural conditions and impede upward diffusion of water and gasses.

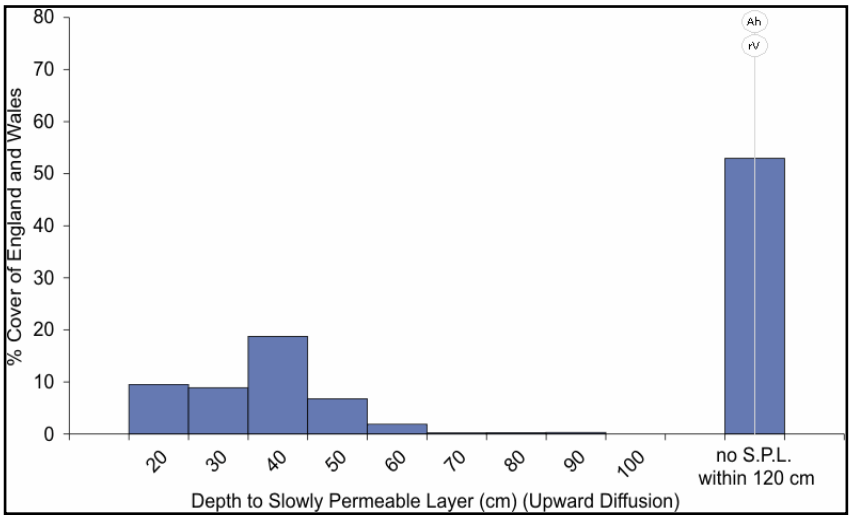


Figure 31. Depth to Slowly Permeable Layer (upward diffusion)

ANGLEZARKE (631a)

Well drained very acid coarse loamy soils over sandstone with a bleached subsurface horizon.

e(ii). Soil Hydrological Information

Integrated air capacity (IAC) is the total coarse pore space (>60 μm diameter) to 1 m depth. This size of pore would normally be air-filled when the soil is fully moist but not waterlogged. A large IAC means that the soil is well aerated. This will encourage root development and, provided near surface soil structure is well developed, will allow rainfall to percolate into the ground thus mitigating against localised flooding.

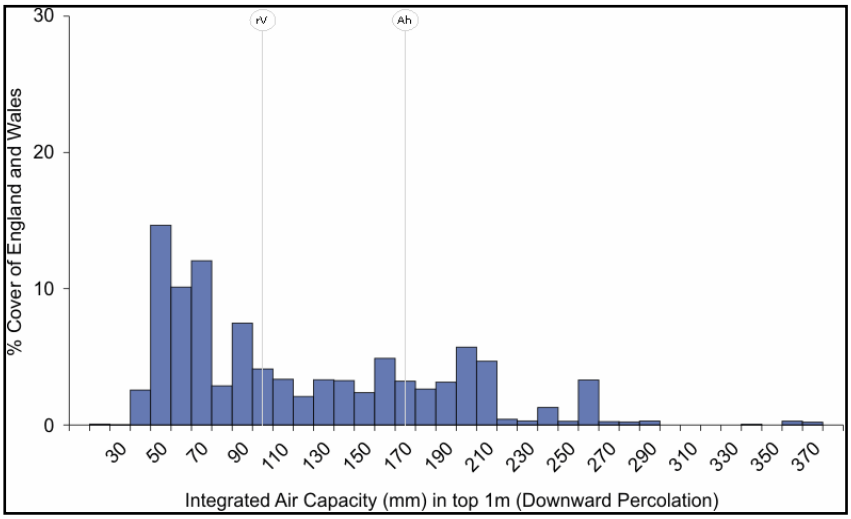


Figure 32. Integrated Air Capacity

Standard Percentage Runoff (SPR) is the percentage of rainfall that causes the short-term increase in flow seen at a catchment outlet following a storm event. The values associated with individual soil series have been calculated from an analysis of the relationships between flow data and the soils present within the catchment for several hundred gauged catchments.

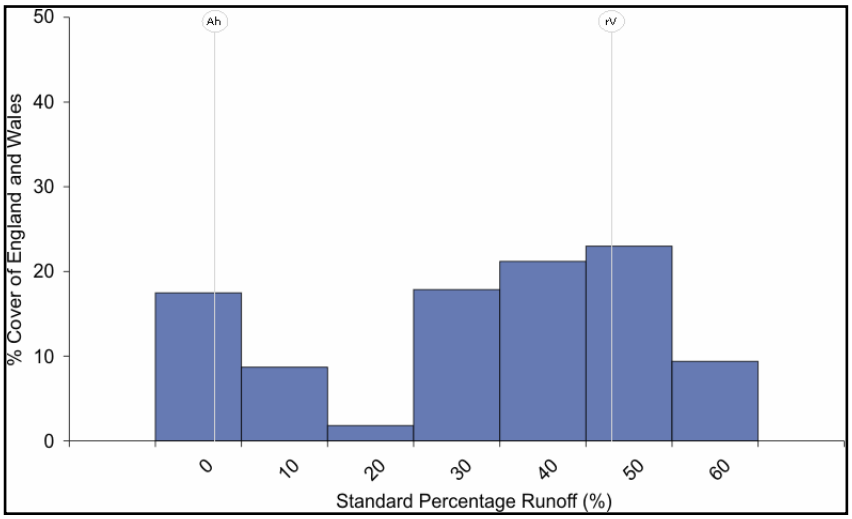


Figure 33. Standard Percentage Runoff

Base flow index is calculated from daily river flow data and expresses the volume of base flow of a river as a fraction of the total flow volume. The values associated with individual soil series have been calculated from an analysis of the relationships between flow data and the soils present within the catchment for several hundred gauged catchments.

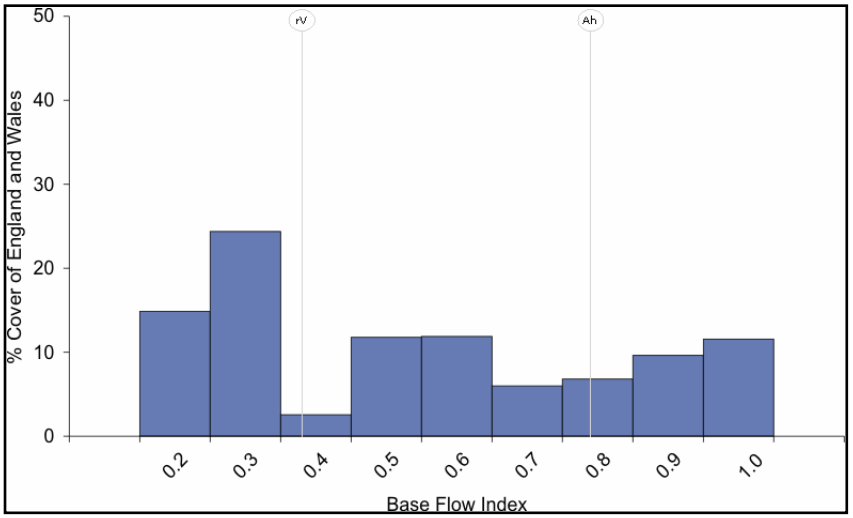


Figure 34. Base Flow Index

ANGLEZARKE (631a)

Well drained very acid coarse loamy soils over sandstone with a bleached subsurface horizon.

e(iii). Available Water Content

Available water content for plants varies depending on a number of factors, including the rooting depth of the plants. Described below are differing available water contents for cereals, sugar beet, grass and potato crops, as well as a generic available water value to 1 m depth.

Available water (by crop) Available water content to 1 m for the specified soil series between suctions of 5 and 1500kPa.

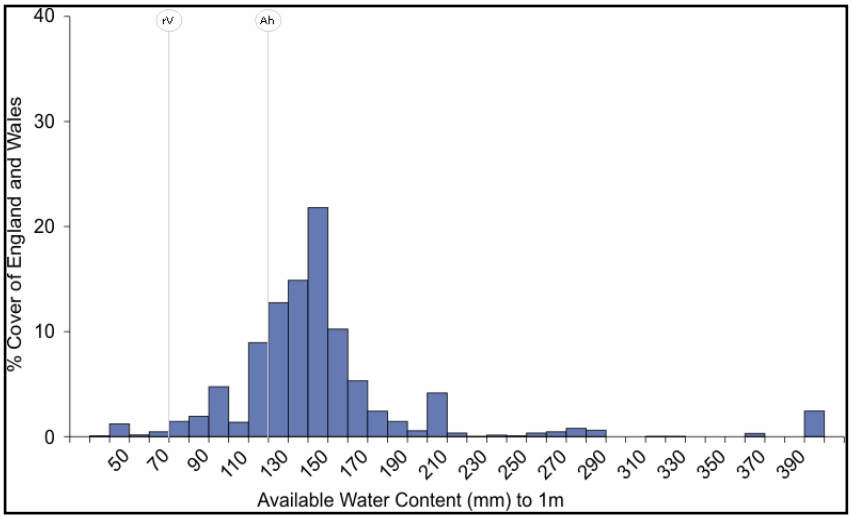


Figure 35. Available Water (by crop)

Available water for grass represents the water that is available to a permanent grass sward that is able to root to 100cm depth.

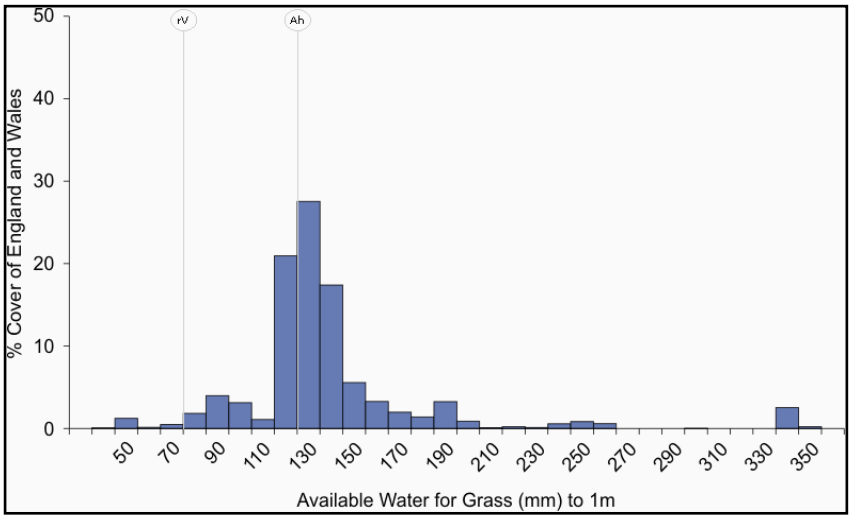


Figure 36. Available Water for Grass

ANGLEZARKE (631a)

Well drained very acid coarse loamy soils over sandstone with a bleached subsurface horizon.

e(iii). Available Water Content continued

Available water for cereal represents the water that is available to a cereal crop that is able to root to 120cm depth.

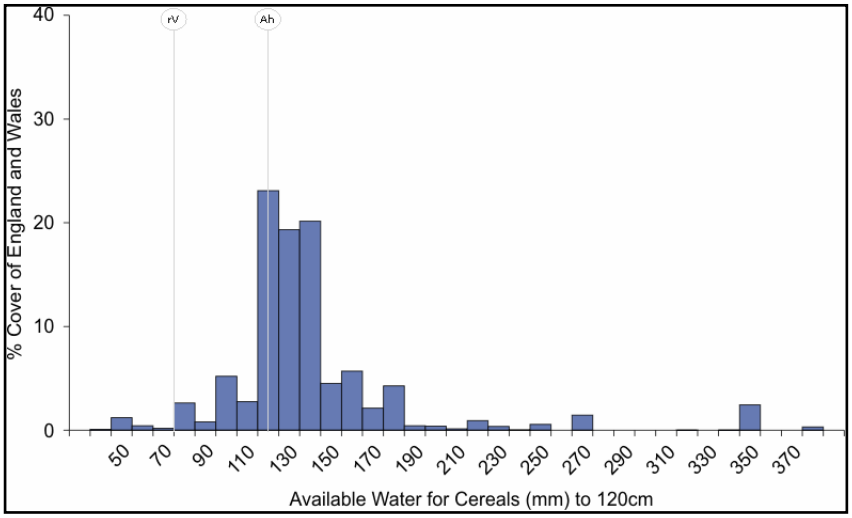


Figure 37. Available Water for Cereal

Available water for Sugar Beet represents the water that is available to a sugar beet crop that is able to root to 140cm depth.

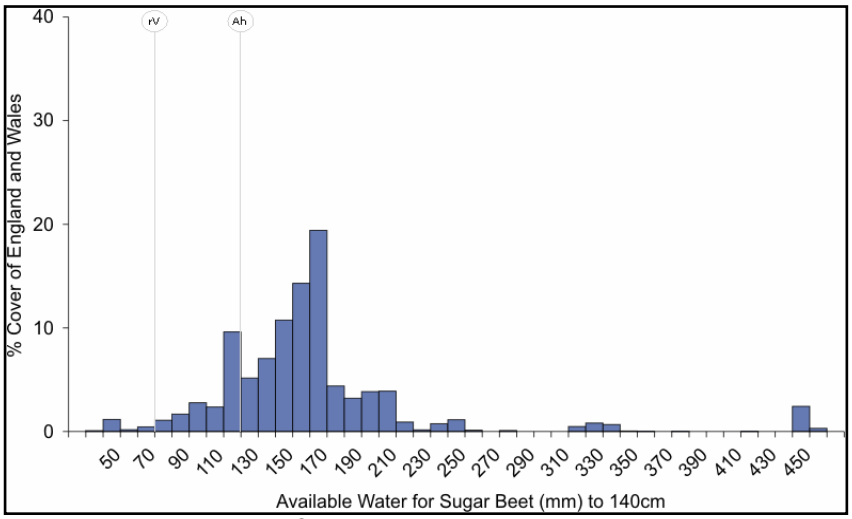


Figure 38. Available Water for Sugar Beet

Available water for Potatoes represents the water that is available to a potato crop that is able to root to 70cm depth.

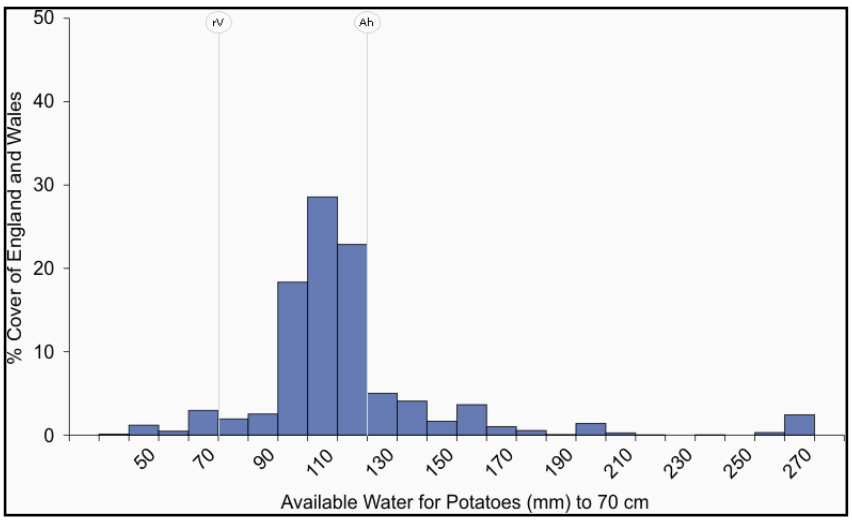


Figure 39. Available Water for Potatoes

CEGIN (713d)

Slowly permeable seasonally waterlogged fine silty and clayey soils.

a. General Description

Slowly permeable seasonally waterlogged fine silty and clayey soils. Some fine silty and fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging on slopes. Well drained fine loamy soils over rock in places.

The major landuse on this association is defined as stock rearing on permanent grassland dairying on lower ground.

b. Distribution (England & Wales)

The CEGIN association covers 1602km² of England and Wales which accounts for 1.06% of the landmass. The distribution of this association is shown in Figure 40. Note that the yellow shading represents a buffer to highlight the location of very small areas of the association.

c. Comprising Soil Series

Multiple soil series comprise a soil association. The soil series of the CEGIN association are outlined in Table 4 below. In some cases other minor soil series are present at a particular site, and these have been grouped together under the heading 'OTHER'. We have endevoured to present the likelihood of a minor, unnamed soil series occuring in your site in Table 4.

Schematic diagrams of the vertical soil profile of the major constituent soil series are provided in Section D to allow easier identification of the particular soil series at your site.

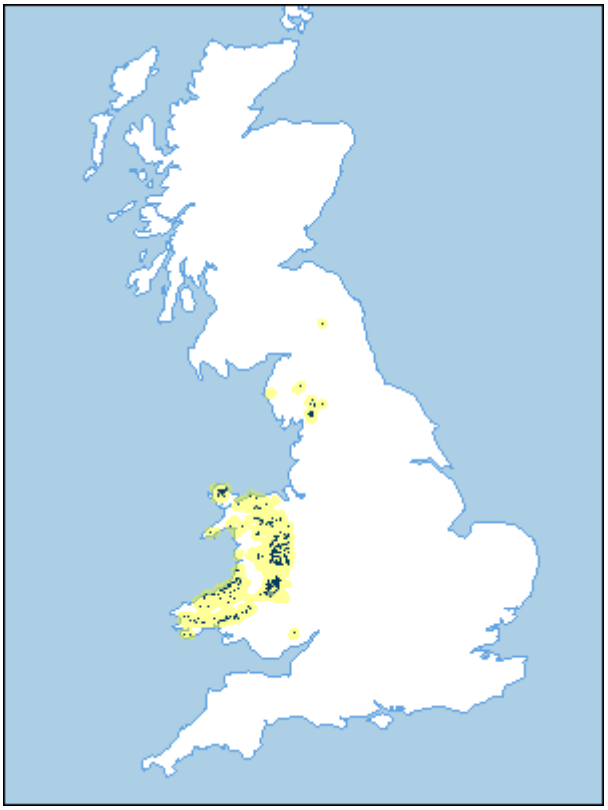


Figure 40. Association Distribution

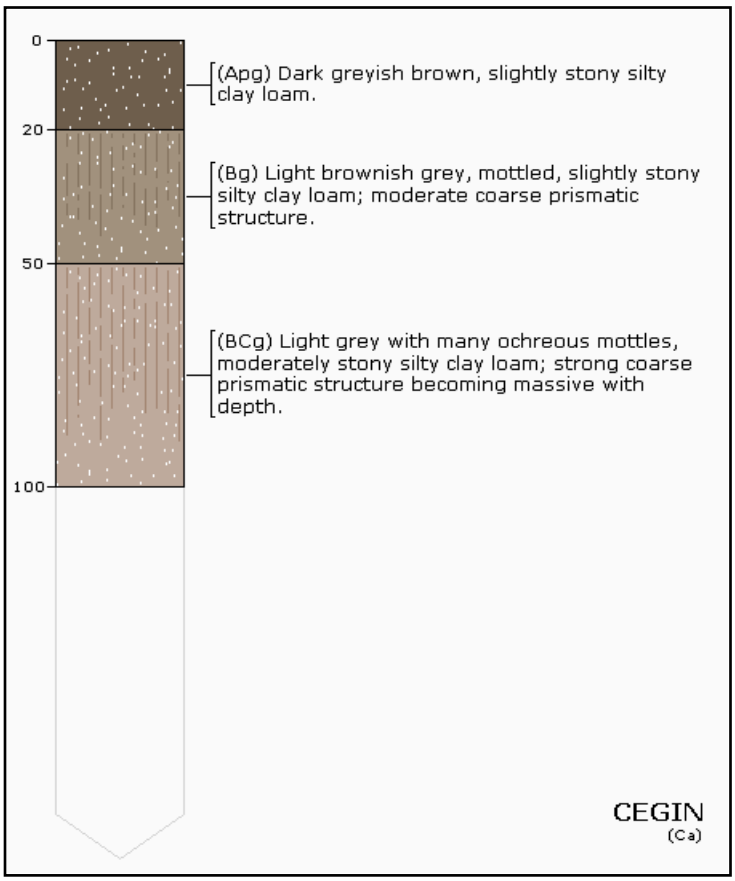
Soil Series	Description	Area %
CEGIN (Ca)	medium silty drift with siliceous stones	40%
GREYLAND (gJ)	medium loamy over clayey drift with siliceous stones	15%
BRICKFIELD (Br)	medium loamy drift with siliceous stones	10%
DENBIGH (Dg)	medium loamy material over lithoskeletal mudstone and sandstone or slate	10%
SANNAN (Sn)	medium silty drift with siliceous stones	10%
OTHER	other minor soils	15%

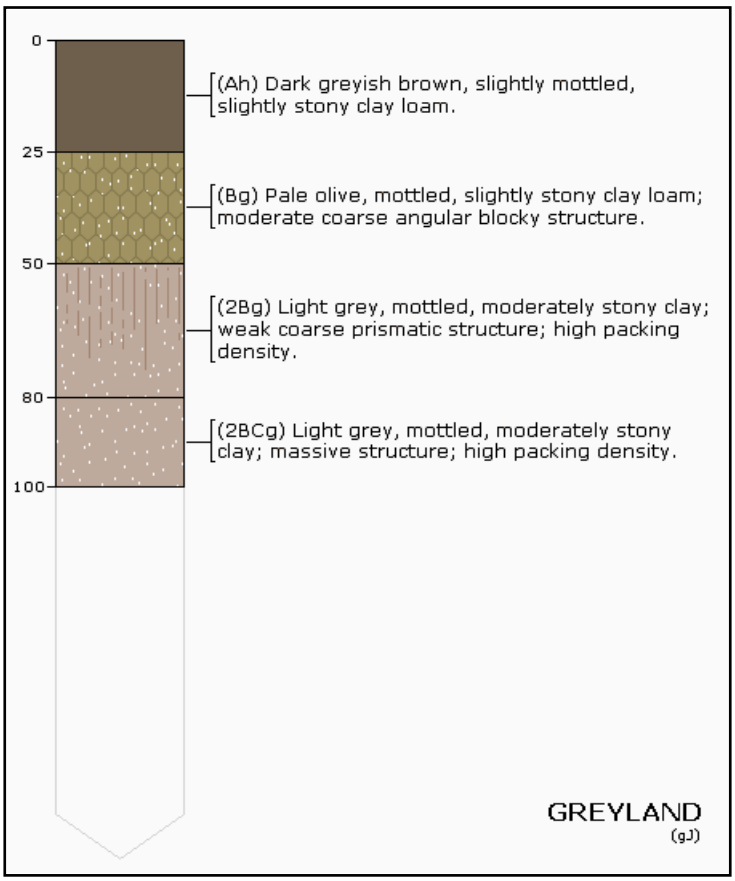
Table 4. The component soil series of the CEGIN soil association. Because absolute proportions of the comprising series in this association vary from location to location, the national proportions are provided.

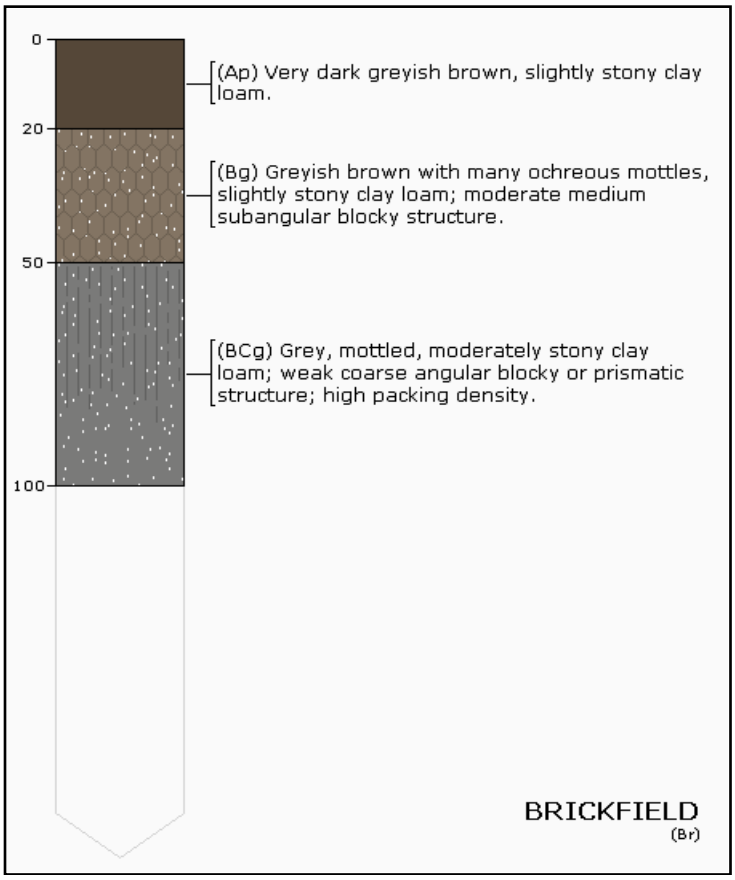
CEGIN (713d)

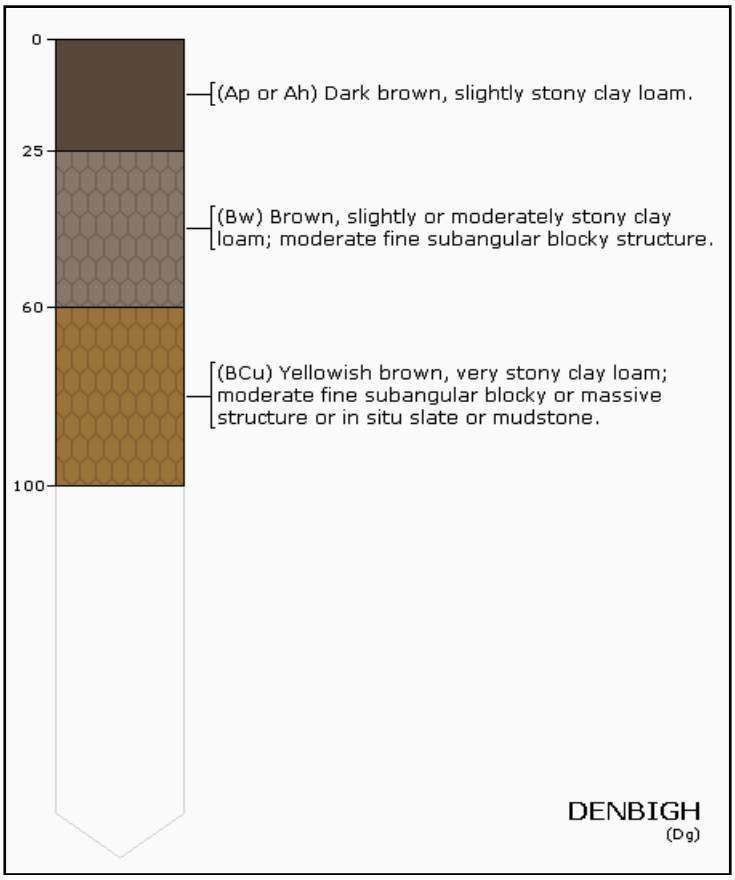
Slowly permeable seasonally waterlogged fine silty and clayey soils.

d. CEGIN Component Series Profiles





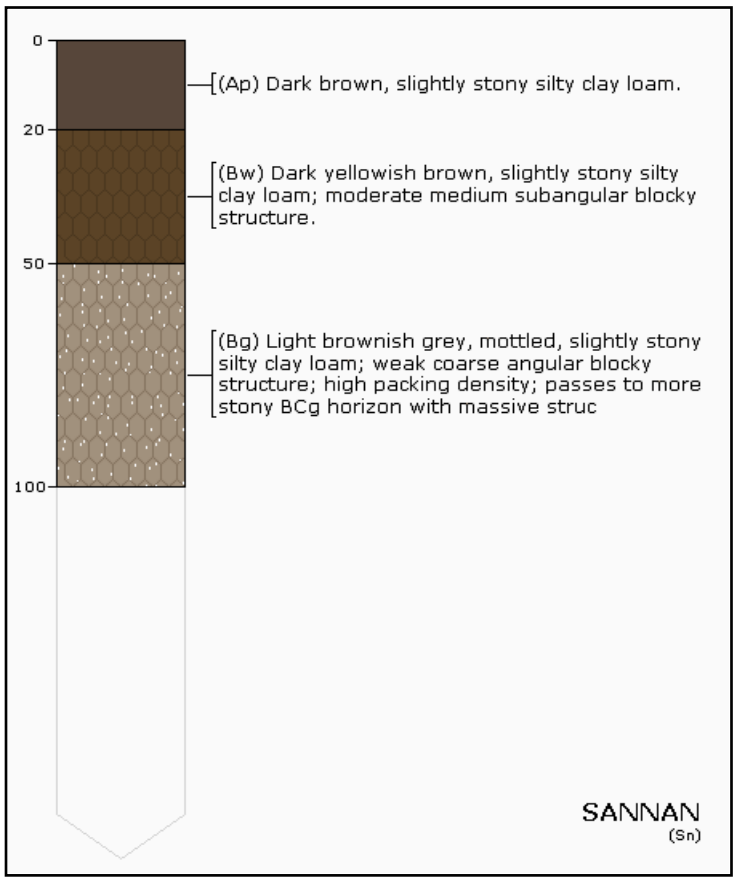




CEGIN (713d)

Slowly permeable seasonally waterlogged fine silty and clayey soils.

d. CEGIN Component Series Profiles continued



CEGIN (713d)

Slowly permeable seasonally waterlogged fine silty and clayey soils.

e. Soil Properties

This section provides graphical summaries of selected attribute data available for the component series in this association. The blue bars of the graphs presented in this section describe the range of property values for all soils across England and Wales. Superimposed on these graphs are the values for the component soil series in this association. This has been done to provide the reader with an understanding of where each property for each series sits within the national context.

Soil Series	Description	Area %
CEGIN (Ca)	medium silty drift with siliceous stones	40%
GREYLAND (gJ)	medium loamy over clayey drift with siliceous stones	15%
BRICKFIELD (Br)	medium loamy drift with siliceous stones	10%
DENBIGH (Dg)	medium loamy material over lithoskeletal mudstone and sandstone or slate	10%
SANNAN (Sn)	medium silty drift with siliceous stones	10%
OTHER	other minor soils	15%

Table 4. The component soil series of the CEGIN soil association. Because absolute proportions of the comprising series in this association vary from location to location, the national proportions are provided.

e(i). Soil Depth Information and Depths to Important Layers

Depth to rock A mean depth to bedrock or very stony rubble which has been assigned to each soil series based on observed and recorded soil profiles.

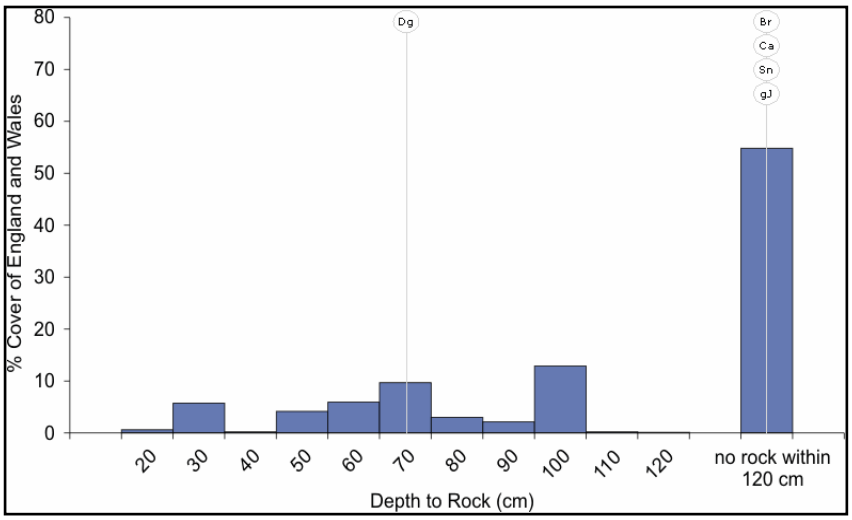


Figure 41. Depth of soil to Rock

Depth to gleying, the presence of grey and ochreous mottles within the soil, is caused by intermittent waterlogging. A mean depth to gleying has been assigned to each soil series based on observed and recorded soil profiles. The definition of a gleyed layer is designed to equate with saturation for at least 30 days in each year or the presence of artificial drainage.

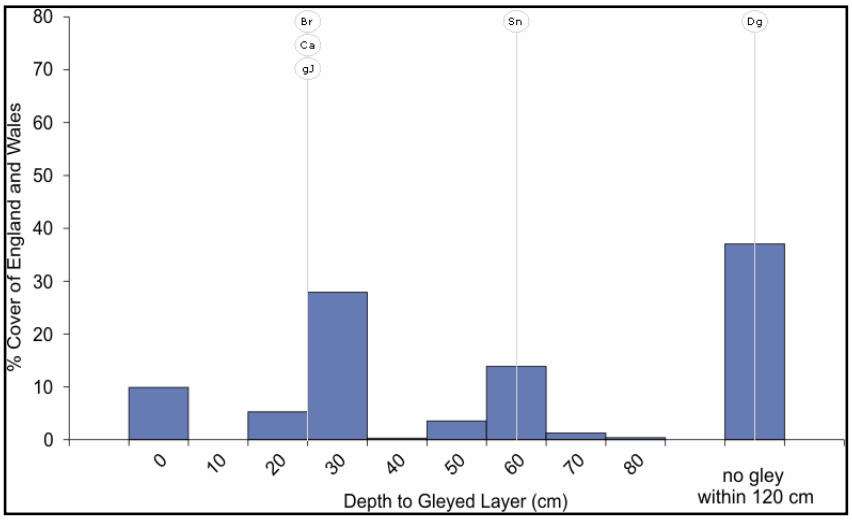


Figure 42. Depth of Soil to Gleying

CEGIN (713d)

Slowly permeable seasonally waterlogged fine silty and clayey soils.

e(i). Soil Depth Information and Depths to Important Layers continued

Depth to slowly permeable layer (downward percolation) A mean depth to a layer with lateral hydraulic conductivity of <10 cm per day has been assigned to each soil series based on observed and recorded soil profiles. Such layers can be defined in terms of their particular soil textural and structural conditions and impede downward percolation of excess soil water. This causes periodic saturation in the overlying soil, reduced storage capacity and therefore increased hydrological response to rainfall events.

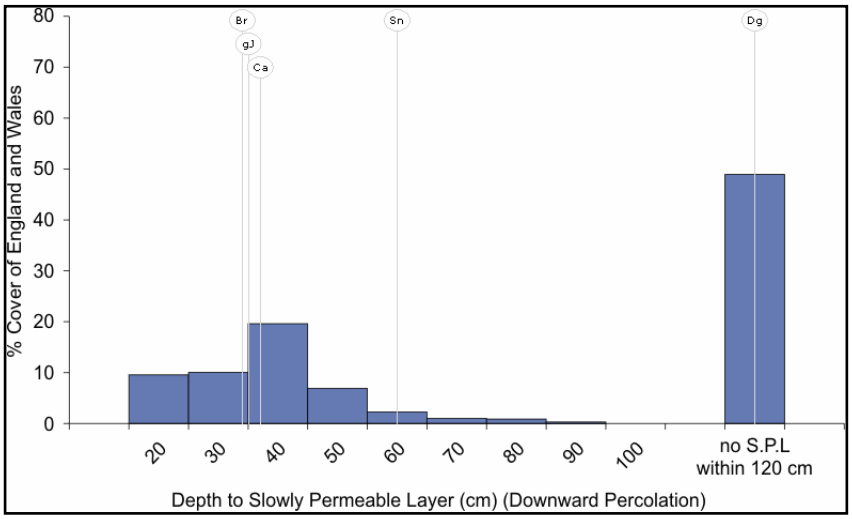


Figure 43. Depth to slowly permeable layer (downward percolation)

Depth to Slowly Permeable Layer (upward diffusion) A mean depth to the bottom of a layer with lateral hydraulic conductivity of <10 cm per day has been assigned to each soil series based on observed and recorded soil profiles. Such layers can be defined in terms of their particular soil textural and structural conditions and impede upward diffusion of water and gasses.

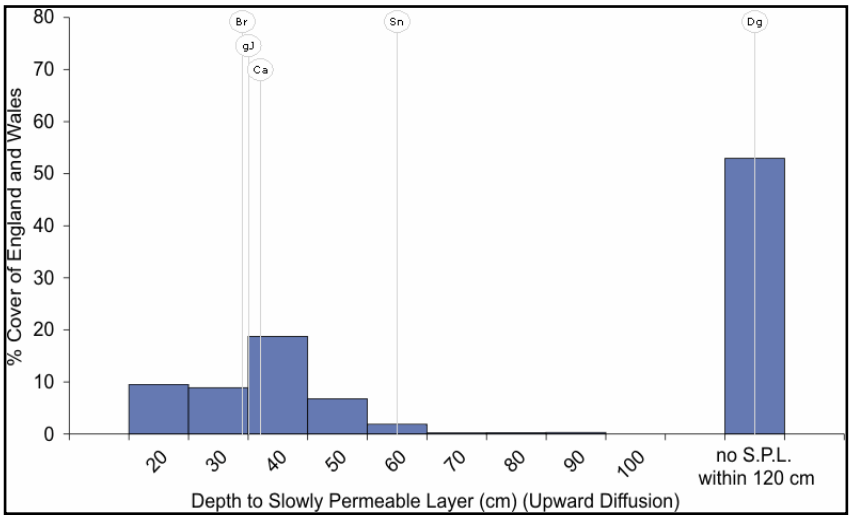


Figure 44. Depth to Slowly Permeable Layer (upward diffusion)

CEGIN (713d)

Slowly permeable seasonally waterlogged fine silty and clayey soils.

e(ii). Soil Hydrological Information

Integrated air capacity (IAC) is the total coarse pore space (>60 μm diameter) to 1 m depth. This size of pore would normally be air-filled when the soil is fully moist but not waterlogged. A large IAC means that the soil is well aerated. This will encourage root development and, provided near surface soil structure is well developed, will allow rainfall to percolate into the ground thus mitigating against localised flooding.

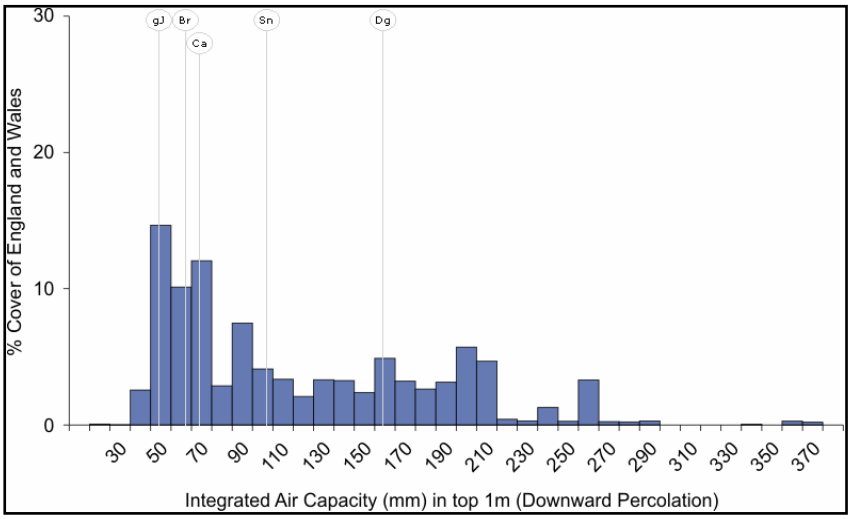


Figure 45. Integrated Air Capacity

Standard Percentage Runoff (SPR) is the percentage of rainfall that causes the short-term increase in flow seen at a catchment outlet following a storm event. The values associated with individual soil series have been calculated from an analysis of the relationships between flow data and the soils present within the catchment for several hundred gauged catchments.

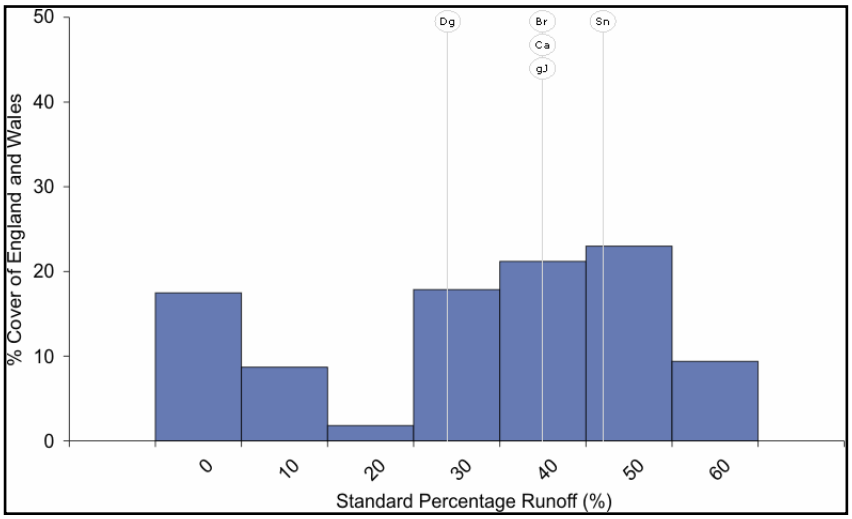


Figure 46. Standard Percentage Runoff

Base flow index is calculated from daily river flow data and expresses the volume of base flow of a river as a fraction of the total flow volume. The values associated with individual soil series have been calculated from an analysis of the relationships between flow data and the soils present within the catchment for several hundred gauged catchments.

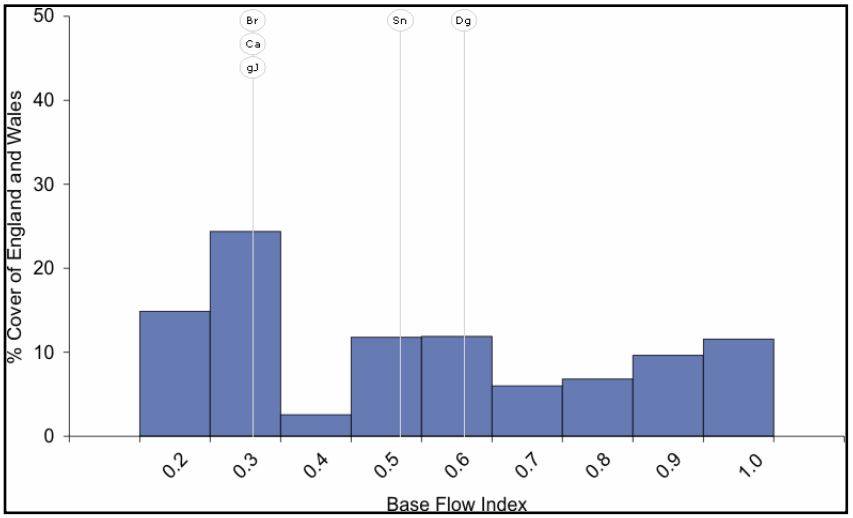


Figure 47. Base Flow Index

CEGIN (713d)

Slowly permeable seasonally waterlogged fine silty and clayey soils.

e(iii). Available Water Content

Available water content for plants varies depending on a number of factors, including the rooting depth of the plants. Described below are differing available water contents for cereals, sugar beet, grass and potato crops, as well as a generic available water value to 1 m depth.

Available water (by crop) Available water content to 1 m for the specified soil series between suctions of 5 and 1500kPa.

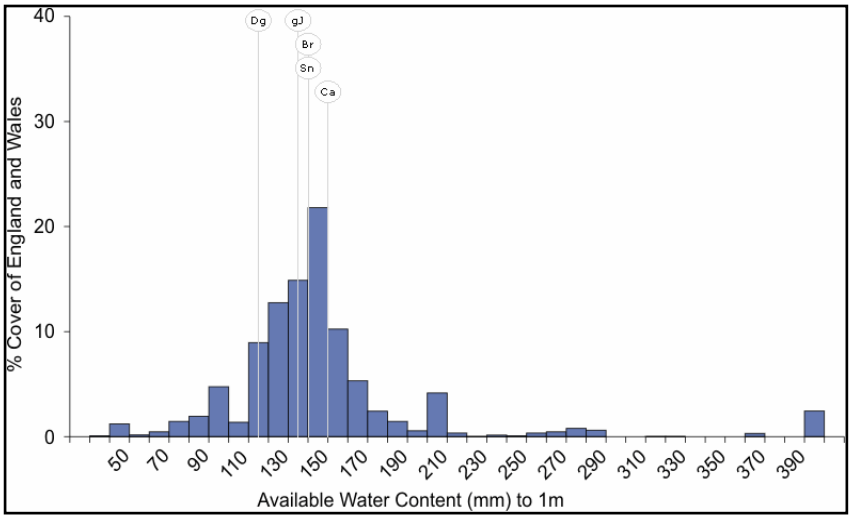


Figure 48. Available Water (by crop)

Available water for grass represents the water that is available to a permanent grass sward that is able to root to 100cm depth.

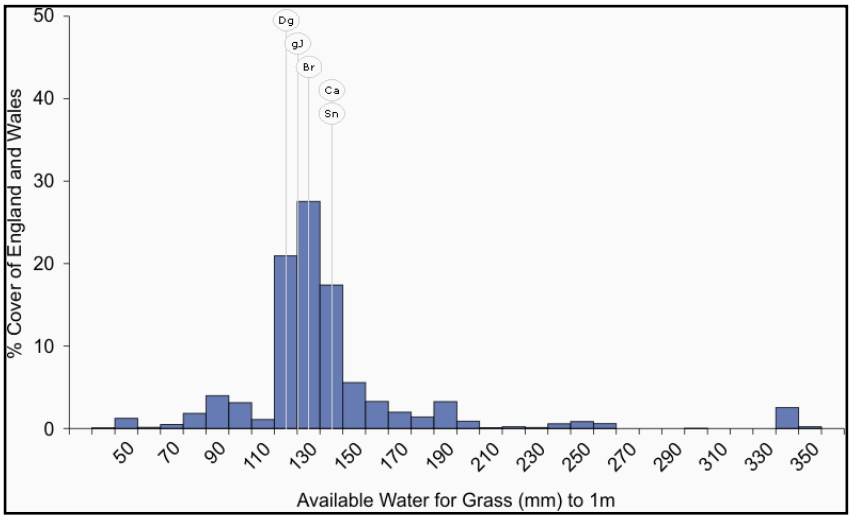


Figure 49. Available Water for Grass

CEGIN (713d)

Slowly permeable seasonally waterlogged fine silty and clayey soils.

e(iii). Available Water Content continued

Available water for cereal represents the water that is available to a cereal crop that is able to root to 120cm depth.

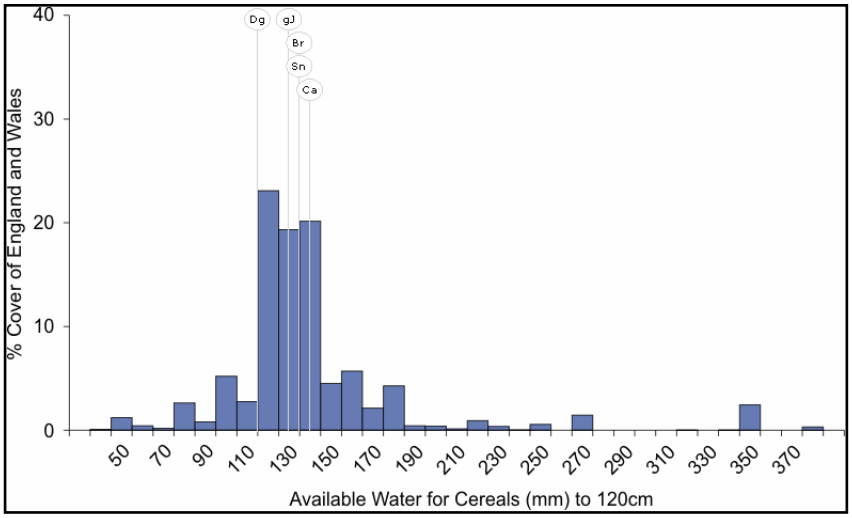


Figure 50. Available Water for Cereal

Available water for Sugar Beet represents the water that is available to a sugar beet crop that is able to root to 140cm depth.

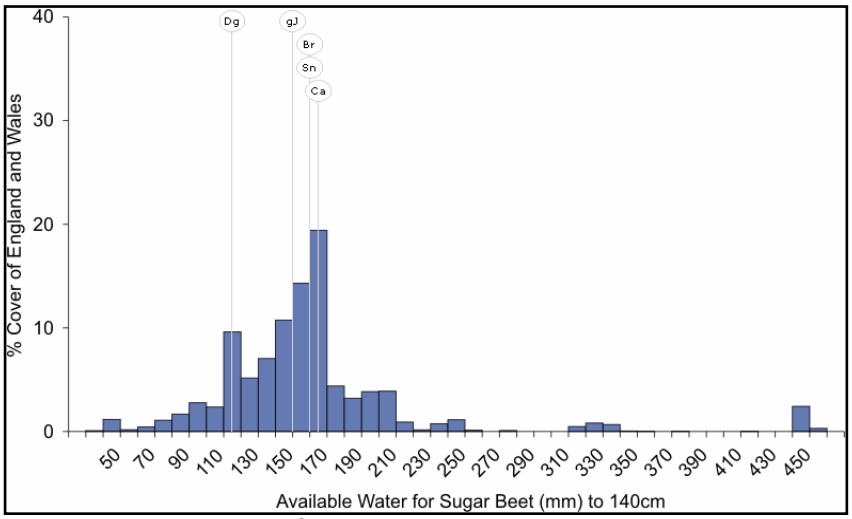


Figure 51. Available Water for Sugar Beet

Available water for Potatoes represents the water that is available to a potato crop that is able to root to 70cm depth.

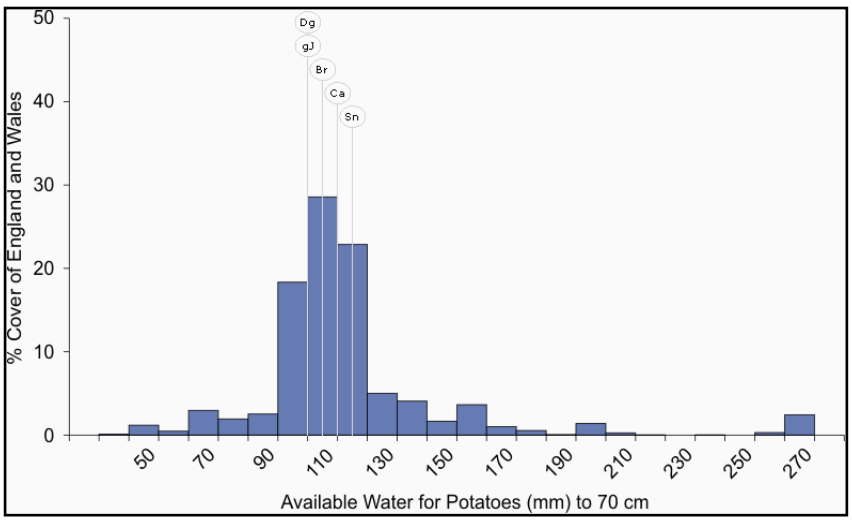


Figure 52. Available Water for Potatoes

BRICKFIELD 2 (713f)

Slowly permeable seasonally waterlogged fine loamy soils.

a. General Description

Slowly permeable seasonally waterlogged fine loamy soils. Associated with fine loamy soils with only slight waterlogging and some deep well drained fine loamy soils.

The major landuse on this association is defined as dairying and stock rearing on permanent or short term grassland; some cereals in drier areas.

b. Distribution (England & Wales)

The BRICKFIELD 2 association covers 1596km² of England and Wales which accounts for 1.06% of the landmass. The distribution of this association is shown in Figure 53. Note that the yellow shading represents a buffer to highlight the location of very small areas of the association.

c. Comprising Soil Series

Multiple soil series comprise a soil association. The soil series of the BRICKFIELD 2 association are outlined in Table 5 below. In some cases other minor soil series are present at a particular site, and these have been grouped together under the heading 'OTHER'. We have endevoured to present the likelihood of a minor, unnamed soil series occuring in your site in Table 5.

Schematic diagrams of the vertical soil profile of the major constituent soil series are provided in Section D to allow easier identification of the particular soil series at your site.

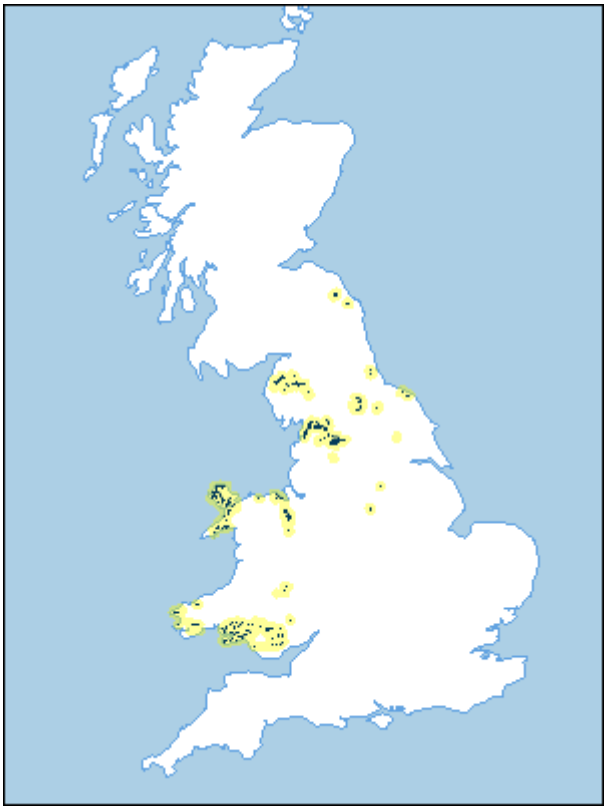


Figure 53. Association Distribution

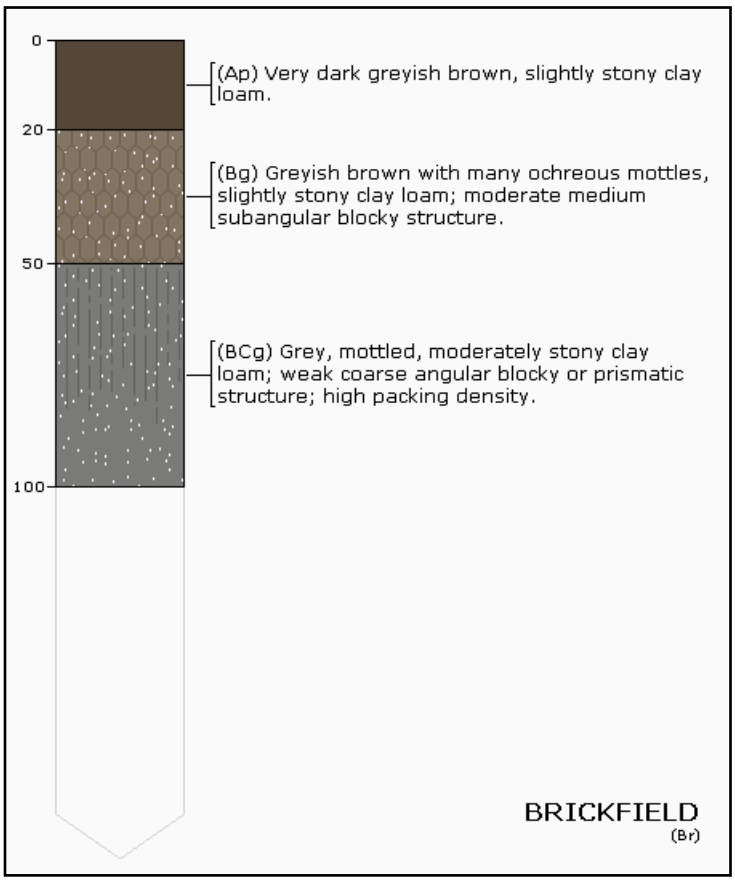
Soil Series	Description	Area %
BRICKFIELD (Br)	medium loamy drift with siliceous stones	40%
NERCWYS (Nc)	medium loamy drift with siliceous stones	20%
EAST KESWICK (Ew)	medium loamy drift with siliceous stones	15%
OTHER	other minor soils	25%

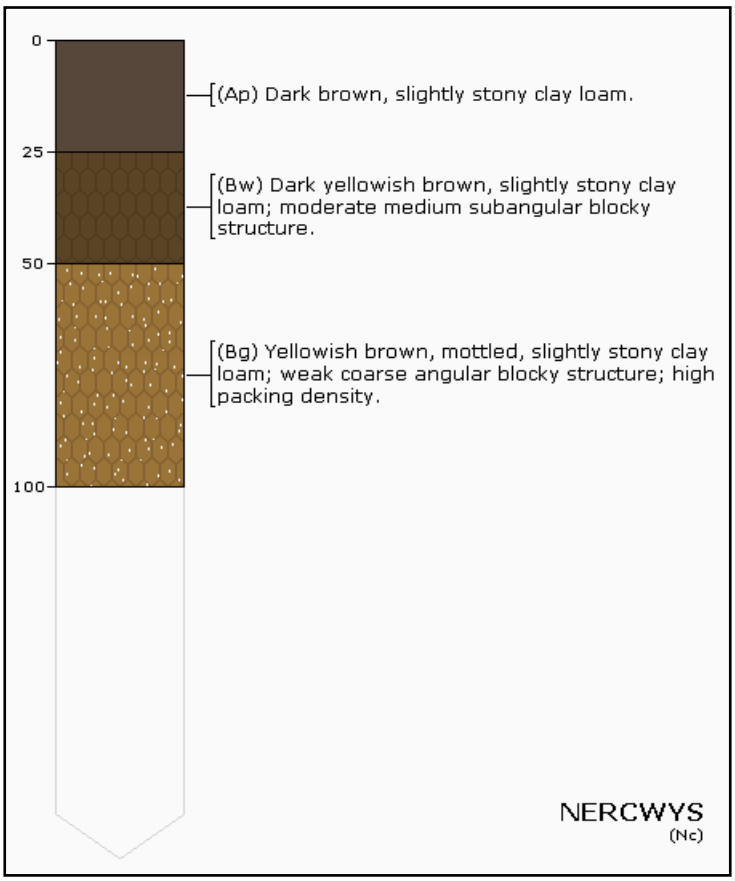
Table 5. The component soil series of the BRICKFIELD 2 soil association. Because absolute proportions of the comprising series in this association vary from location to location, the national proportions are provided.

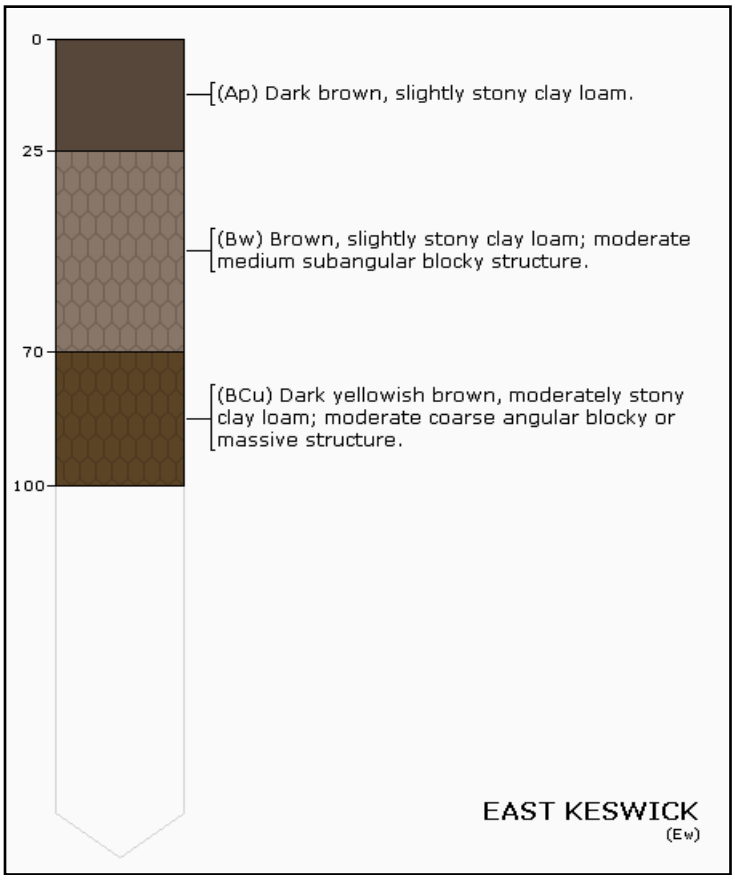
BRICKFIELD 2 (713f)

Slowly permeable seasonally waterlogged fine loamy soils.

d. BRICKFIELD 2 Component Series Profiles







BRICKFIELD 2 (713f)

Slowly permeable seasonally waterlogged fine loamy soils.

e. Soil Properties

This section provides graphical summaries of selected attribute data available for the component series in this association. The blue bars of the graphs presented in this section describe the range of property values for all soils across England and Wales. Superimposed on these graphs are the values for the component soil series in this association. This has been done to provide the reader with an understanding of where each property for each series sits within the national context.

Soil Series	Description	Area %
BRICKFIELD (Br)	medium loamy drift with siliceous stones	40%
NERCWYS (Nc)	medium loamy drift with siliceous stones	20%
EAST KESWICK (Ew)	medium loamy drift with siliceous stones	15%
OTHER	other minor soils	25%

Table 5. The component soil series of the BRICKFIELD 2 soil association. Because absolute proportions of the comprising series in this association vary from location to location, the national proportions are provided.

e(i). Soil Depth Information and Depths to Important Layers

Depth to rock A mean depth to bedrock or very stony rubble which has been assigned to each soil series based on observed and recorded soil profiles.

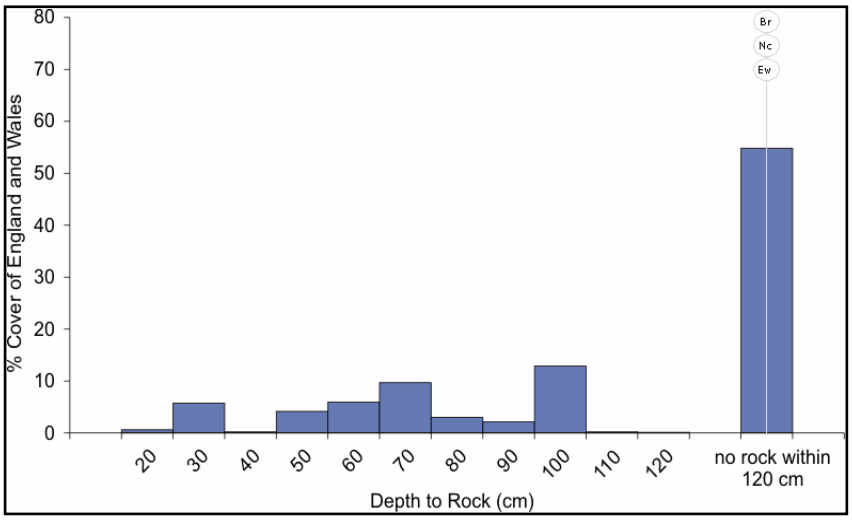


Figure 54. Depth of soil to Rock

Depth to gleying, the presence of grey and ochreous mottles within the soil, is caused by intermittent waterlogging. A mean depth to gleying has been assigned to each soil series based on observed and recorded soil profiles. The definition of a gleyed layer is designed to equate with saturation for at least 30 days in each year or the presence of artificial drainage.

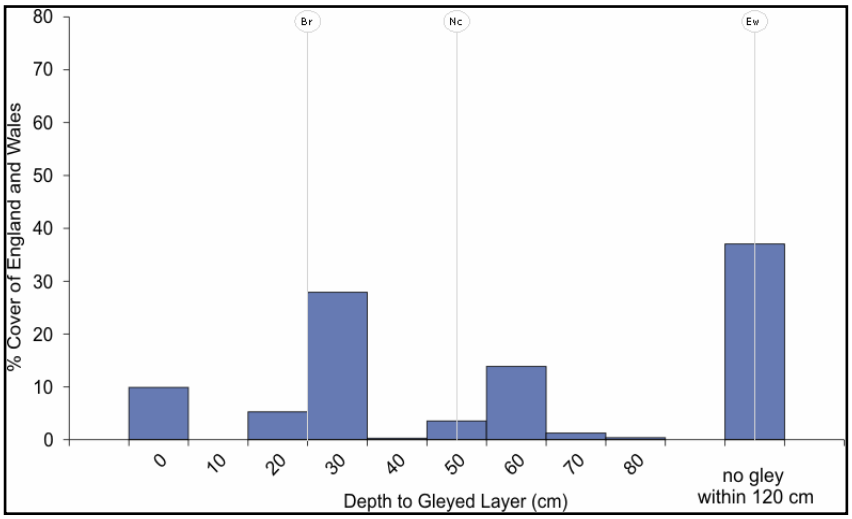


Figure 55. Depth of Soil to Gleying

BRICKFIELD 2 (713f)

Slowly permeable seasonally waterlogged fine loamy soils.

e(i). Soil Depth Information and Depths to Important Layers continued

Depth to slowly permeable layer (downward percolation) A mean depth to a layer with lateral hydraulic conductivity of <10 cm per day has been assigned to each soil series based on observed and recorded soil profiles. Such layers can be defined in terms of their particular soil textural and structural conditions and impede downward percolation of excess soil water. This causes periodic saturation in the overlying soil, reduced storage capacity and therefore increased hydrological response to rainfall events.

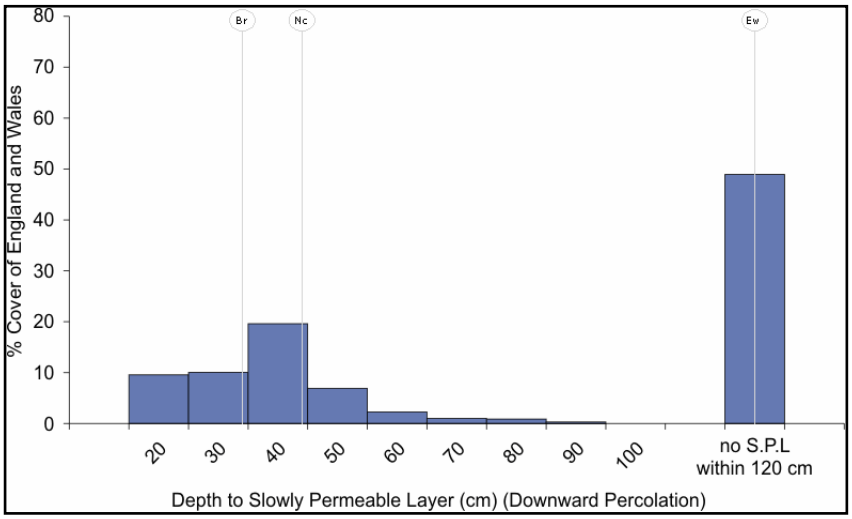


Figure 56. Depth to slowly permeable layer (downward percolation)

Depth to Slowly Permeable Layer (upward diffusion) A mean depth to the bottom of a layer with lateral hydraulic conductivity of <10 cm per day has been assigned to each soil series based on observed and recorded soil profiles. Such layers can be defined in terms of their particular soil textural and structural conditions and impede upward diffusion of water and gasses.

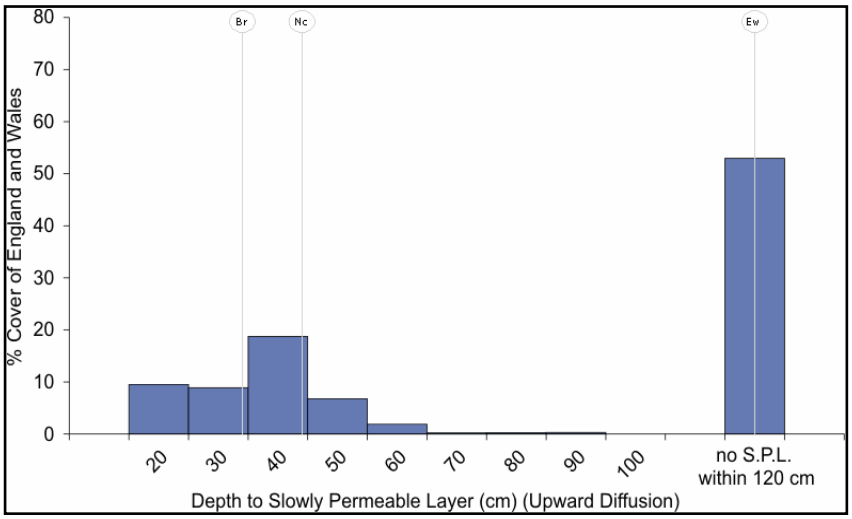


Figure 57. Depth to Slowly Permeable Layer (upward diffusion)

BRICKFIELD 2 (713f)

Slowly permeable seasonally waterlogged fine loamy soils.

e(ii). Soil Hydrological Information

Integrated air capacity (IAC) is the total coarse pore space (>60 μm diameter) to 1 m depth. This size of pore would normally be air-filled when the soil is fully moist but not waterlogged. A large IAC means that the soil is well aerated. This will encourage root development and, provided near surface soil structure is well developed, will allow rainfall to percolate into the ground thus mitigating against localised flooding.

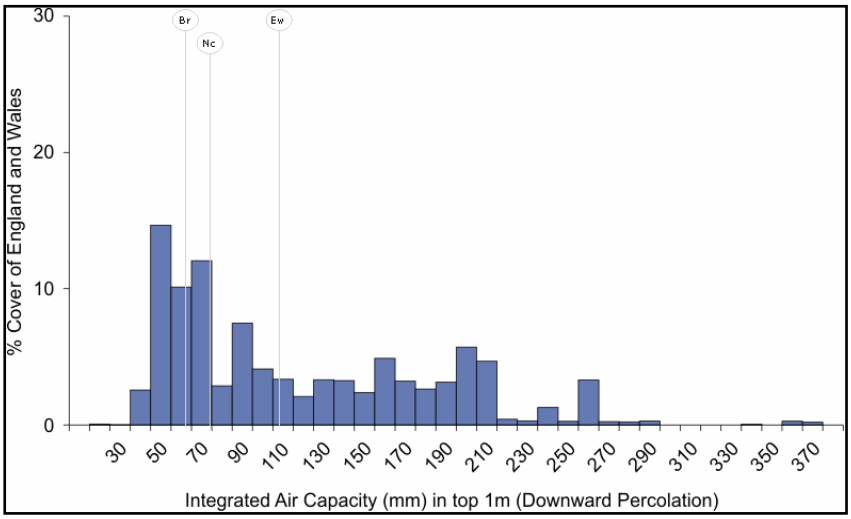


Figure 58. Integrated Air Capacity

Standard Percentage Runoff (SPR) is the percentage of rainfall that causes the short-term increase in flow seen at a catchment outlet following a storm event. The values associated with individual soil series have been calculated from an analysis of the relationships between flow data and the soils present within the catchment for several hundred gauged catchments.

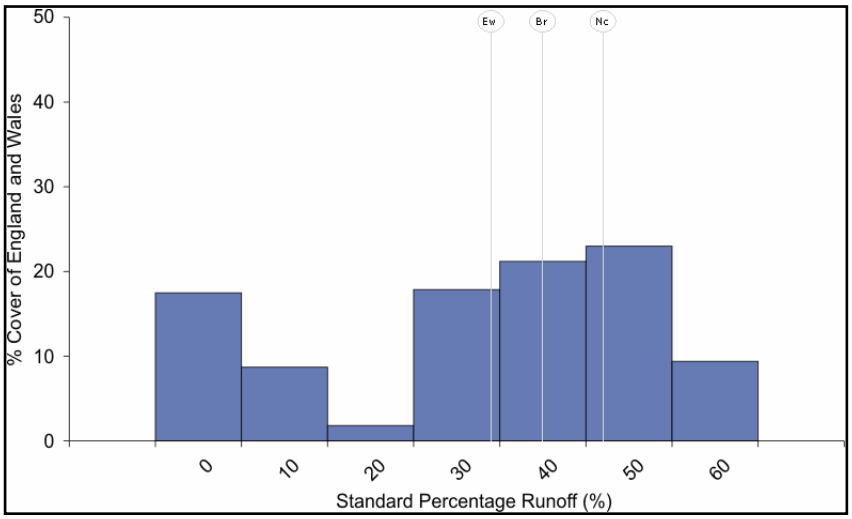


Figure 59. Standard Percentage Runoff

Base flow index is calculated from daily river flow data and expresses the volume of base flow of a river as a fraction of the total flow volume. The values associated with individual soil series have been calculated from an analysis of the relationships between flow data and the soils present within the catchment for several hundred gauged catchments.

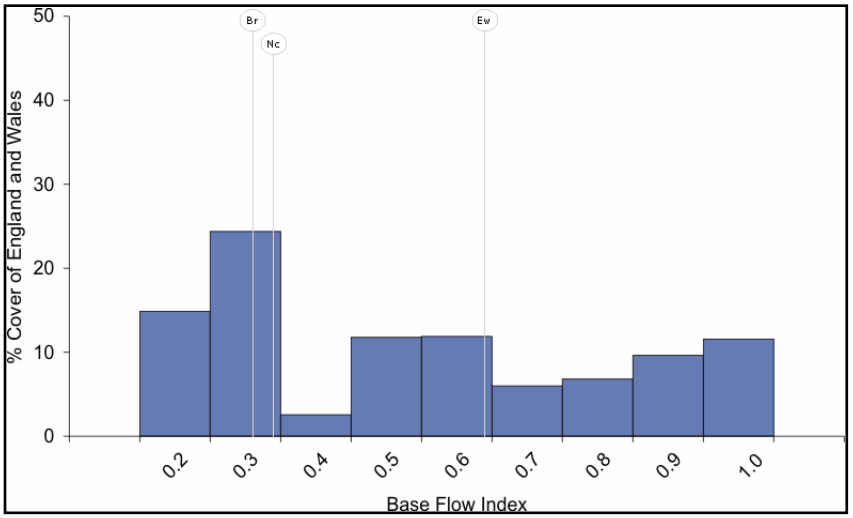


Figure 60. Base Flow Index

BRICKFIELD 2 (713f)

Slowly permeable seasonally waterlogged fine loamy soils.

e(iii). Available Water Content

Available water content for plants varies depending on a number of factors, including the rooting depth of the plants. Described below are differing available water contents for cereals, sugar beet, grass and potato crops, as well as a generic available water value to 1 m depth.

Available water (by crop) Available water content to 1 m for the specified soil series between suctions of 5 and 1500kPa.

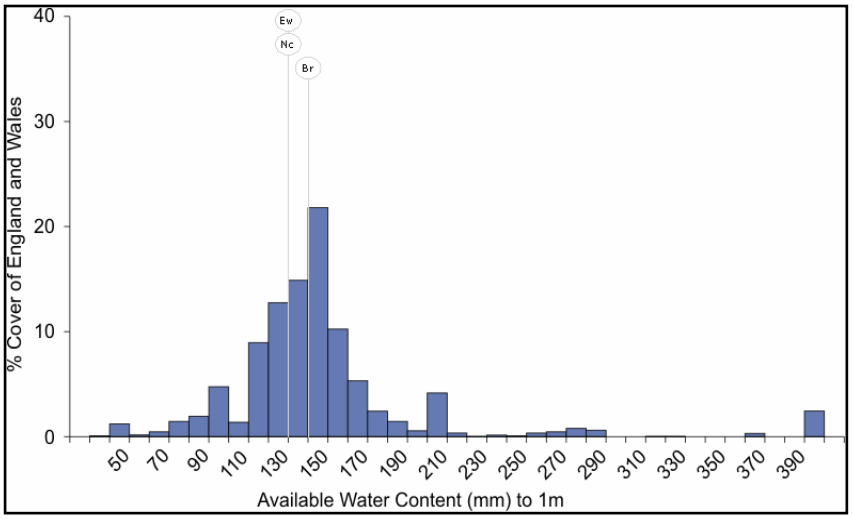


Figure 61. Available Water (by crop)

Available water for grass represents the water that is available to a permanent grass sward that is able to root to 100cm depth.

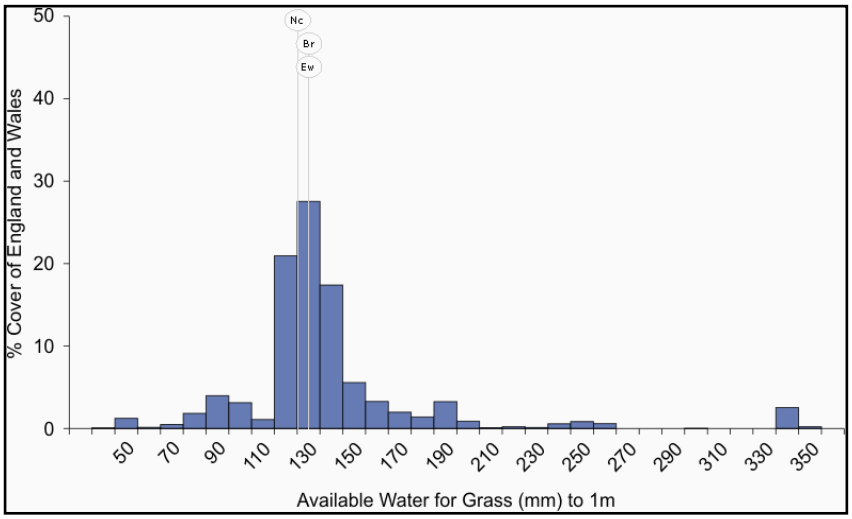


Figure 62. Available Water for Grass

BRICKFIELD 2 (713f)

Slowly permeable seasonally waterlogged fine loamy soils.

e(iii). Available Water Content continued

Available water for cereal represents the water that is available to a cereal crop that is able to root to 120cm depth.

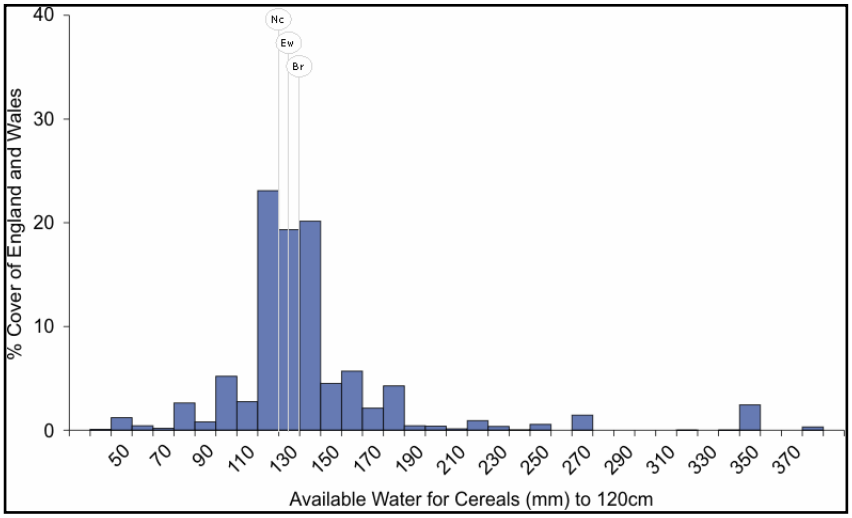


Figure 63. Available Water for Cereal

Available water for Sugar Beet represents the water that is available to a sugar beet crop that is able to root to 140cm depth.

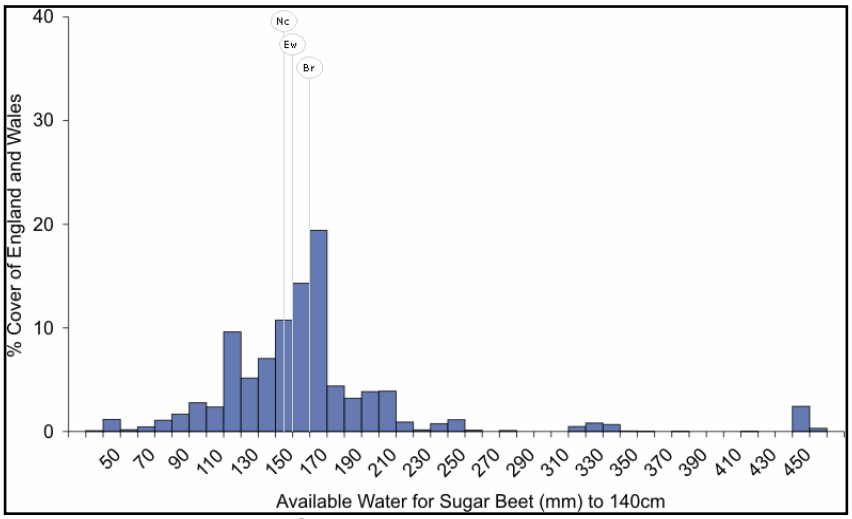


Figure 64. Available Water for Sugar Beet

Available water for Potatoes represents the water that is available to a potato crop that is able to root to 70cm depth.

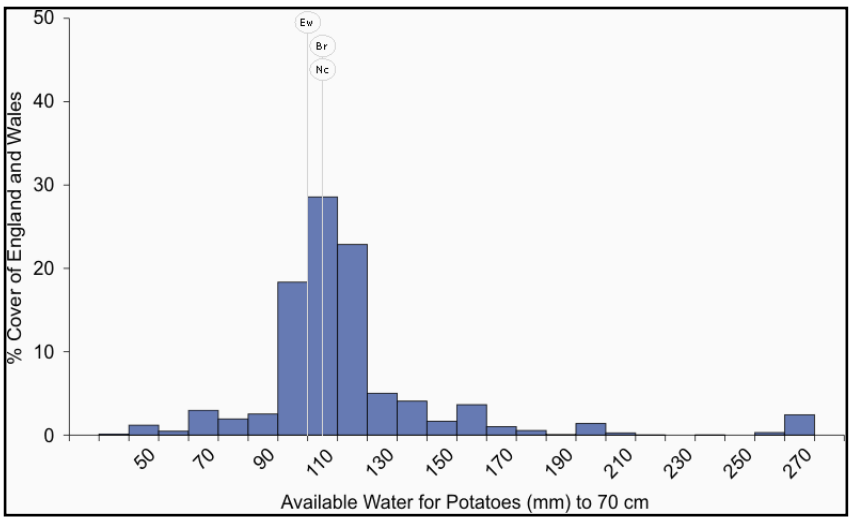
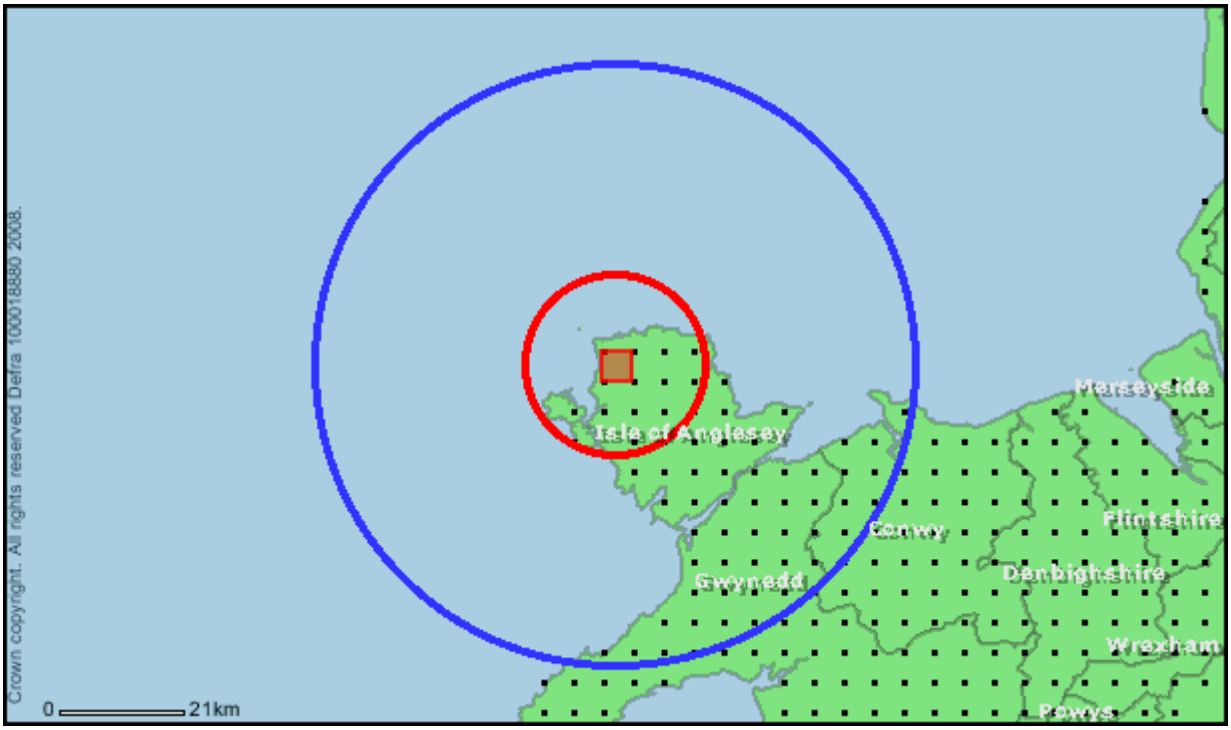


Figure 65. Available Water for Potatoes

3. TOPSOIL ELEMENT BACKGROUND LEVELS



TOPSOIL ELEMENT BACKGROUND LEVELS KEY

- ■ - NSI sample points
- ▭ - Report area
- ○ - 15 km radius - local area
- ○ - 50 km radius - regional area

TOPSOIL ELEMENT BACKGROUND LEVELS DESCRIPTION

The National Soil Inventory (NSI) covers England and Wales on a 5 km grid and provides detailed information for each intersect of the grid. Collectively NSI data are statistically representative of England and Wales soils. The original sampling was undertaken around 1980 and there were partial resamplings in the mid-1990s. The most up-to-date data is presented here.

Analysis of the NSI samples provides detailed measurements of over 20 elements from the soils, in addition to pH. This data is summarised over three areas to provide you with an understanding of how your site, and your data for it, sits within the local, regional and national context.

Where available, the soil element levels are compared with the Soil Guideline Values and where a soil sample we have analysed has been found in excess of the SGV guidelines for "residential with plant uptake" land, this is displayed in red in the tables which follow.

SGV levels are provided for the following elements: lead, selenium, nickel, mercury, chromium, cadmium and arsenic.

In the following pages, a number of analyses of the topsoil are provided. The majority of analyses have been performed on the full compliment of sample points, however, in some areas, for some elements, only a few samples were analysed as part of subsequent programmes. In order to present the full suite of possible datasets, and accurately convey the validity of the data, the number of actual measured samples is stated for each analysis. Care should be taken where the number of samples is disproportionately low.

3a. Analyses Within a 15 km Radius (14 Sample Points)

ANALYSES	SAMPLES	MEAN	MIN	MAX	ST. DEV
pH (PH)	14	5.1	4.5	5.6	0.4
Carbon (CARBON)	14	4.7	2.2	13.5	2.9
Aluminium (AL_ACID)	14	33,346.3	13,802.0	53,950.0	9,671.8
Arsenic (AS_ACID)	12	3.8	2.0	9.6	2.0
Barium (BA_ACID)	14	189.4	76.0	372.0	89.7
Calcium (CA_ACID)	14	2,958.9	353.0	4,696.0	1,357.5
Cadmium (CD_ACID)	14	0.6	0.1	1.3	0.4
Cadmium (Extractable) (CD_EDTA)	14	0.2	0.1	0.4	0.1
Cobalt (CO_ACID)	14	11.9	3.6	26.1	7.0
Cobalt (Extractable) (CO_EDTA)	14	0.7	0.1	2.1	0.7
Chromium (CR_ACID)	14	51.0	34.8	88.4	16.3
Copper (CU_ACID)	14	28.4	5.8	103.7	24.0
Copper (Extractable) (CU_EDTA)	14	8.3	1.2	39.2	9.2
Flouride (F_ACID)	13	45.1	0.0	137.0	39.0
Iron (FE_ACID)	14	33,349.7	17,114.0	53,860.0	10,669.5
Mercury (HG_ACID)	12	0.0	0.0	0.1	0.0
Potassium (K_ACID)	14	5,181.6	2,280.0	8,269.0	1,751.2
Potassium (Extractable) (K_NITRATE)	14	107.3	38.0	247.0	55.6
Magnesium (MG_ACID)	14	3,903.4	2,138.0	5,459.0	930.7
Magnesium (Extractable) (MG_NITRATE)	14	133.6	55.0	307.0	65.3
Manganese (MN_ACID)	14	1,110.6	231.0	2,707.0	881.9
Manganese (Extractable) (MN_EDTA)	14	156.3	9.0	589.0	158.9
Molybdenum (MO_ACID)	13	1.0	0.0	2.9	0.7
Sodium (NA_ACID)	14	620.8	193.0	1,176.0	355.1
Nickel (NI_ACID)	14	21.6	10.0	33.0	7.5
Nickel (Extractable) (NI_EDTA)	14	0.9	0.3	2.9	0.7
Phosphorus (P_ACID)	14	869.1	175.0	2,016.0	492.3
Phosphorus (Extractable) (P_OLSEN)	14	22.9	6.0	58.0	13.7
Lead (PB_ACID)	14	46.9	15.0	151.0	33.4
Lead (Extractable) (PB_EDTA)	14	13.5	3.6	56.7	14.2
Selenium (SE_ACID)	12	0.6	0.2	1.0	0.2
Strontium (SR_ACID)	14	30.8	2.0	54.0	12.3
Vanadium (V_ACID)	13	38.3	6.7	52.3	12.1
Zinc (ZN_ACID)	14	89.4	25.0	237.0	52.8
Zinc (Extractable) (ZN_EDTA)	14	3.7	1.1	10.2	2.3

for units, see Analyses Definitions (p65)

3b. Analyses Within a 50 km Radius (66 Sample Points)

ANALYSES	SAMPLES	MEAN	MIN	MAX	ST. DEV
pH (PH)	66	4.8	3.5	6.2	0.6
Carbon (CARBON)	66	10.1	0.2	44.1	11.0
Aluminium (AL_ACID)	66	24,787.4	3,269.0	53,950.0	11,212.2
Arsenic (AS_ACID)	42	5.2	0.4	25.2	4.1
Barium (BA_ACID)	66	149.3	11.0	393.0	87.1
Calcium (CA_ACID)	66	1,980.5	100.0	5,800.0	1,511.1
Cadmium (CD_ACID)	66	0.6	0.0	4.5	0.6
Cadmium (Extractable) (CD_EDTA)	65	1.3	0.0	75.0	9.3
Cobalt (CO_ACID)	66	16.5	0.7	321.8	43.1
Cobalt (Extractable) (CO_EDTA)	65	0.9	0.0	10.8	1.8
Chromium (CR_ACID)	66	36.8	4.3	95.4	21.1
Copper (CU_ACID)	66	22.5	2.4	103.7	17.4
Copper (Extractable) (CU_EDTA)	65	5.5	1.2	39.2	5.0
Flouride (F_ACID)	55	49.1	0.0	340.7	68.2
Iron (FE_ACID)	66	28,449.2	4,223.0	83,515.0	14,519.8
Mercury (HG_ACID)	42	0.1	0.0	1.2	0.2
Potassium (K_ACID)	66	3,903.9	581.0	8,269.0	1,913.2
Potassium (Extractable) (K_NITRATE)	66	105.2	13.0	256.0	49.9
Magnesium (MG_ACID)	66	3,202.6	322.0	11,264.0	2,123.2
Magnesium (Extractable) (MG_NITRATE)	66	107.0	24.0	307.0	51.2
Manganese (MN_ACID)	66	1,336.8	32.0	13,613.0	1,835.3
Manganese (Extractable) (MN_EDTA)	65	176.7	1.0	2,347.0	301.5
Molybdenum (MO_ACID)	55	1.3	0.0	5.9	1.3
Sodium (NA_ACID)	66	453.7	137.0	2,209.0	350.4
Nickel (NI_ACID)	66	17.9	2.9	61.0	11.4
Nickel (Extractable) (NI_EDTA)	65	0.7	0.1	2.9	0.5
Phosphorus (P_ACID)	66	940.9	175.0	2,214.0	384.7
Phosphorus (Extractable) (P_OLSEN)	66	20.7	3.0	88.0	14.3
Lead (PB_ACID)	66	77.0	6.0	795.0	99.4
Lead (Extractable) (PB_EDTA)	65	18.8	3.6	108.0	18.1
Selenium (SE_ACID)	42	1.0	0.0	6.4	1.1
Strontium (SR_ACID)	66	19.3	0.0	54.0	11.8
Vanadium (V_ACID)	56	35.0	0.0	96.1	26.2
Zinc (ZN_ACID)	66	71.7	21.0	237.0	41.0
Zinc (Extractable) (ZN_EDTA)	65	5.1	1.1	21.1	3.7

for units, see Analyses Definitions (p65)

3c. National Analyses (5686 Sample Points)

ANALYSES	SAMPLES	MEAN	MIN	MAX	ST. DEV
pH (PH)	5,630	6.0	3.1	9.2	1.3
Carbon (CARBON)	5,672	6.1	0.1	61.5	8.9
Aluminium (AL_ACID)	5,677	26,775.3	491.0	79,355.0	12,772.2
Arsenic (AS_ACID)	2,729	4.6	0.0	110.0	5.7
Barium (BA_ACID)	5,677	150.0	7.0	3,840.0	159.5
Calcium (CA_ACID)	5,677	13,768.7	0.0	339,630.0	37,785.0
Cadmium (CD_ACID)	5,677	0.7	0.0	40.9	1.0
Cadmium (Extractable) (CD_EDTA)	5,655	0.5	0.0	85.0	3.0
Cobalt (CO_ACID)	5,677	10.6	0.0	567.0	13.7
Cobalt (Extractable) (CO_EDTA)	5,655	1.1	0.0	26.5	1.2
Chromium (CR_ACID)	5,677	38.9	0.0	2,339.8	43.7
Copper (CU_ACID)	5,677	22.6	0.0	1,507.7	36.8
Copper (Extractable) (CU_EDTA)	5,655	6.4	0.3	431.4	11.1
Flouride (F_ACID)	3,320	58.5	0.0	6,307.9	186.2
Iron (FE_ACID)	5,677	28,147.8	395.0	264,405.0	16,510.5
Mercury (HG_ACID)	2,159	0.1	0.0	2.4	0.2
Potassium (K_ACID)	5,677	4,727.7	60.0	23,905.0	2,700.2
Potassium (Extractable) (K_NITRATE)	5,609	182.0	6.0	2,776.0	151.6
Magnesium (MG_ACID)	5,677	3,648.1	0.0	62,690.0	3,284.1
Magnesium (Extractable) (MG_NITRATE)	5,609	146.0	1.0	1,601.0	147.5
Manganese (MN_ACID)	5,677	777.0	3.0	42,603.0	1,068.8
Manganese (Extractable) (MN_EDTA)	5,654	159.4	0.0	3,108.0	188.6
Molybdenum (MO_ACID)	4,417	0.9	0.0	56.3	2.0
Sodium (NA_ACID)	5,677	323.3	17.0	25,152.0	572.3
Nickel (NI_ACID)	5,677	25.4	0.0	1,350.2	29.2
Nickel (Extractable) (NI_EDTA)	5,655	1.6	0.1	73.2	2.0
Phosphorus (P_ACID)	5,677	792.1	41.0	6,273.0	433.9
Phosphorus (Extractable) (P_OLSEN)	5,604	27.4	0.0	534.0	25.5
Lead (PB_ACID)	5,677	73.3	0.0	17,365.0	280.6
Lead (Extractable) (PB_EDTA)	5,655	27.8	1.2	6,056.5	119.7
Selenium (SE_ACID)	2,729	0.6	0.0	22.8	0.8
Strontium (SR_ACID)	5,677	42.3	0.0	1,445.0	67.8
Vanadium (V_ACID)	4,428	41.0	0.0	854.4	33.9
Zinc (ZN_ACID)	5,677	90.2	0.0	3,648.0	104.4
Zinc (Extractable) (ZN_EDTA)	5,655	9.6	0.5	712.0	24.6

for units, see Analyses Definitions (p65)

SOIL GUIDELINE VALUES (SGV)

Defra and the Environment Agency have produced soil guideline values (SGVs) as an aid to preliminary assessment of potential risk to human health from land that may be contaminated. SGVs represent 'intervention values', which, if exceeded, act as indicators of potential unacceptable risk to humans, so that more detailed risk assessment is needed.

The SGVs were derived using the Contaminated Land Exposure Assessment (CLEA) model for four land uses:

1. residential (with plant uptake / vegetable growing)
2. residential (without vegetable growing)
3. allotments
4. commercial / industrial

SGVs are only designed to indicate whether further site-specific investigation is needed. Where a soil guideline value is exceeded, it does not mean that there is necessarily a chronic or acute risk to human health.

The values presented in this report represent those from a number of sample points (given in the "Samples" column in each table) providing local, regional and national background levels. Figures which appear in red indicate that a bulked sample from 20m surrounding a sample point, has at a past date, exceeded the SGV for the 'residential with plant uptake' land use.

It is always advisable to perform site specific investigations.

More details on all the SGVs can be found on the Environment Agency Website.

All units are mg/kg which is equivalent to parts per million (ppm)

SUBSTANCE	RESIDENTIAL WITH PLANT UPTAKE	RESIDENTIAL WITHOUT PLANT UPTAKE	ALLOTMENTS	COMMERCIAL / INDUSTRIAL
LEAD	450	450	450	750
SELENIUM	35	260	35	8000
NICKEL	50	75	50	5000
MERCURY	8	15	8	480
CHROMIUM	130	200	130	5000
CADMIUM (pH 6)	1	30	1	1400
CADMIUM (pH 7)	2	30	2	1400
CADMIUM (pH 8)	8	30	8	1400
ARSENIC	20	20	20	500

ANALYSES DEFINITIONS

PH (pH)
pH of soil measure after shaking 10ml of soil for 15 minutes with 25ml of water

CARBON (Carbon)
Organic Carbon (% by wt) measured either by loss-on-ignition for soils estimated to contain more than about 20% organic carbon or by dichromate digestion.

AL_ACID (Aluminium)
Total Aluminium concentration (mg/kg) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) in an aqua regia digest

AS_ACID (Arsenic)
Total Arsenic concentration (mg/kg) determined by Hydride Atomic Absorption Spectrometry (AAS), extracted into hydrochloric acid after digestion with nitric acid and ashing with magnesium nitrate

BA_ACID (Barium)
Total Barium concentration (mg/kg) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) in an aqua regia digest

CA_ACID (Calcium)
Total Calcium concentration (mg/kg) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) in an aqua regia digest

CD_ACID (Cadmium)
Total Cadmium concentration (mg/kg) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) in an aqua regia digest

CD_EDTA (Cadmium Extractable)
Extractable Cadmium concentration (mg/l) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) after shaking 10ml of soil with 50ml of 0.05M EDTA at pH 7.0 for 1h at 20 deg. C and then filtering

CO_ACID (Cobalt)
Total Cobalt concentration (mg/kg) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) in an aqua regia digest

CO_EDTA (Cobalt Extractable)
Extractable Cobalt concentration (mg/l) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) after shaking 10ml of soil with 50ml of 0.05M EDTA at pH 7.0 for 1h at 20 deg. C and then filtering

CR_ACID (Chromium)
Total Chromium concentration (mg/kg) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) in an aqua regia digest

CU_ACID (Copper)
Total Copper concentration (mg/kg) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) in an aqua regia digest

CU_EDTA (Copper Extractable)
Extractable Copper concentration (mg/l) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) after shaking 10ml of soil with 50ml of 0.05M EDTA at pH 7.0 for 1h at 20 deg. C and then filtering

F_ACID (Flouride)
Flouride extracted with 1mol / l sulphuric acid and determined by Ion Selective Electrode (ISE)

FE_ACID (Iron)
Total Iron concentration (mg/kg) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) in an aqua regia digest

HG_ACID (Mercury)
Total Mercury concentration (mg/kg) determined by Hydride Atomic Absorption Spectrometry (AAS), digested in a nitric/sulphuric acid mixture

K_ACID (Potassium)
Total Potassium concentration (mg/kg) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) in an aqua regia digest

K_NITRATE (Potassium Extractable)
Extractable Potassium concentration (mg/l) determined by shaking 10ml of air dry soil with 50ml of 1.0M ammonium nitrate for 30mins, filtering and then measuring the concentration by flame photometry

ANALYSES DEFINITIONS continued

MG_ACID (Magnesium)
Total Magnesium concentration (mg/kg) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) in an aqua regia digest

MG_NITRATE (Magnesium Extractable)
Extractable Magnesium concentration (mg/l) determined by shaking 10ml of air dry soil with 50ml of 1.0M ammonium nitrate for 30mins, filtering and then measuring the concentration by flame photometry

MN_ACID (Manganese)
Total Manganese concentration (mg/kg) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) in an aqua regia digest

MN_EDTA (Manganese Extractable)
Extractable Manganese concentration (mg/l) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) after shaking 10ml of soil with 50ml of 0.05M EDTA at pH 7.0 for 1h at 20 deg. C and then filtering

MO_ACID (Molybdenum)
Total Molybdenum concentration (mg/kg) determined by Atomic Adsorption Spectrometyr (AAS) in an aqua regia digest

MO_EDTA (Molybdenum Extractable)
Extractable Molybdenum concentration (mg/l) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) after shaking 10ml of soil with 50ml of 0.05M EDTA at pH 7.0 for 1h at 20 deg. C and then filtering

NA_ACID (Sodium)
Total Sodium concentration (mg/kg) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) in an aqua regia digest

NI_ACID (Nickel)
Total Nickel concentration (mg/kg) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) in an aqua regia digest

NI_EDTA (Nickel Extractable)
Extractable Nickel concentration (mg/l) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) after shaking 10ml of soil with 50ml of 0.05M EDTA at pH 7.0 for 1h at 20 deg. C and then filtering

P_ACID (Phosphorus)
Total Phosphorus concentration (mg/kg) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) in an aqua regia digest

P_OLSON (Phosphorous Extractable)
Extractable Phosphorus concentration (mg/l) determined by shaking 5ml of air dry soil with 100ml of 0.5M sodium bicarbonate for 30mins at 20 deg.C, filtering and then measuring the absorbance at 880 nm colorimetrically with acid ammonium molybdate solution

PB_ACID (Lead)
Total Lead concentration (mg/kg) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) in an aqua regia digest

PB_EDTA (Lead Extractable)
Extractable Lead concentration (mg/l) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) after shaking 10ml of soil with 50ml of 0.05M EDTA at pH 7.0 for 1h at 20 deg. C and then filtering

SE_ACID (Selenium)
Total Selenium concentration (mg/kg) determined by Hydride Atomic Absorption Spectrometry (AAS), extracted into hydrochloric acid after digestion with nitric acid and ashing with magnesium nitrate

SR_ACID (Strontium)
Total Strontium concentration (mg/kg) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) in an aqua regia digest

V_ACID (Vanadium)
Total Vanadium concentration (mg/kg) determined by Atomic Adsorption Spectrometyr (AAS) in an aqua regia digest

ZN_ACID (Zinc)
Total Zinc concentration (mg/kg) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) in an aqua regia digest

ZN_EDTA (Zinc Extractable)
Extractable Zinc concentration (mg/l) determined by Inductively Coupled Plasma Emission Spectrometry (ICP) after shaking 10ml of soil with 50ml of 0.05M EDTA at pH 7.0 for 1h at 20 deg. C and then filtering

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To view the glossary visit: www.landis.org.uk/sitereporter/GLOSSARY.pdf

For a list of further reading visit: www.landis.org.uk/sitereporter/FURTHER_READING.pdf

For more information visit: www.landis.org.uk/reports

GIS DATASETS:

The GIS data used in the creation of this report is available to lease for use in projects.

To learn more about, or acquire the GIS datasets used in the creation of this report, please contact the National Soil Resources Institute:

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Appendix B. Groundsure Enviroinsight, Geoinsight and Mapinsight

Jacobs

95 SCOTTISH LEGAL LIFE BUILDING 1/1
JACOBS UK LTD, BOTHWELL STREET,
GLASGOW, G2 7HX

Groundsure Reference:	GS-2735145
Your Reference:	60PO8050
Report Date	8 Feb 2016
Report Delivery Method:	Email - pdf

Groundsure Enviroinsight

Address: HEN SIOP, A5025, HOLYHEAD, LL65 4NW

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Enviroinsight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,

[redacted]

Managing Director
Groundsure Limited

Enc.
Groundsure Enviroinsight

Groundsure Enviroinsight

Address:	**HEN SIOP, A5025, HOLYHEAD, LL65 4NW**
Date:	**8 Feb 2016**
Reference:	**GS-2735145**
Client:	**Jacobs**

NW N NE

W E

SW S SE

Aerial Photograph Capture date:	04-Jun-2013
Grid Reference:	231695,387214
Site Size:	0.98ha

Report Reference: GS-2735145
Client Reference: 60PO8050

Groundsure
LOCATION INTELLIGENCE

Contents Page

Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	1	2	17	5
1.2 Additional Information – Historical Tank Database	0	0	2	1
1.3 Additional Information – Historical Energy Features Database	0	0	0	0
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	2	0	0	0
1.6 Potentially Infilled Land	0	1	17	11

Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	0
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	2	0
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	0	3	0
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency Registered Landfill Sites	0	0	0	0	0	Not searched
3.1.2 Environment Agency Historic Landfill Sites	0	0	1	0	0	0
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	0
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	0
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency Licensed Waste Sites	0	0	2	1	0	0

Section 4: Current Land Use

	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	0	1	4	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	0	0
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology

5.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	No
5.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 6: Hydrogeology and Hydrology

	0-500m
6.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes
6.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
6.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	0	0	0	0	Not searched	Not searched

	On-site	0-50m	51-250	251-500	501-1000	1000-1500

Section 6: Hydrogeology and Hydrology	0-500m					
6.9 Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	No	No	No
6.10 Detailed River Network entries within 500m of the site	1	0	5	4	Not searched	Not searched
6.11 Surface water features within 250m of the study site	Yes	No	Yes	Not searched	Not searched	Not searched

Section 7: Flooding	
7.1 Are there any Enviroment Agency Zone 2 floodplains within 250m of the study site?	No
7.2 Are there any Environment Agency Zone 3 floodplains within 250m of the study site	No
7.3 What is the Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site?	Very Low
7.4 Are there any Flood Defences within 250m of the study site?	No
7.5 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
7.6 Are there any areas used for Flood Storage within 250m of the study site?	No
7.7 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Potential at Surface
7.8 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Moderate

Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	2	0
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	0	0	26	1
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	1	0	0	0	1

Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0
8.14 Records of Green Belt land	0	0	0	0	0	0

Section 9: Natural Hazards

9.1 What is the maximum risk of natural ground subsidence?	Very Low
9.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Very Low
9.1.2 What is the maximum Landslides hazard rating identified on the study site?	Very Low
9.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Negligible
9.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Negligible
9.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Very Low
9.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Very Low
9.2 Radon	
9.2.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.
9.2.2 Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary.

Section 10: Mining

10.1 Are there any coal mining areas within 75m of the study site?	No
10.2 Are there any Non-Coal Mining areas within 50m of the study site boundary?	Yes
10.3 Are there any brine affected areas within 75m of the study site?	No

Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

1. Historical Industrial Sites

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

2. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

3. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

4. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

5. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

6. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

7. Flooding

Provides information on river and coastal flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

8. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

9. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence and radon..

10. Mining

Provides information on areas of coal and non-coal mining and brine affected areas.

11. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

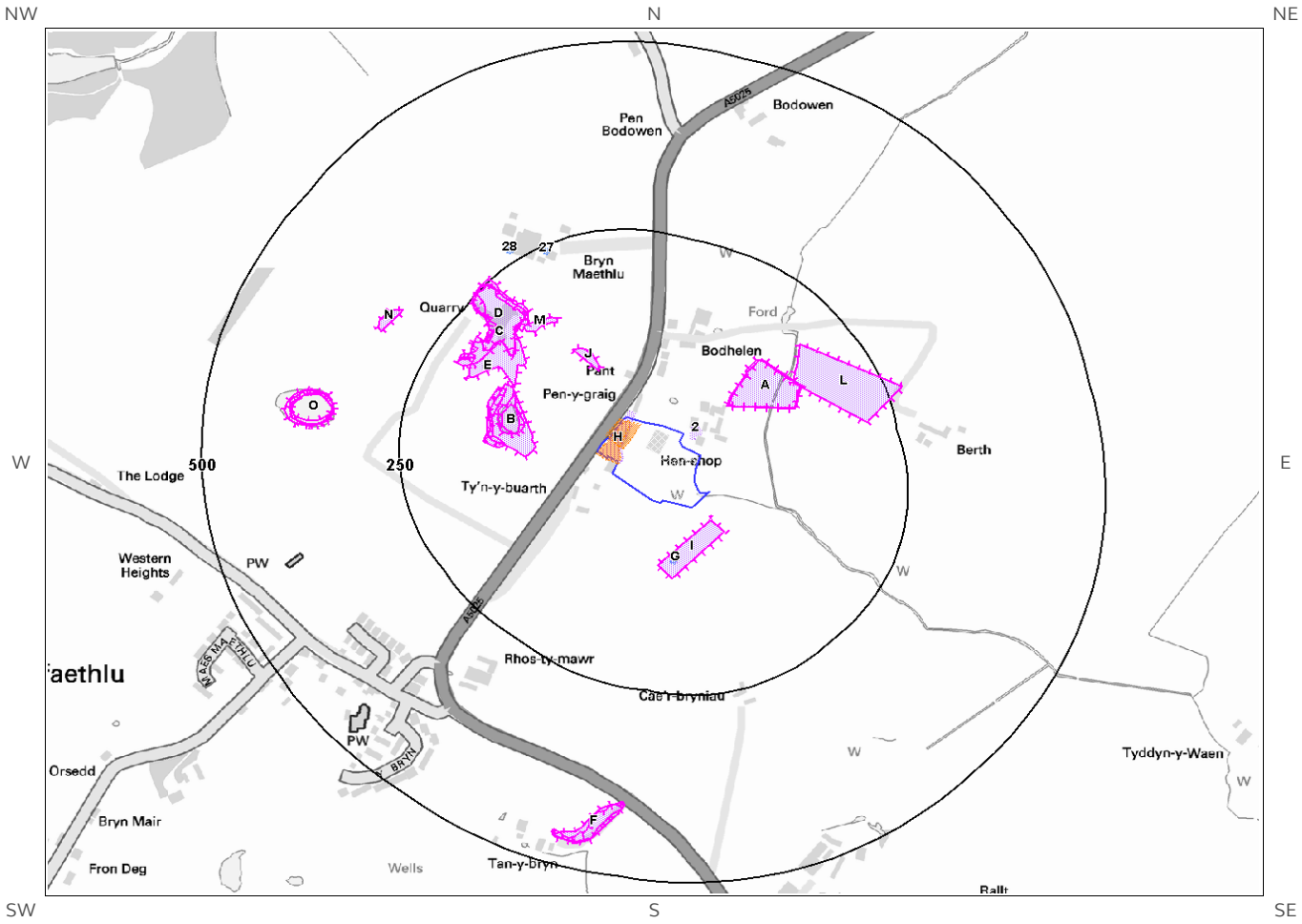
Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier “A” on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as “Not Shown”.

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

1. Historical Land Use



Site Outline

250
500
Search Buffers (m)

Historical 1:10,000 and 1:10,560 scale mapping

Industrial Land Use

Potentially Infilled Land

Historical 1:2,500, 1:1,250 and 1:500 scale mapping

Energy Features

Petrol Stations

Tanks

Garages

1. Historical Industrial Sites

1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 25

ID	Distance [m]	Direction	Use	Date
1H	0	On Site	Garage	1978
2	9	E	Smithy	1899
3I	28	SE	Sewage Works	1978
4A	67	NE	Burial Ground	1959
5A	68	NE	Site of Burial Ground	1926
6G	69	S	Unspecified Tank	1978
7J	69	NW	Unspecified Pit	1886
8B	77	W	Unspecified Quarry	1949
9B	77	W	Unspecified Old Quarry	1886
10B	77	W	Unspecified Old Quarry	1899
11K	116	W	Unspecified Ground Workings	1959
12C	133	NW	Unspecified Old Quarry	1886
13L	152	NE	Site of Burial Ground	1949
14M	153	NW	Unspecified Heap	1886
15C	161	NW	Unspecified Quarry	1949
16C	161	NW	Unspecified Old Quarry	1899
17D	162	NW	Unspecified Quarry	1959
18D	162	NW	Unspecified Disused Quarry	1978
19E	172	NW	Disused Lime Kiln	1978
20E	174	NW	Old Lime Kiln	1886
21N	308	NW	Unspecified Heap	1886
22F	400	S	Unspecified Quarry	1899
23F	400	S	Unspecified Quarry	1949
24F	400	S	Unspecified Quarry	1886
25F	405	S	Unspecified Quarry	1978

1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary: 3

ID	Distance (m)	Direction	Use	Date
26G	71	S	Unspecified Tank	1995
27	238	NW	Unspecified Tank	1924
28	261	NW	Unspecified Tank	1924

1.3 Additional Information – Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary: 0

Database searched and no data found.

1.4 Additional Information – Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 2

ID	Distance (m)	Direction	Use	Date
29H	0	On Site	Garage	1995
30H	0	On Site	Garage	1974

1.6 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 29

The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

ID	Distance(m)	Direction	Use	Date
31I	28	SE	Sewage Works	1978
32A	67	NE	Burial Ground	1959
33A	68	NE	Site of Burial Ground	1926
34J	69	NW	Unspecified Pit	1886
35B	77	W	Unspecified Old Quarry	1886
36B	77	W	Unspecified Quarry	1949
37B	77	W	Unspecified Old Quarry	1899
38B	98	W	Pond	1886
39B	98	W	Pond	1899
40B	103	W	Pond	1978
41K	116	W	Unspecified Ground Workings	1959
42C	133	NW	Unspecified Old Quarry	1886
43L	152	NE	Site of Burial Ground	1949
44M	153	NW	Unspecified Heap	1886
45D	161	NW	Unspecified Quarry	1949
46D	161	NW	Unspecified Old Quarry	1899
47D	162	NW	Unspecified Quarry	1959
48D	162	NW	Unspecified Disused Quarry	1978
49N	308	NW	Unspecified Heap	1886
50O	337	W	Pond	1926
51O	339	W	Pond	1978
52O	339	W	Pond	1949
53O	339	W	Pond	1886
54O	339	W	Pond	1899
55O	339	W	Pond	1959
56F	400	S	Unspecified Quarry	1886
57F	400	S	Unspecified Quarry	1899
58F	400	S	Unspecified Quarry	1949
59F	405	S	Unspecified Quarry	1978

2. Environmental Permits, Incidents and Registers Map

- Site Outline
- Search Buffers (m) (250, 500)
- Recorded Pollution Incident
- Dangerous Substances (List 1)
- Dangerous Substances (List 2)
- Water Industry Referrals
- Licenced Discharge Consents
- Red List Discharge Consents
- RAS 3 & 4 Authorisations
- Part A(1) Authorised Processes and Historic IPC Authorisations
- Part A(2) and Part B Authorised Processes
- COMAH / NIHHS Sites
- Sites Determined as Contaminated Land
- Hazardous Substance Consents and Enforcements

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

2.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

2.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

2.1.3 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

2.1.4 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.5 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

0

Database searched and no data found.

2.1.6 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

0

Database searched and no data found.

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

2.1.8 Records of Licensed Discharge Consents within 500m of the study site:

2

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
4A	123	SE	231900 387130	Address: LLANFAETHLU STW, LLANFAETHLU STW, UNKNOWN, UNKNOWN, UNKNOWN, UNKNOWN Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: CG0110201 Permit Version: 1	Receiving Water: Status: NEW CONSENT, BY APPLICATION (WRA 91, SECTION 88) Issue date: 06/12/1982 Effective Date: 06-Dec-1982 Revocation Date: 31/12/2009
5A	123	SE	231900 387130	Address: LLANFAETHLU STW, LLANFAETHLU STW, UNKNOWN, UNKNOWN, UNKNOWN, UNKNOWN Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - WATER COMPANY Permit Number: CG0110201 Permit Version: 2	Receiving Water: Status: NEW CONSENT, BY APPLICATION (WRA 91, SECTION 88) Issue date: 24/09/2009 Effective Date: 01-Jan-2010 Revocation Date: -

2.1.9 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site: 0

Database searched and no data found.

2.3 Environment Agency Recorded Pollution Incidents

2.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

3

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
1	70	S	231763 387088	Incident Date: 31-Mar-2003 Incident Identification: 147516 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
2	79	S	231731 387085	Incident Date: 20-Oct-2001 Incident Identification: 37915 Pollutant: Sewage Materials Pollutant Description: Crude Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
3	88	SE	231802 387079	Incident Date: 08-Nov-2002 Incident Identification: 119554 Pollutant: Sewage Materials Pollutant Description: Storm Sewage	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

2.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site? 0

Database searched and no data found.

3. Landfill and Other Waste Sites Map

Site Outline

250
500
Search Buffers (m)

E.A. Active Landfill

E.A. Historic Landfill

BGS / DoE Survey Landfill

Historic and Planned Waste Sites

E.A. Licensed Waste Site

Local Authority/Historical Mapping Landfill Records

3. Landfill and Other Waste Sites

3.1 Landfill Sites

3.1.1 Records from Environment Agency landfill data within 1000m of the study site:

0

Database searched and no data found.

3.1.2 Records of Environment Agency historic landfill sites within 1500m of the study site:

1

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
1	161	NW	231491 387421	Site Address: Bryn Maethlu Landfill, Holyhead, Llanfaethlu, Ynys Mon Waste Licence: Yes Site Reference: - Waste Type: Inert Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: 21-Sep-1995 Licence Surrendered: 16-Mar-2010 Licence Hold Address: Off Spencer Road, Valley, , Ynys Mon Operator: Bryn Maethlu Landfill First Recorded: - Last Recorded: -

3.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

0

Database searched and no data found.

3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

0

Database searched and no data found.

3.2 Other Waste Sites

3.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

0

Database searched and no data found.

3.2.2 Records of Environment Agency licensed waste sites within 1500m of the study site:

3

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
2A	236	NW	231491 387421	Site Address: Bryn Maethlu Landfill, Llanfaethlu, Holyhead, Ynys Mon, LL65 4NW Type: Landfill taking Non-Biodegradeable Wastes Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: PAR002 EPR reference: ZP3894FD/S005 Operator: Parry Emyr Wyn Waste Management licence No: 37136 Annual Tonnage: 0.0	Issue Date: 21/09/1995 Effective Date: - Modified: - Surrendered Date: 16/03/2010 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Bryn Maethlu Landfill Correspondence Address: -, -
3A	236	NW	231491 387421	Site Address: Bryn Maethlu Landfill, Llanfaethlu, Holyhead, Ynys Mon, LL65 4NW Type: Landfill taking Non-Biodegradeable Wastes Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: PAR002 EPR reference: EA/EPR/ZP3894FD/S005 Operator: Parry Emyr Wyn Waste Management licence No: 37136 Annual Tonnage: 0.0	Issue Date: 21/09/1995 Effective Date: - Modified: - Surrendered Date: 16/03/2010 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Bryn Maethlu Landfill Correspondence Address: -, -
4	258	NW	231502 387466	Site Address: Gwynant, Llanfachraeth, Holyhead, Ynys Mon, LL65 4DD Type: Landfill taking Non-Biodegradeable Wastes Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: PAR002 EPR reference: - Operator: Parry E W & Sons Waste Management licence No: 37136 Annual Tonnage: 0.0	Issue Date: 21/09/1995 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Bryn Maethlu Landfill Correspondence Address: -, Cleifiog Uchaf, Off Spencer Road, Valley, Ynys Mon, LL65 3AB

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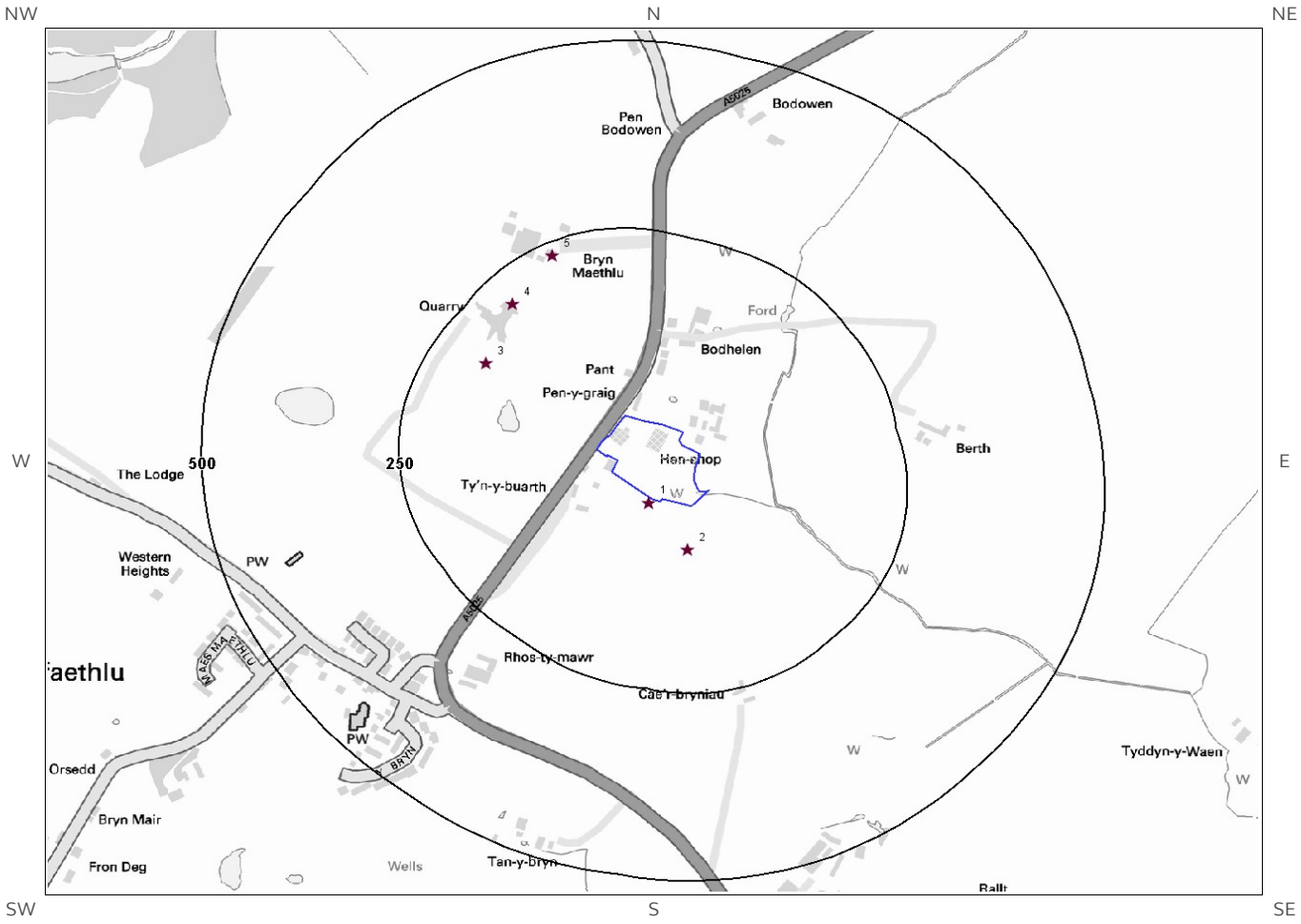
4. Current Land Use Map



Site Outline

Search Buffers (m)
250
500

Current Industrial Sites

Petrol & Fuel Sites

Electricity Transmission Cables

Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 5

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	7	SW	Pumping House	231709 387163	LL65	Water Pumping Stations	Industrial Features
2	58	S	Sewage Works	231759 387100	LL65	Waste Storage, Processing and Disposal	Infrastructure and Facilities
3	180	NW	Lime Kiln (Disused)	231504 387349	LL65	Lime Kilns	Industrial Features
4	207	NW	Quarry (Disused)	231537 387428	LL65	Unspecified Quarries Or Mines	Extractive Industries
5	233	NW	Celtic Spirit Co	231587 387492	Bryn Maethlu, Llanfaethlu, Holyhead, LL65 4NW	Alcoholic Drinks	Foodstuffs

4.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site: 0

Database searched and no data found.

4.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site: 0

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

5.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
TILLD	TILL, DEVENSIAN	DIAMICTON

5.3 Bedrock and Solid Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
NGW-QZITE	GWNA GROUP	QUARTZITE
NGW-QZITE	GWNA GROUP	QUARTZITE
NGW-SCH	GWNA GROUP	SCHIST
NGW-QZITE	GWNA GROUP	QUARTZITE

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

6 Hydrogeology and Hydrology

6a. Aquifer Within Superficial Geology

6b. Aquifer Within Bedrock Geology and Abstraction Licenses

Site Outline

250
500
Search Buffers (m)

Principal Aquifer

Secondary (A) Aquifer - Permeable Layers

Secondary (B) Aquifer - Lower Permeability Layers

Groundwater Abstraction Licence

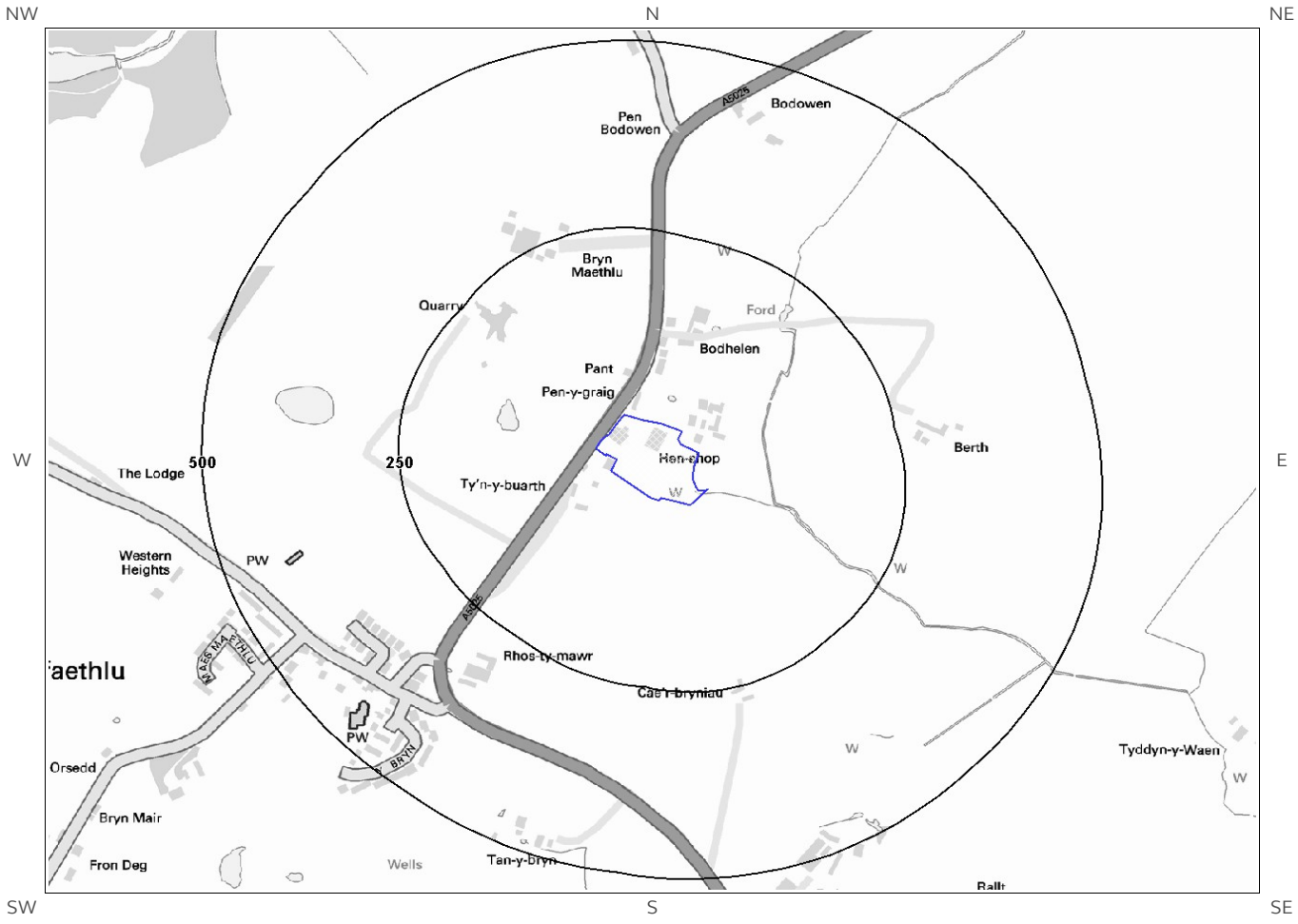
Secondary Aquifer - Undifferentiated Layers

Unproductive

Unknown (lakes and landslip)

Surface Water Abstraction Licence

6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



Site Outline

250
500
Search Buffers (m)

Source Protection Zone 1 - Inner Catchment

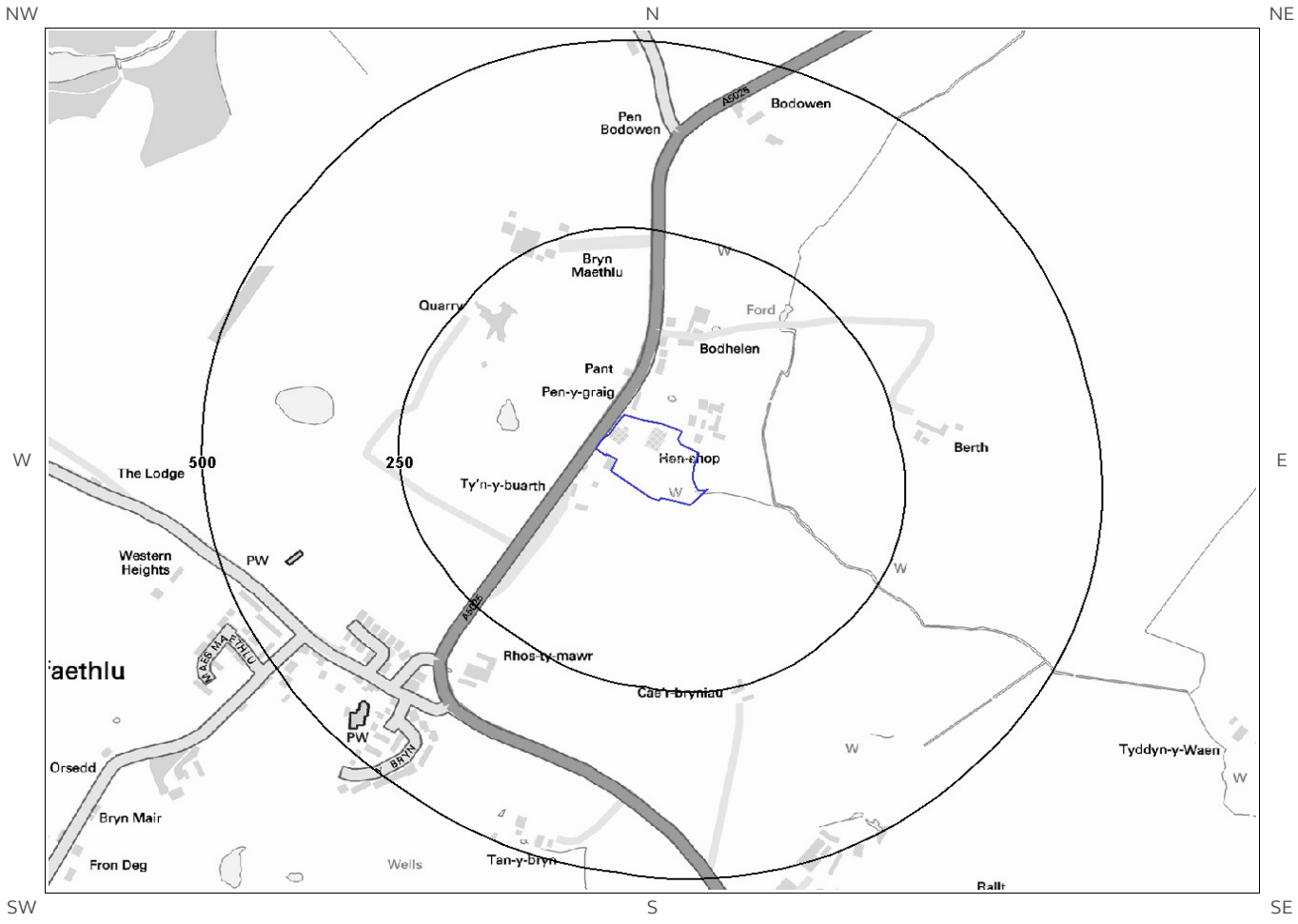
Source Protection Zone 2 - Outer Catchment

Source Protection Zone 3 - Total Catchment

Source Protection Zone 4 - Zone of Special Interest

Potable Water Abstraction Licence

6d. Hydrogeology – Source Protection Zones within confined aquifer



Site Outline

250
500
Search Buffers (m)

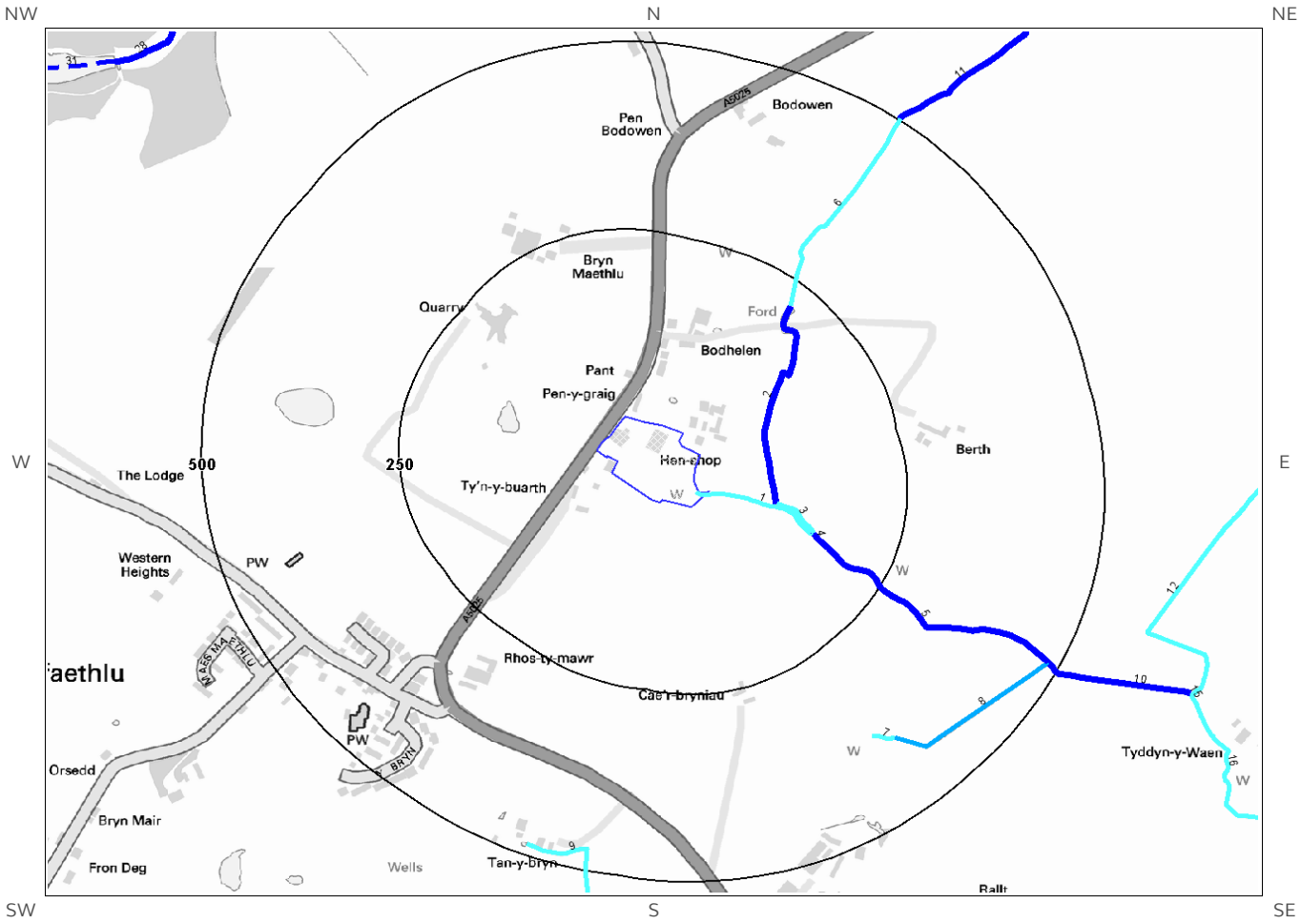
Source Protection Zone 1 - Inner Catchment

Source Protection Zone 2C - Outer Catchment within Confined Aquifer

Source Protection Zone 3C - Total Catchment within Confined Aquifer

Potable Water Abstraction Licence

6e. Hydrology – Detailed River Network and River Quality



Site Outline

250
500
Search Buffers (m)

Primary River
Secondary River
Tertiary River
Lake/Reservoir
Underground River (inferred)
General Quality Assessment: Biology
General Quality Assessment: Chemistry

Canal
Canal Tunnel
Culvert
Multiple Channel Culvert
Underground River (Potential Sewer)
Underground River (local knowledge)

6.Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (6a):

ID	Distance (m)	Direction	Designation	Description
1	14	E	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

6.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	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

6.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

6.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

6.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

6.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? No

Database searched and no data found.

6.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site? No

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency information on groundwater vulnerability and soil leaching potential within 500m of the study site? No

Database searched and no data found.

6.9 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site? No

6.9.1 Biological Quality:

Database searched and no data found.

6.9.2 Chemical Quality:

Database searched and no data found.

6.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site? Yes

The following Detailed River Network records are represented on the Hydrology Map (6e):

ID	Distance (m)	Direction	Details	
1	0	On Site	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
2	80	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
3	86	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
4	143	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
5	144	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined
6	218	NE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
7	381	SE	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
8	401	SE	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
9	471	S	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
10	485	SE	River Name: - Welsh River Name: - Alternative Name: -	River Type: Primary River Main River Status: Currently Undefined

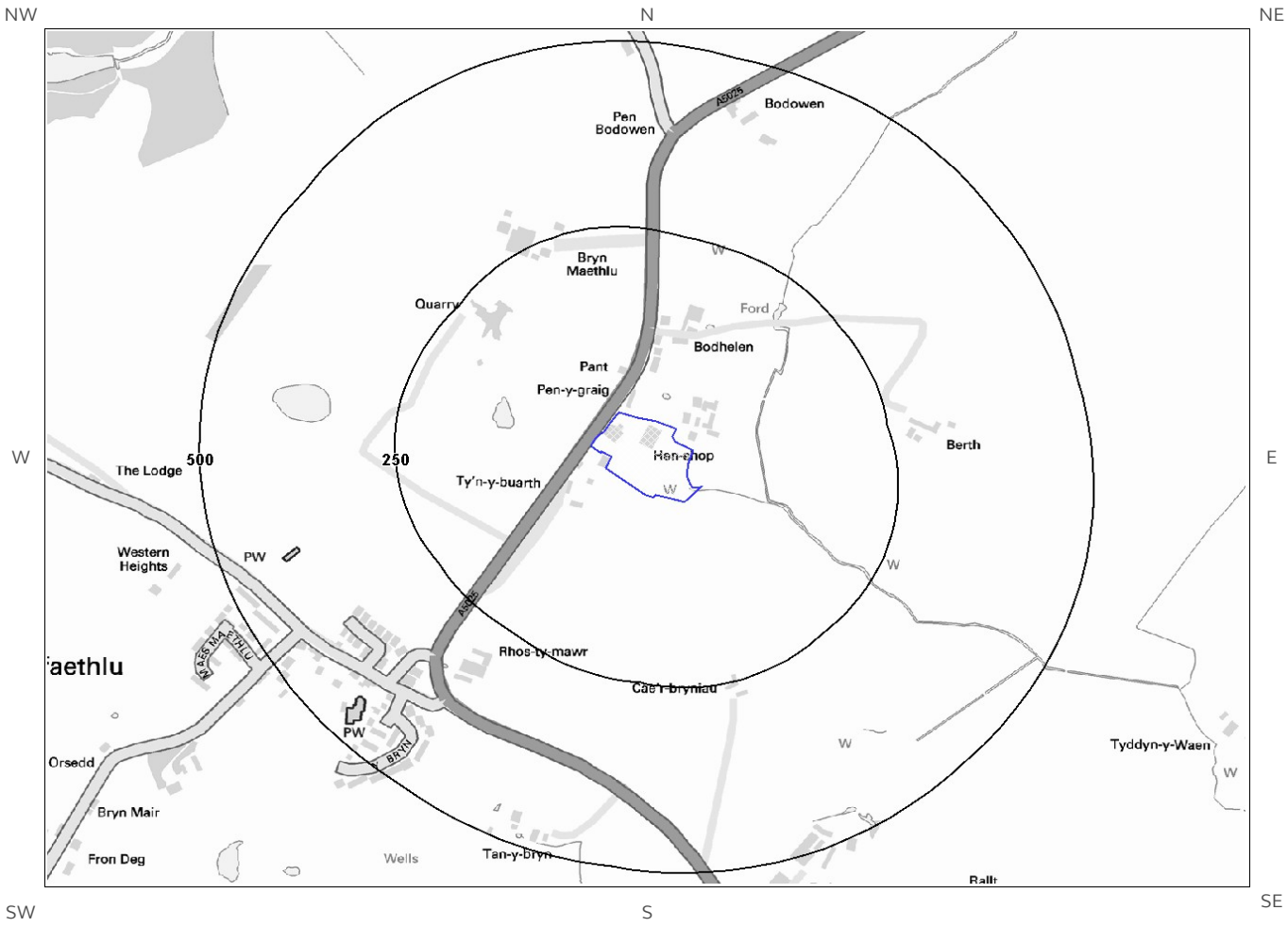
6.11 Surface Water Features

Are there any surface water features within 250m of the study site? Yes

The following surface water records are not represented on mapping:

Distance (m)	Direction
0	On Site
79	E
86	E
115	NE
142	SE
192	NE
218	NE

7a. Environment Agency Flood Map for Planning (from rivers and the sea)



Site Outline

100
250
Search Buffers (m)

Zone 2 Floodplain

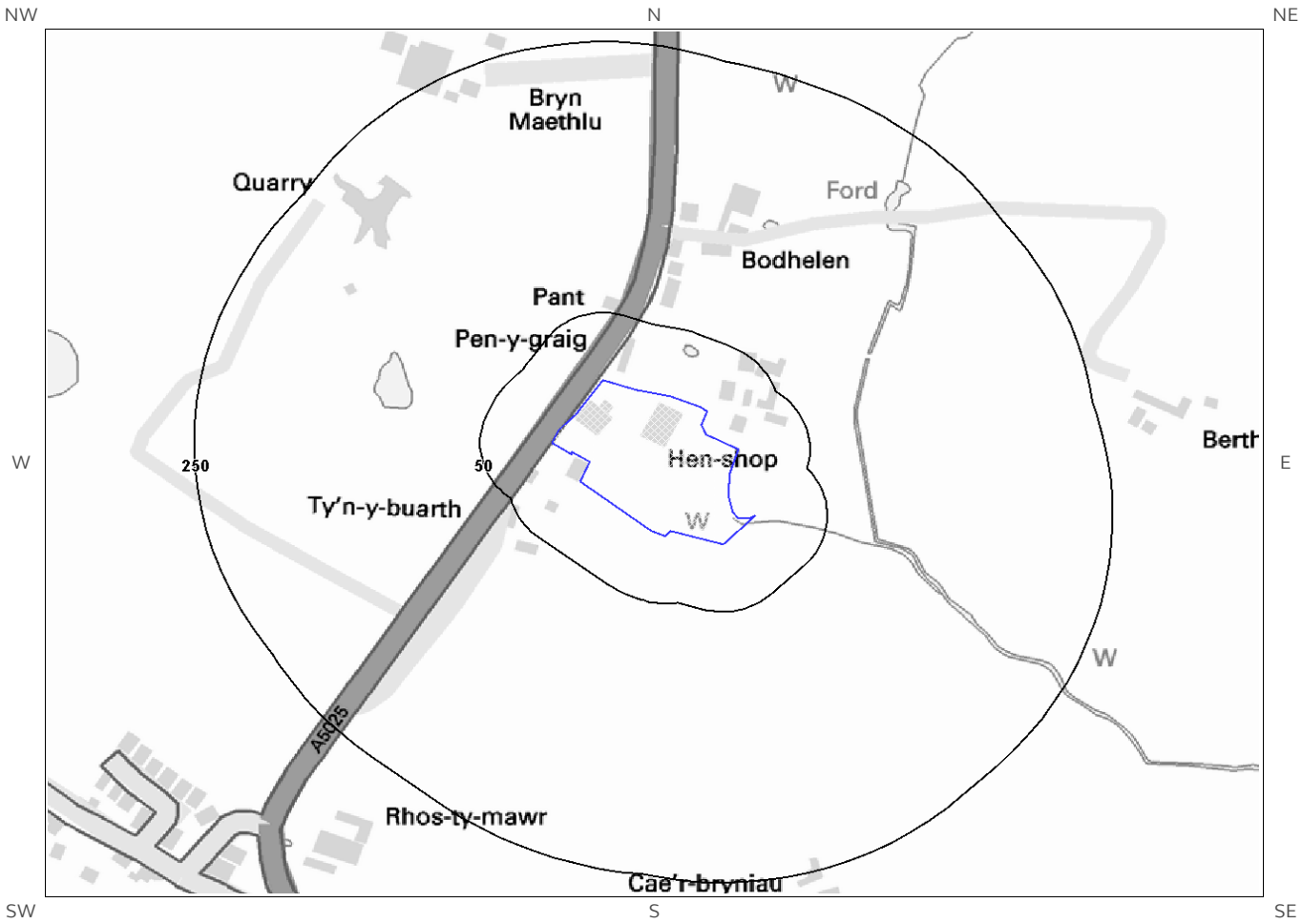
Zone 3 Floodplain

Flood Defences

Area used for Flood Storage

Area Benefiting from Flood Defences

7b. Environment Agency Risk of Flooding from Rivers and the Sea (RoFRaS) Map



Site Outline

100
250
Search Buffers (m)

RoFRaS Rating

Very Low

Low

Medium

High

7 Flooding

7.1 River and Coastal Zone 2 Flooding

Is the site within 250m of an Environment Agency Zone 2 floodplain? No

Environment Agency Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 7a – Flood Map for Planning:

Database searched and no data found.

7.2 River and Coastal Zone 3 Flooding

Is the site within 250m of an Environment Agency Zone 3 floodplain? No

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 7a – Flood Map for Planning.

Database searched and no data found.

7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating

What is the highest risk of flooding onsite? Very Low

The Environment Agency RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a Very Low (less than 1 in 1000) chance of flooding in any given year.

7.4 Flood Defences

Are there any Flood Defences within 250m of the study site? No

Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? No

7.6 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site? Yes

Does this relate to Clearwater Flooding or Superficial Deposits Flooding? Superficial Deposits Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

7.7.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Potential at Surface

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

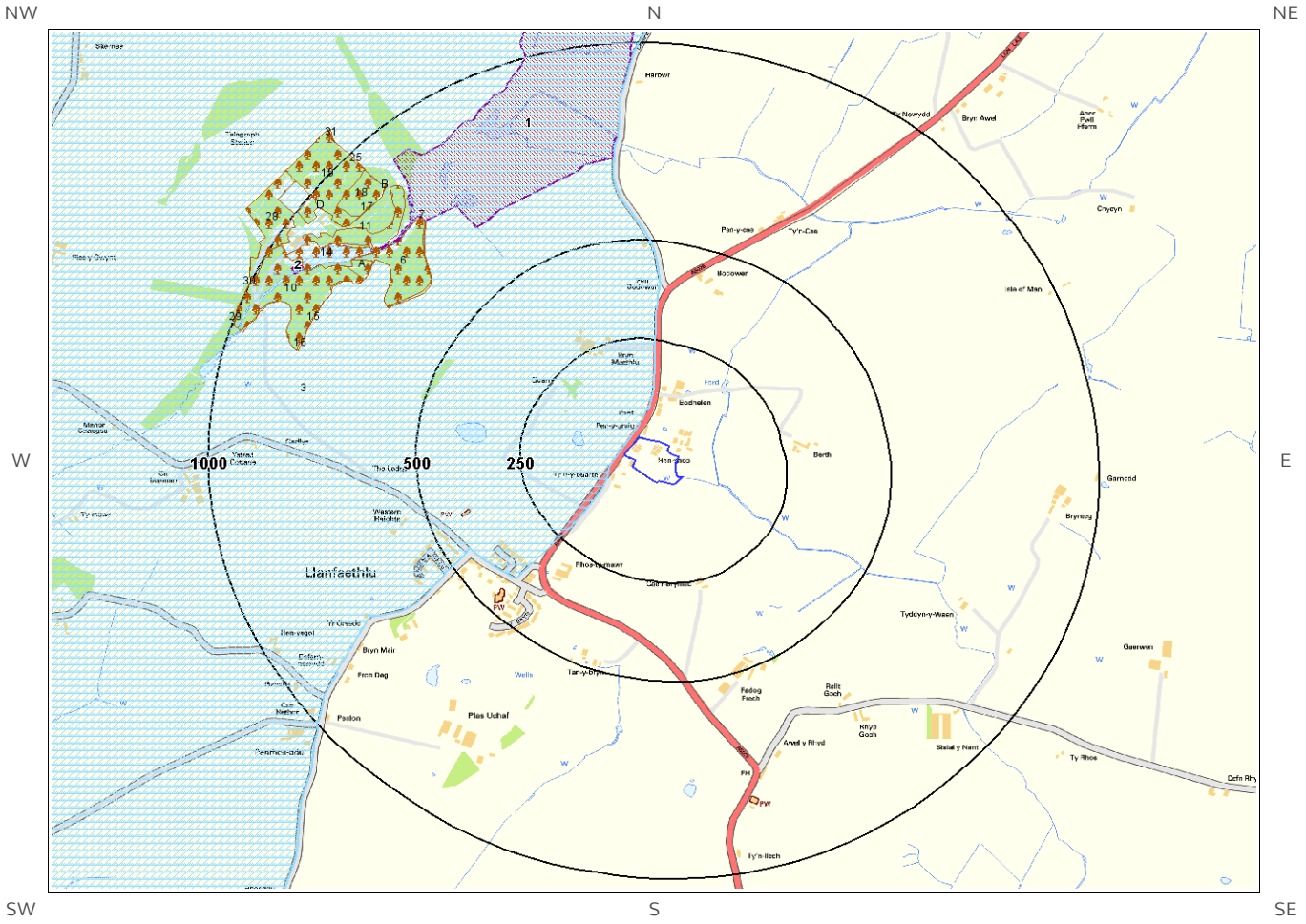
7.8 Groundwater Flooding Confidence Areas

What is the British Geological Survey confidence rating in this result? Moderate

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

8. Designated Environmentally Sensitive Sites Map



Site Outline

100
250
Search Buffers (m)

AONB

National Park

SSSI

Special Protection Areas

Nitrate Vulnerable Zones

Green Belt

Environmentally Sensitive Areas

Special Areas of Conservation

World Heritage Sites

Nitrate Sensitive Areas

Ancient Woodland

National Nature Reserve

Local Nature Reserves

Ramsar Sites

8. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? Yes

8.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

2

The following Site of Special Scientific Interest (SSSI) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SSSI Name	Data Source
1	658	NW	LLYN GARREG-LWYD	Natural Resources Wales
2	902	NW	LLYN GARREG-LWYD	Natural Resources Wales

8.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

8.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

0

Database searched and no data found.

8.4 Records of Special Protection Areas (SPA) within 2000m of the study site:

0

Database searched and no data found.

8.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

8.6 Records of Ancient Woodland within 2000m of the study site:

27

The following records of Designated Ancient Woodland provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
5	631	NW	COED PONT-Y-FELIN/BRYN COVERT	Ancient and Semi-Natural Woodland
6	636	NW	Unknown	Restored Ancient Woodland Site
7	752	NW	COED PONT-Y-FELIN/BRYN COVERT	Ancient and Semi-Natural Woodland
8	764	NW	COED PONT-Y-FELIN/BRYN COVERT	Ancient and Semi-Natural Woodland
9A	766	NW	Unknown	Ancient and Semi-Natural Woodland
10	767	NW	Unknown	Restored Ancient Woodland Site
11	772	NW	Unknown	Restored Ancient Woodland Site
12A	773	NW	COED PONT-Y-FELIN/BRYN COVERT	Ancient and Semi-Natural Woodland
13	789	NW	COED PONT-Y-FELIN/BRYN COVERT	Ancient and Semi-Natural Woodland
14	792	NW	COED PONT-Y-FELIN/BRYN COVERT	Ancient and Semi-Natural Woodland
15	821	NW	COED PONT-Y-FELIN/BRYN COVERT	Ancient and Semi-Natural Woodland
16	826	W	COED PONT-Y-FELIN/BRYN COVERT	Ancient and Semi-Natural Woodland
17	869	NW	Unknown	Ancient and Semi-Natural Woodland
18	870	NW	Unknown	Ancient and Semi-Natural Woodland
19	875	NW	Unknown	Ancient and Semi-Natural Woodland
20B	875	NW	Unknown	Ancient and Semi-Natural Woodland
21C	879	NW	Unknown	Ancient and Semi-Natural Woodland
22B	904	NW	Unknown	Ancient and Semi-Natural Woodland
23	915	NW	COED PONT-Y-FELIN/BRYN COVERT	Ancient and Semi-Natural Woodland
24C	925	NW	Unknown	Ancient and Semi-Natural Woodland
25	946	NW	Unknown	Ancient and Semi-Natural Woodland
26D	953	NW	Unknown	Ancient and Semi-Natural Woodland
27D	955	NW	Unknown	Ancient and Semi-Natural Woodland
28	969	NW	Unknown	Ancient and Semi-Natural Woodland
29	994	W	COED PONT-Y-FELIN/BRYN COVERT	Ancient and Semi-Natural Woodland
30	1000	NW	COED PONT-Y-FELIN/BRYN COVERT	Ancient and Semi-Natural Woodland
31	1048	NW	Unknown	Ancient and Semi-Natural Woodland

8.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

0

Database searched and no data found.

8.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

8.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

2

The following Area of Outstanding Natural Beauty (AONB) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	AONB/NSA Name	Data Source
3	12	NW	YNYS MON/ANGLESEY	Natural Resources Wales
Not shown	1644	W	YNYS MON/ANGLESEY	Natural Resources Wales

8.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

8.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

8.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

0

Database searched and no data found.

8.14 Records of Green Belt land within 2000m of the study site:

0

Database searched and no data found.

9. Natural Hazards Findings

9.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a Groundsure GeoInsight, available from our website. The following information has been found:

9.1.1 Shrink Swell

What is the maximum Shrink-Swell*[*] hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

9.1.2 Landslides

What is the maximum Landslide* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

9.1.3 Soluble Rocks

What is the maximum Soluble Rocks* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

* This indicates an automatically generated 50m buffer and site.

9.1.4 Compressible Ground

What is the maximum Compressible Ground* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

9.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

9.1.6 Running Sand

What is the maximum Running Sand*[*] hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard
Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

9.2 Radon

9.2.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level.

* This indicates an automatically generated 50m buffer and site.

9.2.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing
ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary.

10. Mining

10.1 Coal Mining

Are there any coal mining areas within 75m of the study site? No

Database searched and no data found.

10.2 Non-Coal Mining

Are there any Non-Coal Mining areas within 50m of the study site boundary? Yes

The following non-coal mining information is provided by the BGS:

Distance (m)	Direction	Name	Commodity	Assessment of likelihood
0.0	On Site	Not available	Vein Mineral	Occasional minor mining may have occurred but of restricted extent.

Past underground mine workings are uncommon, localised and of limited area. The rock types present in this area are such that minor mineral veins may be present within them on which it is possible that there have been attempts to work these by underground methods and/or it is possible that small scale underground extraction of other materials may have occurred. All such occurrences are likely to be restricted in size and infrequent. It should be noted, however, that there is always the possibility of the existence of other sub-surface excavations, such as wells, cess pits, follies, air raid shelters/bunkers and other military structures etc. that could affect surface ground stability but which are outside the scope of this dataset. However, if in a coalfield area you should still consider a Coal Authority mining search for the area of interest.

10.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? No
Guidance: No Guidance Required.

Contact Details

Groundsure Helpline
Telephone: 08444 159 000
info@groundsure.com

British Geological Survey Enquiries
Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email:
Web:**www.bgs.ac.uk**
BGS Geological Hazards Reports and general geological enquiries:
enquiries@bgs.ac.uk

Environment Agency
National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 08708 506 506
Web:**www.environment-agency.gov.uk**
Email:**enquiries@environment-agency.gov.uk**

Public Health England
Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
www.gov.uk/phe
Email:**enquiries@phe.gov.uk**
Main switchboard**: 020 7654 8000**

The Coal Authority
200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk

Ordnance Survey
Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505

Local Authority
Authority: Sir Ynys Mon - Isle of Anglesey County Council
Phone: 01248 750 057
Web: http://www.anglesey.gov.uk
Address: Council Offices, Llangefni, Anglesey, LL77 7TW

Gemapping PLC
Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444

Standard Terms and Conditions

1 Definitions

I**n these terms and conditions unless the context otherwise requires:**

"Beneficiary" means the person or entity for whose benefit the Client has obtained the Services.

"Client" means the party or parties entering into a Contract with Groundsure.

"Commercial" means any building or property which is not Residential.

"Confidential Information" means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by Groundsure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

"Support Services" means Support Services provided by Groundsure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

"Contract" means the contract between Groundsure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

"Third Party Data Provider" means any third party providing Third Party Content to Groundsure.

"Data Reports" means reports comprising factual data with no accompanying interpretation.

"Fees" has the meaning set out in clause 5.1.

"Groundsure" means Groundsure Limited, a company registered in England and Wales under number 03421028.

"Groundsure Materials" means all materials prepared by Groundsure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

"Intellectual Property" means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

"Mapping" means a map, map data or a combination of historical maps of various ages, time periods and scales.

"Order" means an electronic, written or other order form submitted by the Client requesting Services from Groundsure in respect of a specified Site.

"Ordnance Survey" means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

"Order Website" means the online platform through which Orders may be placed by the Client and accepted by Groundsure.

"Report" means a Risk Screening Report or Data Report for Commercial or Residential property.

"Residential" means any building or property used as or intended to be used as a single dwelling.

"Risk Screening Report" means a risk screening report comprising factual data with an accompanying interpretation by Groundsure.

"Services" means any Report, Mapping and/or Support Services which Groundsure has agreed to provide by accepting an Order pursuant to clause 2.6.

"Site" means the area of land in respect of which the Client has requested Groundsure to provide the Services.

"Third Party Content" means data, database information or other information which is provided to Groundsure by a Third Party Data Provider.

"User Guide" means the user guide, as amended from time to time, available upon request from Groundsure and on the website (www.Groundsure.com) and forming part of this Contract.

2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 Groundsure agrees to provide the Services in accordance with the Contract.

2.2 Groundsure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of Groundsure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, Groundsure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and Groundsure will have no liability therefor. In addition you acknowledge and agree that Groundsure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 Groundsure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by Groundsure. Groundsure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by Groundsure. Groundsure's acceptance of an Order shall be binding only when made in writing and signed by Groundsure's authorised representative or when accepted through the Order Website.

3 The Client's obligations

3.1The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to Groundsure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.

3.3 The Client shall supply to Groundsure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as Groundsure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client's approval or decision is required to enable Groundsure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the Groundsure Materials, or use the Groundsure Materials in a manner for which they were not intended. The Client may make the Groundsure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that Groundsure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1The Client acknowledges that the Services provided by Groundsure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by Groundsure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

(i) the Beneficiary,

(ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),

(iv) the first purchaser or first tenant of the Site, and

(v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by Groundsure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1Groundsure shall charge and the Client shall pay fees at the rate and

frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by Groundsure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").

5.2 The Client shall pay all outstanding Fees to Groundsure in full without deduction, counterclaim or set off within 30 days of the date of Groundsure's invoice or such other period as may be agreed in writing between Groundsure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of Groundsure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to

(i) full payment of all relevant Fees and

(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the Groundsure Materials.

6.2 All Intellectual Property in the Groundsure Materials are and shall remain owned by Groundsure or Groundsure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the Groundsure Materials shall:

(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to Groundsure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the Groundsure Materials in order to advise the Beneficiary in a professional capacity. However, Groundsure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify Groundsure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7.Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of Groundsure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

(i) any breach of contract, including any deliberate breach of the Contract by Groundsure or its employees, agents or subcontractors;

(ii) any use made of the Reports, Services, Materials or any part of them; and

(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 Groundsure shall not be liable for

(i) loss of profits;

(ii) loss of business;

(iii) depletion of goodwill and/or similar losses;

(iv) loss of anticipated savings;

(v) loss of goods;

(vi) loss of contract;

(vii) loss of use;

(viii) loss or corruption of data or information;

(ix) business interruption;

(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;

(xi) loss or damage that arise as a result of the use of all or part of the Groundsure Materials in breach of the Contract;

(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the Groundsure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;

(xiii) loss or damage to a computer, software, modem, telephone or other property; and

(xiv) loss or damage caused by a delay or loss of use of Groundsure's internet ordering service.

7.5 Groundsure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 Groundsure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of Groundsure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against Groundsure in relation to the Services or other matters arising pursuant to the Contract.

8 Groundsure's right to suspend or terminate

8.1 If Groundsure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, Groundsure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 Groundsure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to Groundsure within 30 days of the Payment Date; or

(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon Groundsure's acceptance of the Order; and

(ii) the Reports and/or Mapping provided under this Contract are

(a) supplied to the Client's specification(s) and in any event

(b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(i) Groundsure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in Groundsure's possession or control; and

(ii) the Client shall pay to Groundsure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay Groundsure any additional costs incurred in relation to the termination or suspension of the Contract.

11 Anti-Bribery

11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of Groundsure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to Groundsure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through Groundsure.

12.3 Groundsure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of Groundsure.

12.4 No failure on the part of Groundsure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 Groundsure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

(i) the Client or Beneficiary's failure to provide facilities, access or information;

(ii) fire, storm, flood, tempest or epidemic;

(iii) Acts of God or the public enemy;

(iv) riot, civil commotion or war;

(v) strikes, labour disputes or industrial action;

(vi) acts or regulations of any governmental or other agency;

(vii) suspension or delay of services at public registries by Third Party Data Providers;

(viii) changes in law; or

(ix) any other reason beyond Groundsure's reasonable control.

In the event that Groundsure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then Groundsure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 Groundsure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at Groundsure who will respond in a timely manner. In the event you are not satisfied with Groundsure's complaints handling process or you are unable to resolve the complaint, at your discretion you may refer the complaint to The Property Ombudsman Scheme at the following URL/email: website www.tpos.co.uk or email: admin@tpos.co.uk

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law.

Jacobs

95 SCOTTISH LEGAL LIFE BUILDING 1/1
JACOBS UK LTD, BOTHWELL STREET,
GLASGOW, G2 7HX

Groundsure Reference:	GS-2735146
Your Reference:	60PO8050
Report Date	8 Feb 2016
Report Delivery Method:	Email - pdf

Groundsure Geoinsight

Address: HEN SIOP, A5025, HOLYHEAD, LL65 4NW

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Geoinsight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above Groundsure reference number.

Yours faithfully,

[redacted]

Managing Director
Groundsure Limited

Enc.
Groundsure Geoinsight

Groundsure Geoinsight

Address:	**HEN SIOP, A5025, HOLYHEAD, LL65 4NW**
Date:	**8 Feb 2016**
Reference:	**GS-2735146**
Client:	**Jacobs**

NW N NE

W E

SW S SE

Aerial Photograph Capture date:	04-Jun-2013
Grid Reference:	231695,387214
Site Size:	0.98ha

Contents Page

Overview of Findings

The Groundsure Geoinsight provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Shallow Mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and Groundsure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1:Geology		
1.1 Artificial Ground	1.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	No
	1.1.2 Are there any records relating to permeability of artificial ground within the study site* boundary?	No
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?	Yes
	1.2.2 Are there any records relating to permeability of superficial geology within the study site boundary?	Yes
	1.2.3 Are there any records of landslip within 500m of the study site boundary?	No
	1.2.4 Are there any records relating to permeability of landslips within the study site boundary?	No
1.3 Bedrock, Solid Geology & Faults	1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	1.3.2 Are there any records relating to permeability of bedrock within the study site boundary?	Yes
	1.3.3 Are there any records of faults within 500m of the study site boundary?	No
1.4 Radon data	1.4.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level
	1.4.2 Is the property in an area where Radon Protection Measures are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary

Section 2:Ground Workings	On-site	0-50m	51-250	251-500	501-1000
2.1 Historical Surface Ground Working Features from Small Scale Mapping	0	1	16	Not Searched	Not Searched
2.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	0
2.3 Current Ground Workings	0	0	2	0	0

Section 3: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
3.1 Historical Mining	0	0	0	0	0
3.2 Coal Mining	0	0	0	0	0
3.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
3.4 Non-Coal Mining	1	0	0	0	0
3.5 Non-Coal Mining Cavities	0	0	0	0	0
3.6 Natural Cavities	0	0	0	0	0
3.7 Brine Extraction	0	0	0	0	0
3.8 Gypsum Extraction	0	0	0	0	0
3.9 Tin Mining	0	0	0	0	0
3.10 Clay Mining	0	0	0	0	0

Section 4: Natural Ground Subsidence	On-site
4.1 Shrink Swell Clay	Very Low
4.2 Landslides	Very Low
4.3 Ground Dissolution of Soluble Rocks	Negligible
4.4 Compressible Deposits	Negligible
4.5 Collapsible Deposits	Very Low
4.6 Running Sand	Very Low

Section 5: Borehole Records	On-site	0-50m	51-250
5 BGS Recorded Boreholes	0	0	0

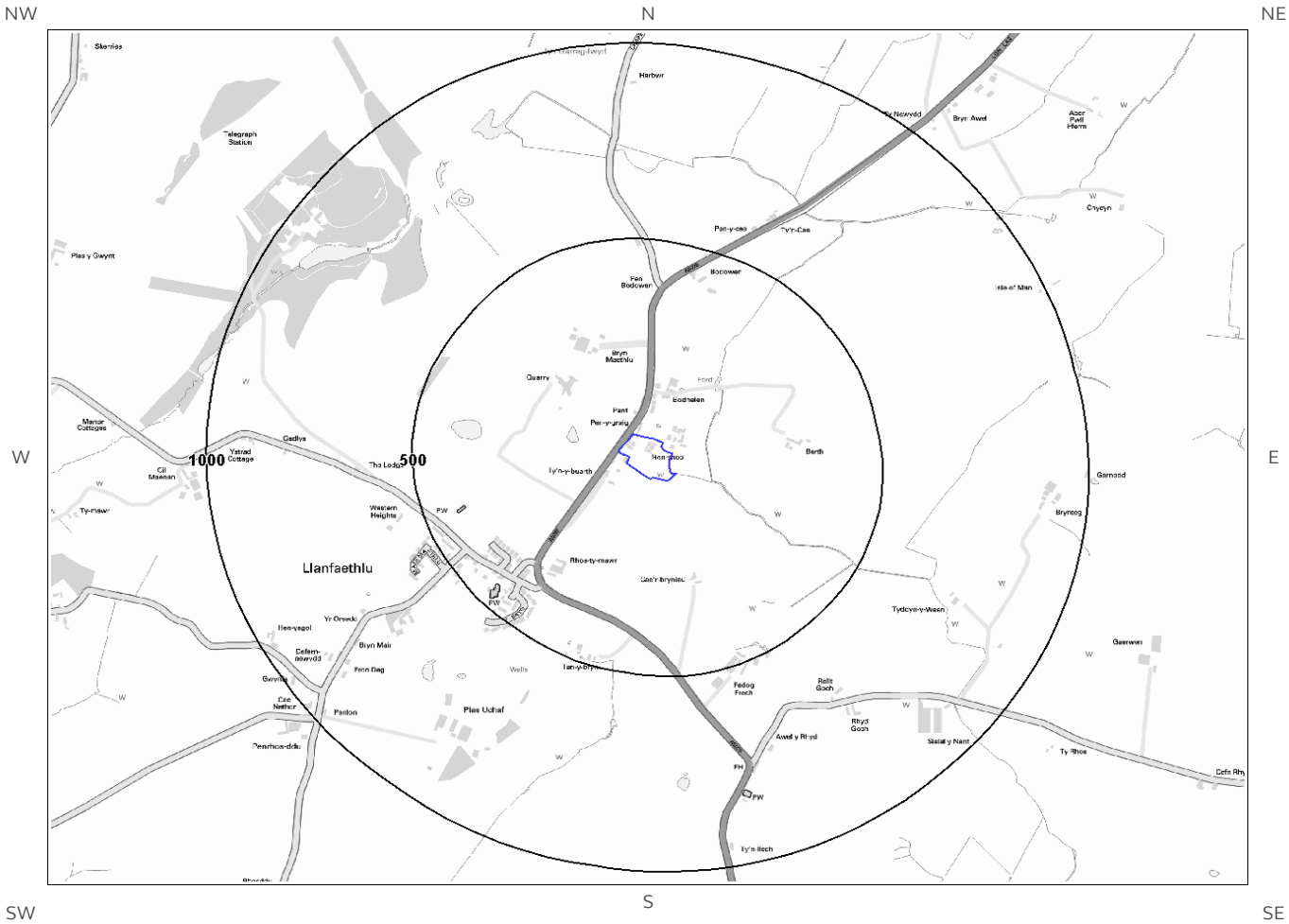
Section 6: Estimated Background Soil Chemistry	On-site	0-50m	51-250
6 Records of Background Soil Chemistry	3	2	14

Section 7: Railways and Tunnels	On-site	0-50m	51-250	251-500
7.1 Tunnels	0	0	0	Not Searched
7.2 Historical Railway and Tunnel Features	0	0	0	Not Searched
7.3 Historical Railways	0	0	0	Not Searched
7.4 Active Railways	0	0	0	Not Searched

Section 7:Railways and Tunnels	On-site	0-50m	51-250	251-500
7.5 Railway Projects	0	0	0	0

1 Geology

1.1 Artificial Ground Map



Artificial Ground Legend

Site Outline

500
1000
Search Buffers (m)

Made Ground (undivided)

Worked Ground (undivided)

Infilled Ground

Disturbed Ground (undivided)

Landscaped Ground (undivided)

Reclaimed Ground

1 Geology

1.1 Artificial Ground

1.1.1Artificial/ Made Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:093

Are there any records of Artificial/Made Ground within 500m of the study site boundary? No

Database searched and no data found.

1.1.2 Permeability of Artificial Ground

Are there any records relating to permeability of artificial ground within the study site boundary? No

Database searched and no data found.

1.2 Superficial Deposits and Landslips Map

Superficial Deposits and Landslips Legend

Site Outline

500
1000
Search Buffers (m)

1.2 Superficial Deposits and Landslips

1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary? Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	14.0	E	TILLD	TILL, DEVENSIAN	DIAMICTON

1.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
14.0	E	Mixed	High	Low

1.2.3 Landslip

Are there any records of Landslip within 500m of the study site boundary? No

Database searched and no data found.

This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

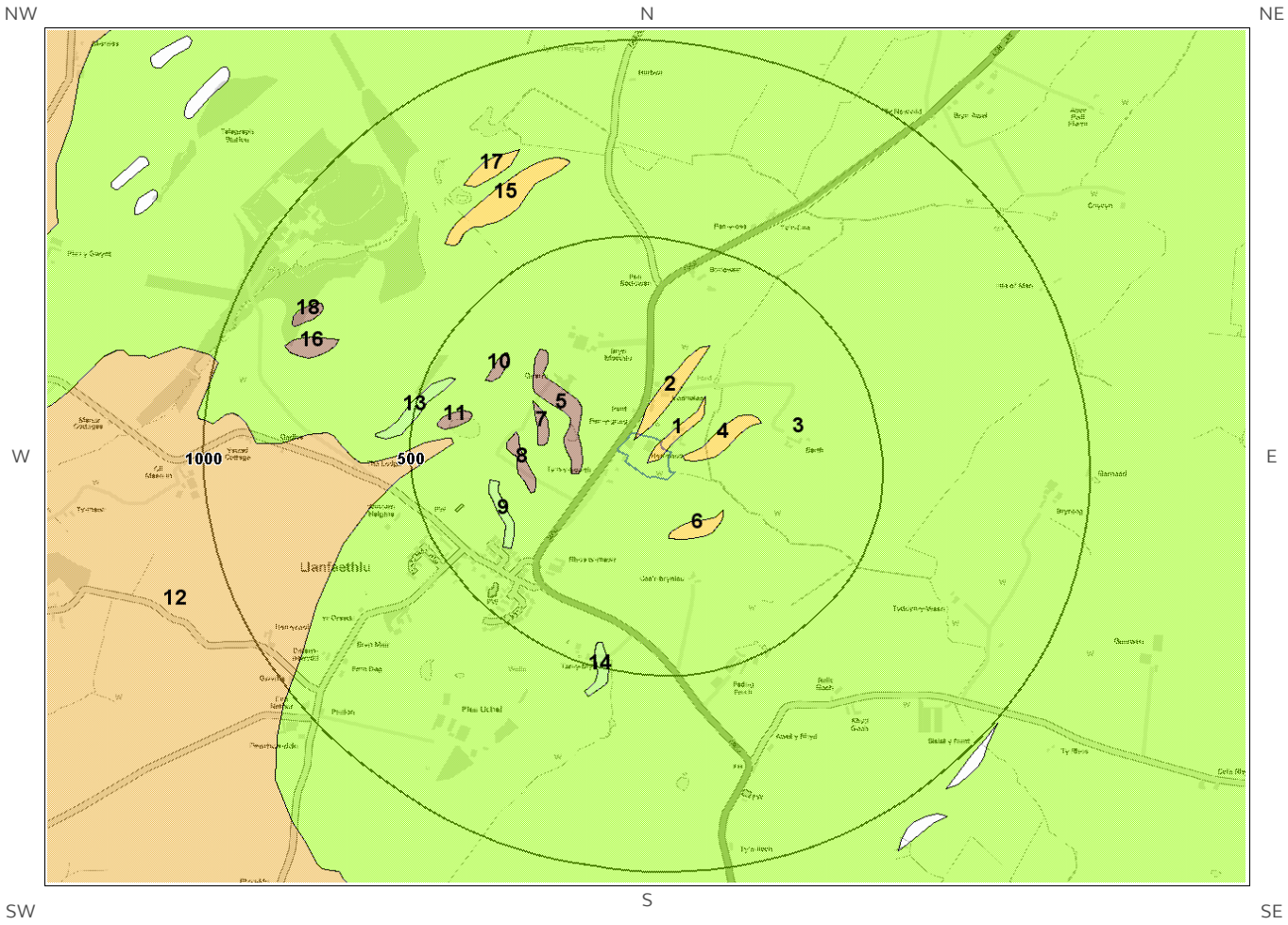
1.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site* boundary? No

Database searched and no data found.

* This includes an automatically generated 50m buffer zone around the site

1.3 Bedrock and Faults Map



Bedrock and Faults Legend

Site Outline

500
1000
Search Buffers (m)

1.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:093

1.3.1 Bedrock/ Solid Geology

Records of Bedrock/ Solid Geology within 500m of the study site boundary:

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	NGW-QZITE	Gwna Group - Quartzite	No Details
2	0.0	On Site	NGW-QZITE	Gwna Group - Quartzite	No Details
3	0.0	On Site	NGW-SCH	Gwna Group - Schist	No Details
4	29.0	E	NGW-QZITE	Gwna Group - Quartzite	No Details
5	85.0	W	CABSZ-GLSCH	Central Anglesey Shear Zone And Berw Shear Zone (undifferentiated) - Schist, Glaucophane	No Details
6	121.0	SE	NGW-QZITE	Gwna Group - Quartzite	No Details
7	169.0	W	CABSZ-GLSCH	Central Anglesey Shear Zone And Berw Shear Zone (undifferentiated) - Schist, Glaucophane	No Details
8	209.0	W	CABSZ-GLSCH	Central Anglesey Shear Zone And Berw Shear Zone (undifferentiated) - Schist, Glaucophane	No Details
9	296.0	W	NGW-MBAR	Gwna Group - Metabasaltic-rock	No Details
10	339.0	NW	CABSZ-GLSCH	Central Anglesey Shear Zone And Berw Shear Zone (undifferentiated) - Schist, Glaucophane	No Details
11	361.0	W	CABSZ-GLSCH	Central Anglesey Shear Zone And Berw Shear Zone (undifferentiated) - Schist, Glaucophane	No Details
12	397.0	W	CTSG-TUSD	Church Bay Tuffs And Skerries Grits (undifferentiated) - Tuff And Sandstone	No Details
13	432.0	NW	NGW-MBAR	Gwna Group - Metabasaltic-rock	No Details
14	435.0	S	NGW-MBAR	Gwna Group - Metabasaltic-rock	No Details

1.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site* boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	Low	Low
0.0	On Site	Fracture	Low	Low
0.0	On Site	Fracture	Low	Low
29.0	E	Fracture	Low	Low

* This includes an automatically generated 50m buffer zone around the site

1.3.3 Faults

Are there any records of Faults within 500m of the study site boundary? No

Database searched and no data found.

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.4 Radon Data

1.4.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level

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1.4.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary

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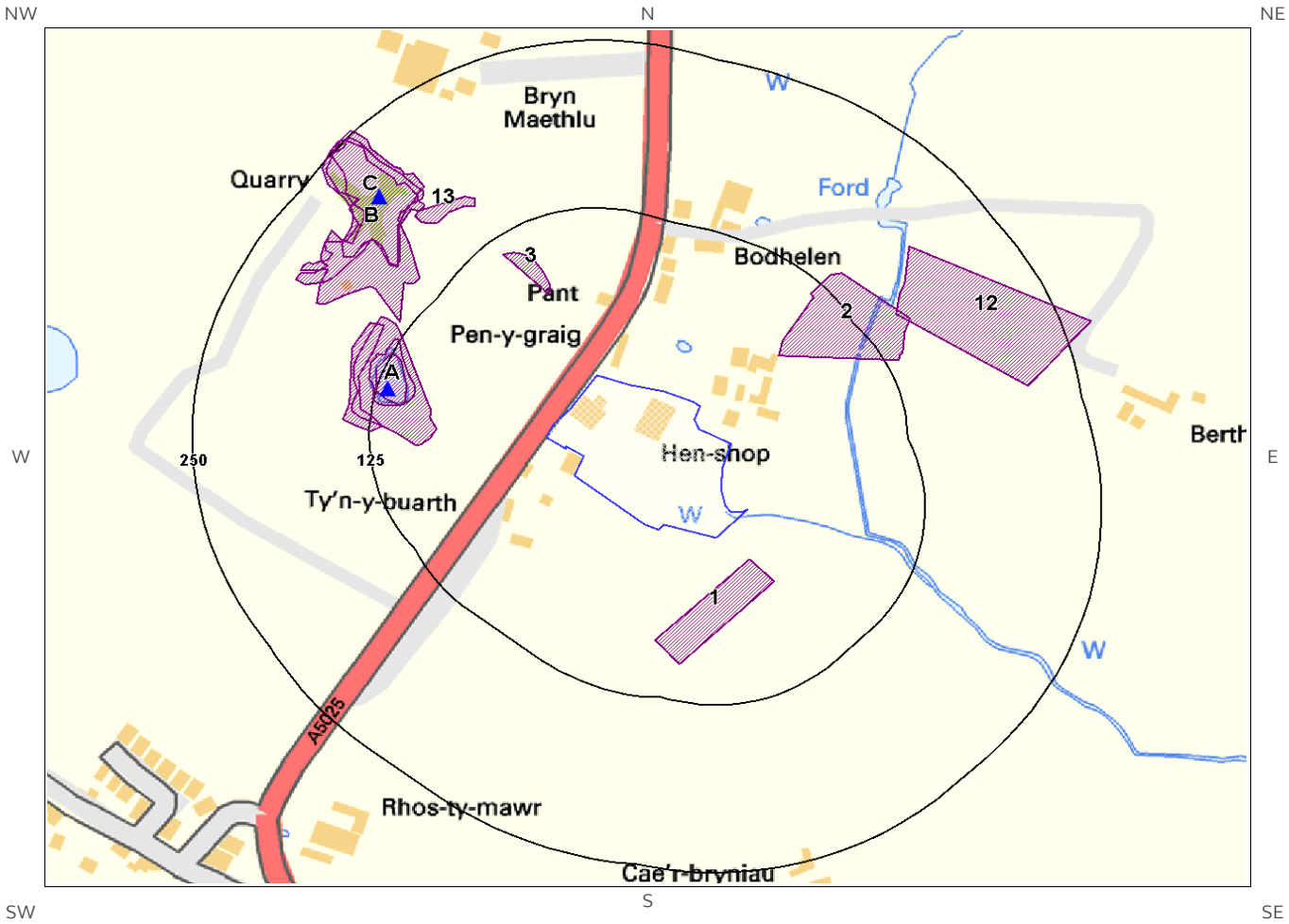
2 Ground Workings Map



Ground Workings Legend

Site Outline

125
250
Search Buffers (m)

Historic Surface Ground Workings

Historic Underground Workings

Current Ground Workings

2 Ground Workings

2.1 Historical Surface Ground Working Features derived from Historical Mapping

This dataset is based on Groundsure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping.

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? Yes

The following Historical Surface Ground Working Features are provided by Groundsure:

ID	Distance (m)	Direction	NGR	Use	Date
1	28.0	SE	231763 387103	Sewage Works	1978
2	67.0	NE	231855 387323	Burial Ground	1959
3	69.0	NW	231630 387355	Unspecified Pit	1886
4A	77.0	W	231537 387275	Unspecified Old Quarry	1899
5A	77.0	W	231537 387275	Unspecified Quarry	1949
6A	77.0	W	231537 387275	Unspecified Old Quarry	1886
7A	98.0	W	231535 387281	Pond	1886
8A	98.0	W	231535 387281	Pond	1899
9A	103.0	W	231535 387276	Pond	1978
10	116.0	W	231509 387278	Unspecified Ground Workings	1959
11B	133.0	NW	231514 387409	Unspecified Old Quarry	1886
12	152.0	NE	231961 387323	Site of Burial Ground	1949
13	153.0	NW	231573 387402	Unspecified Heap	1886
14B	161.0	NW	231513 387401	Unspecified Quarry	1949
15B	161.0	NW	231513 387401	Unspecified Old Quarry	1899
16C	162.0	NW	231521 387409	Unspecified Disused Quarry	1978
17C	162.0	NW	231521 387409	Unspecified Quarry	1959

2.2 Historical Underground Working Features derived from Historical Mapping

This data is derived from the Groundsure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? No

Database searched and no data found.

2.3 Current Ground Workings

This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

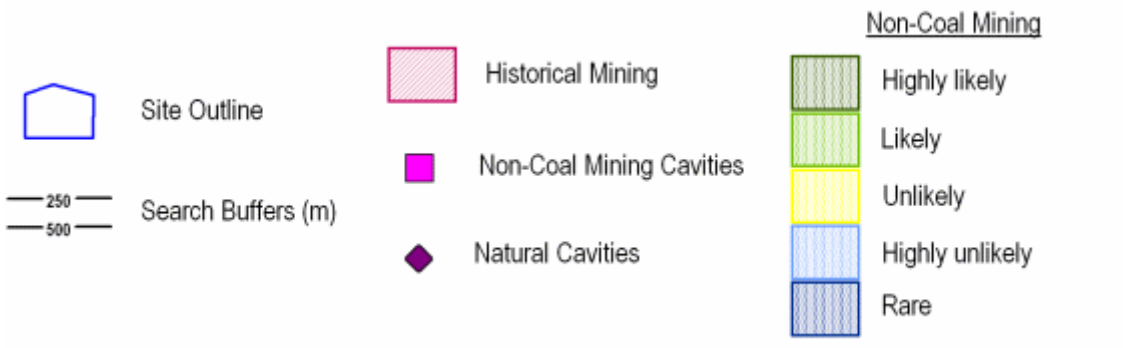
Are there any BGS Current Ground Workings within 1000m of the study site boundary? Yes

The following Current Ground Workings information is provided by British Geological Survey:

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
18A	118.0	W	231532 387269	Igneous & Metamorphic Rock	Ty'n-yr-ardd	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
19C	203.0	NW	231526 387412	Igneous & Metamorphic Rock	Bryn Maethlu	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

3 Mining, Extraction & Natural Cavities Map

Mining, Extraction and Natural Cavities Legend



3 Mining, Extraction & Natural Cavities

3.1 Historical Mining

This dataset is derived from Groundsure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

3.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

3.3 Johnson Poole and Bloomer

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

Are there any JPB Mining areas within 1000m of the study site boundary? No

The following information provided by JPB is not represented on mapping: Database searched and no data found.

3.4 Non-Coal Mining

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

Are there any Non-Coal Mining areas within 1000m of the study site boundary? Yes

The following non-coal mining information is provided by the BGS:

ID	Distance (m)	Direction	Name	Commodity	Assessment of likelihood
1	0.0	On Site	Not available	Vein Mineral	Occasional minor mining may have occurred but of restricted extent.

3.5 Non-Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled "Review of mining instability in Great Britain, 1990" PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary? No

Database searched and no data found.

3.6 Natural Cavities

This dataset provides information based on Peter Brett Associates natural cavities database.

Are there any Natural Cavities within 1000m of the study site boundary? No

Database searched and no data found.

3.7 Brine Extraction

This data provides information from the Coal Authority issued on behalf of the Cheshire Brine Subsidence Compensation Board.

Are there any Brine Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

3.8 Gypsum Extraction

This dataset provides information on Gypsum extraction from British Gypsum records.

Are there any Gypsum Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

3.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level.

Are there any Tin Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

3.10 Clay Mining

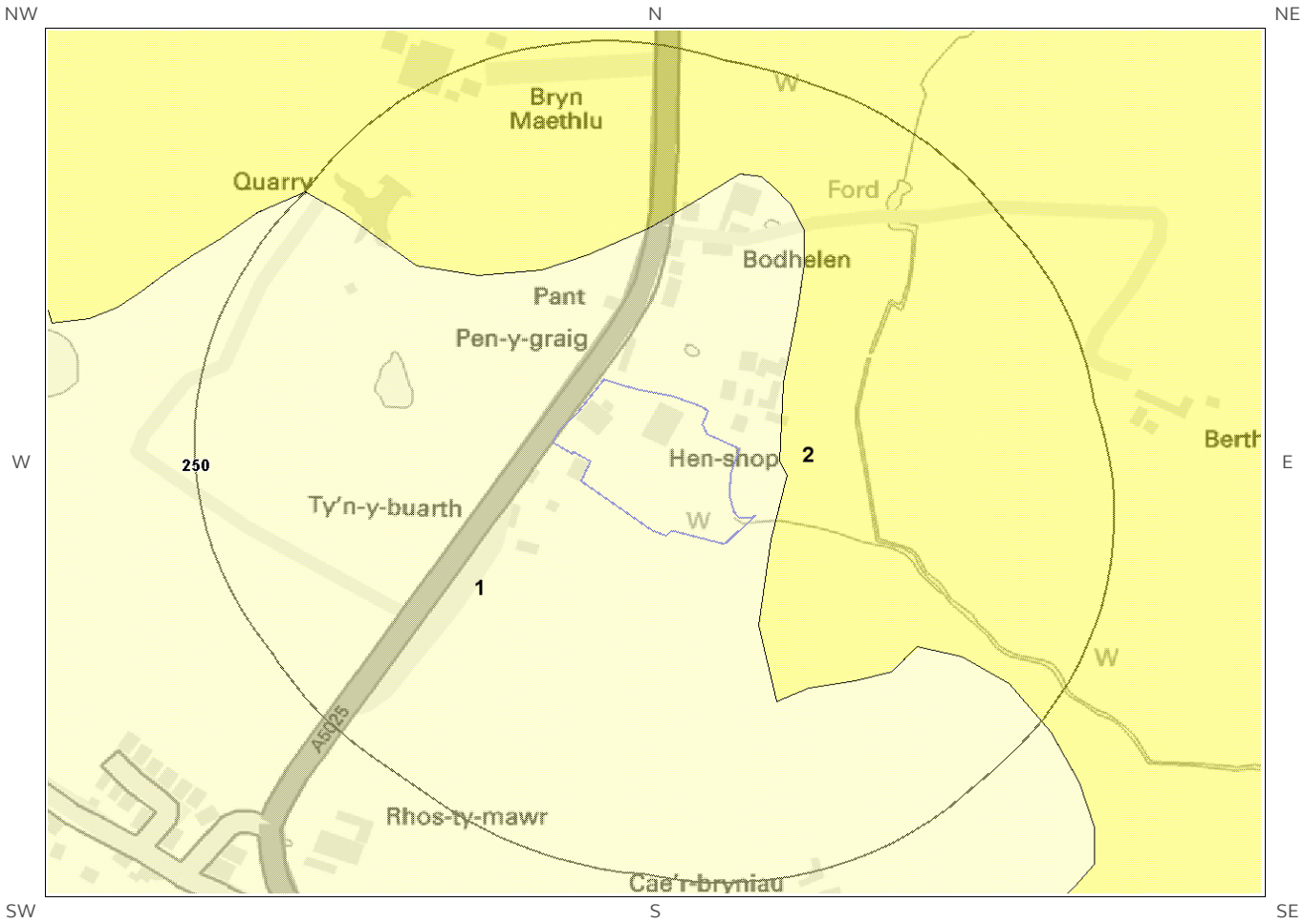
This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

Are there any Clay Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

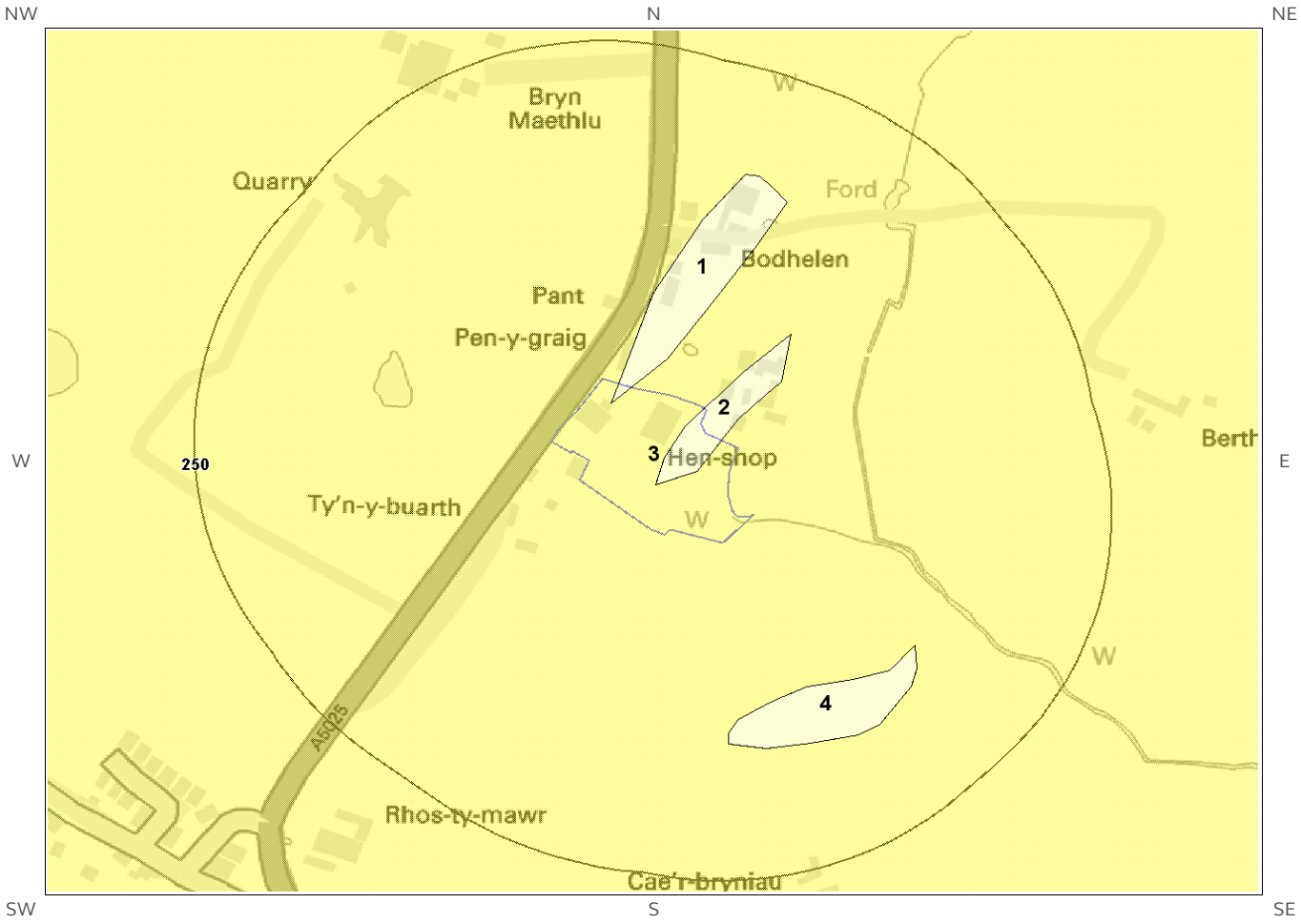
4 Natural Ground Subsidence

4.1 Shrink-Swell Clay Map



Shrink Swell Clay Legend

4.2 Landslides Map



Landslides Legend

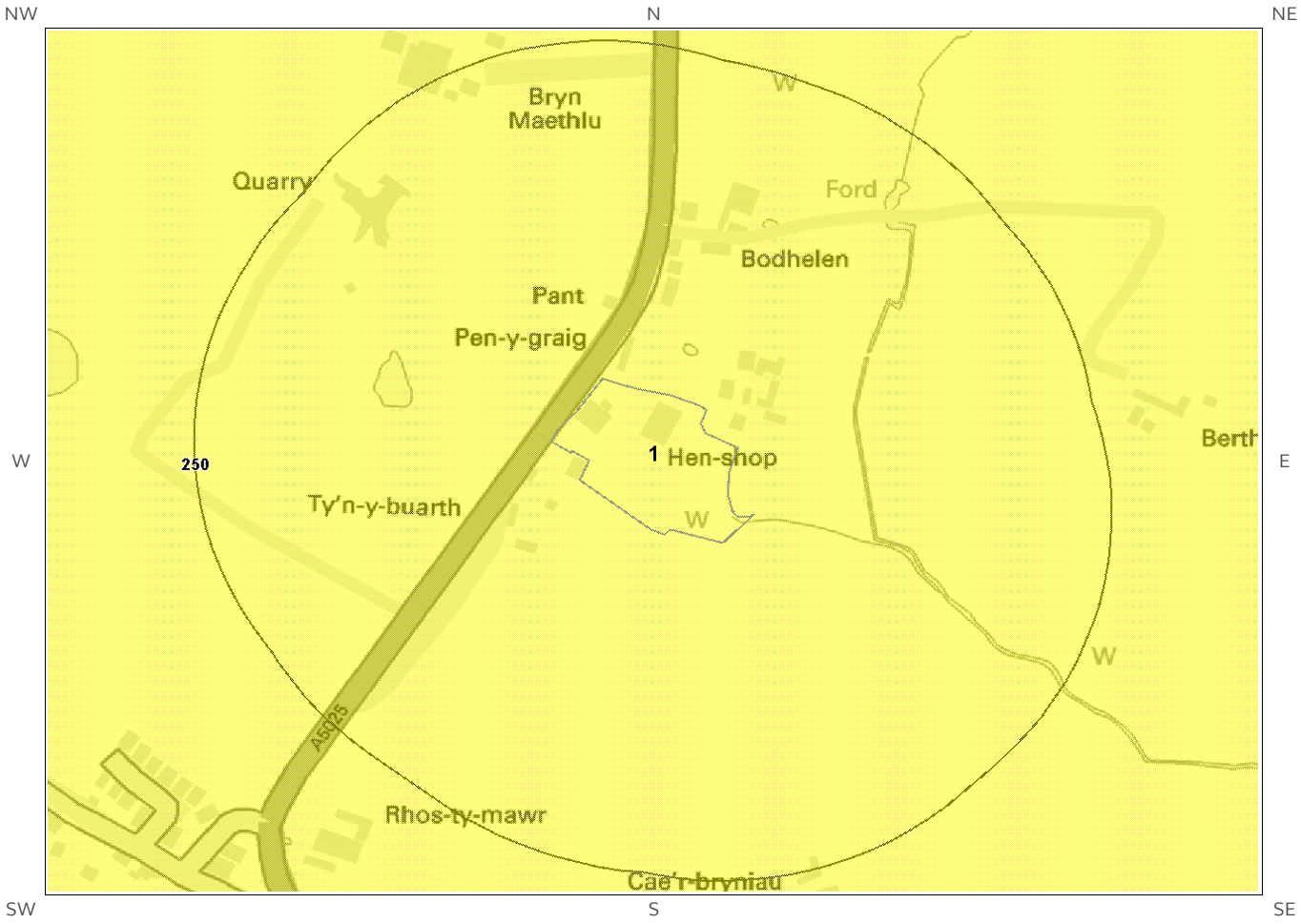
4.3 Ground Dissolution Soluble Rocks Map

Ground Dissolution Soluble Rocks Legend

4.4 Compressible Deposits Map

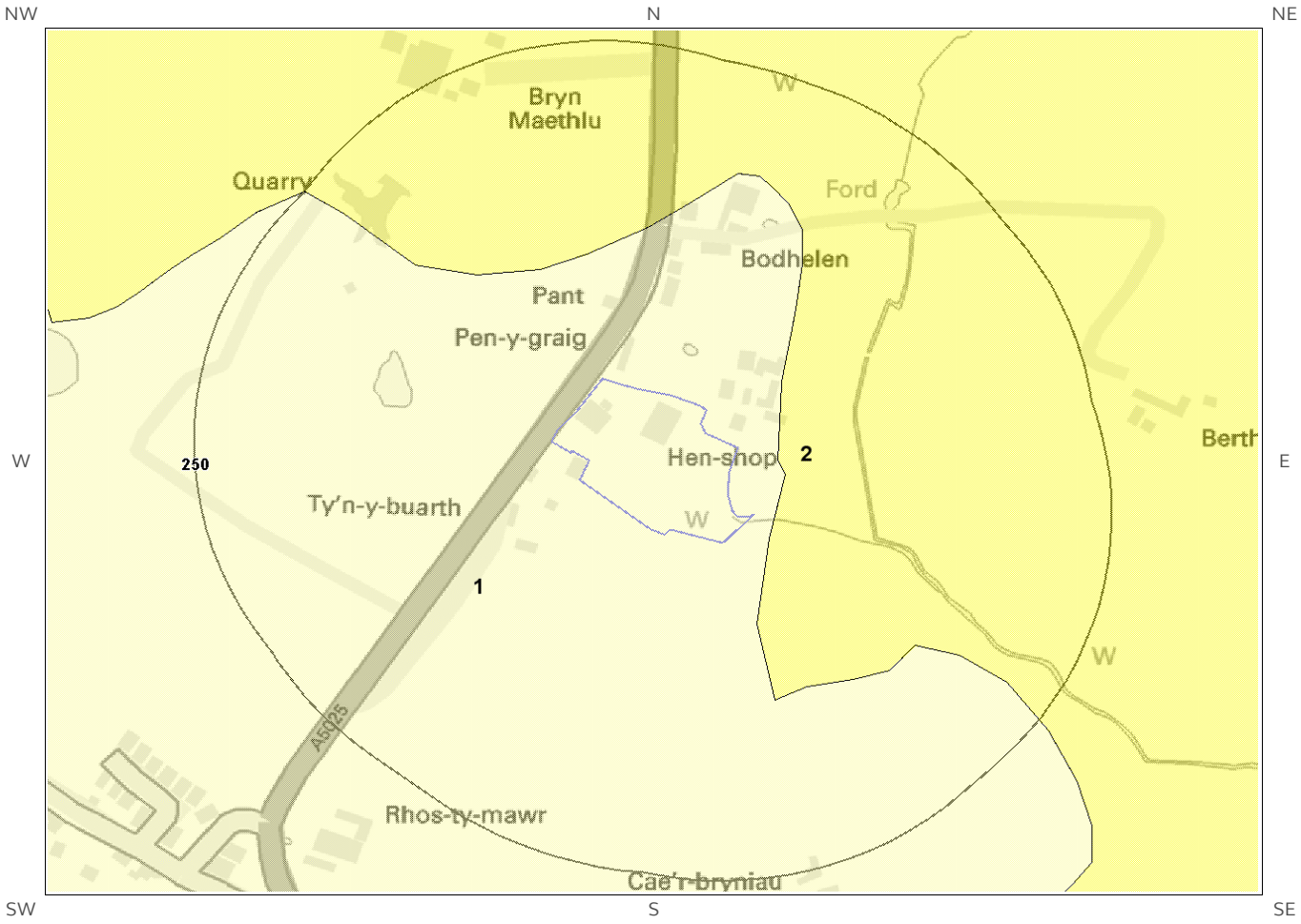
Compressible Deposits Legend

4.5 Collapsible Deposits Map



Collapsible Deposits Legend

4.6 Running Sand Map



Running Sand Legend

4 Natural Ground Subsidence

The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS).

The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

What is the maximum hazard rating of natural subsidence within the study site*[*] boundary? Very Low

4.1 Shrink-Swell Clays

The following Shrink Swell information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Ground conditions predominantly non-plastic. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.
2	14.0	E	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

4.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for slope instability identified. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.
2	0.0	On Site	Negligible	No indicators for slope instability identified. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.
3	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

* This includes an automatically generated 50m buffer zone around the site

4.3 Ground Dissolution of Soluble Rocks

The following Ground Dissolution information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

4.4 Compressible Deposits

The following Compressible Deposits information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for compressible ground identified. No special actions required to avoid problems due to compressible ground. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible ground.

4.5 Collapsible Deposits

The following Collapsible Rocks information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

4.6 Running Sands

The following Running Sands information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for running sand identified. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.
2	14.0	E	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

5 Borehole Records Map

Borehole Records Legend

Site Outline

Borehole Locations

125
250
Search Buffers (m)

5 Borehole Records

The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary: 0

Database searched and no data found.

6 Estimated Background Soil Chemistry

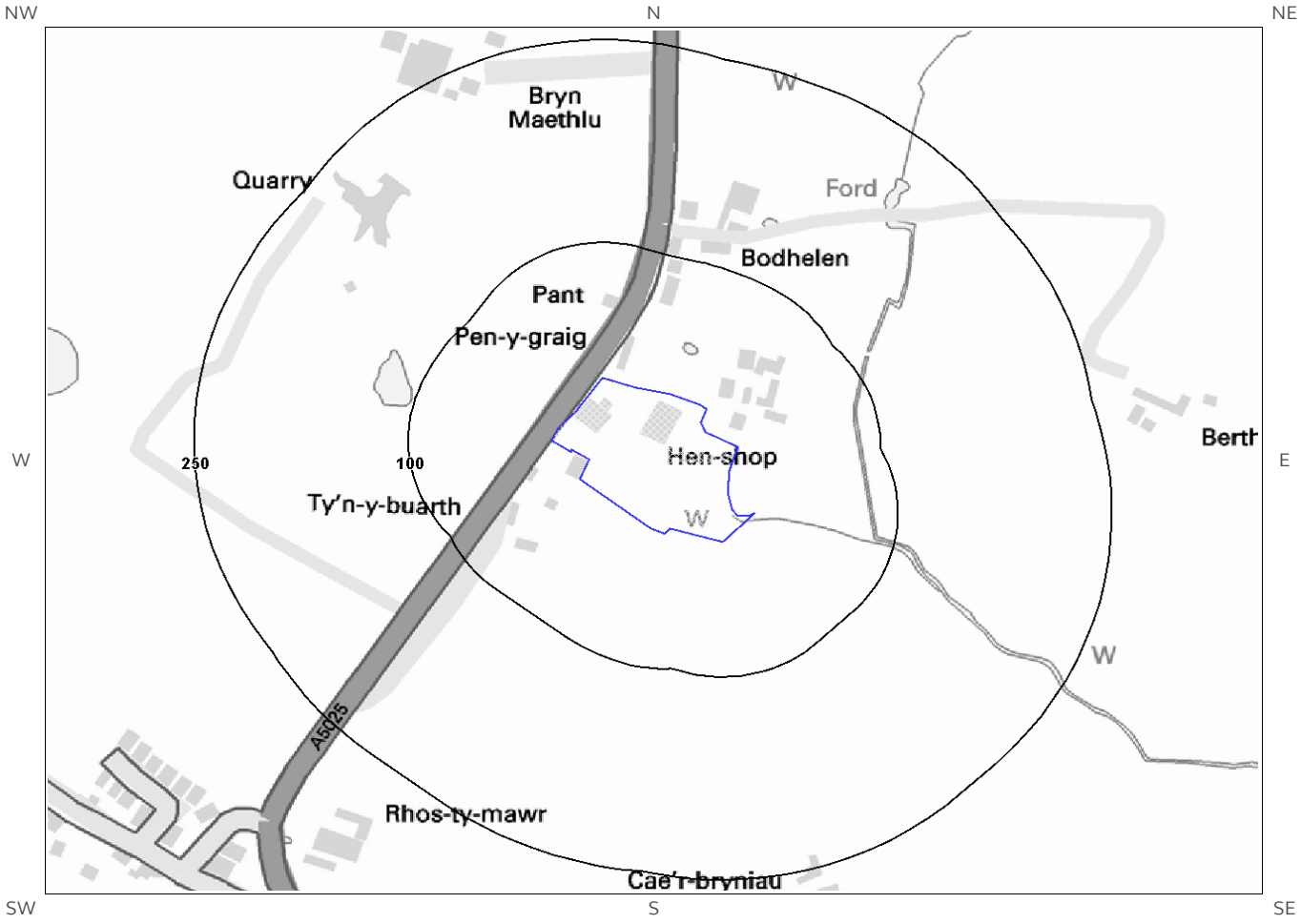
Records of background estimated soil chemistry within 250m of the study site boundary: 19

For further information on how this data is calculated and limitations upon its use, please see the Groundsure Geoinsight User Guide, available on request.

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
0.0	On Site	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
14.0	E	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
29.0	E	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
56.0	E	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
85.0	W	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
91.0	N	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
121.0	SE	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
144.0	W	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
158.0	S	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
163.0	N	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
169.0	W	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
180.0	NW	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
209.0	W	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
213.0	E	Sediment	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
213.0	E	Sediment	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
217.0	NW	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg
221.0	N	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<100 mg/kg

*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

7 Railways and Tunnels Map



Railways and Tunnels Legend

- Site Outline
- Search Buffers (m): 250, 500
- Underground or Partially Underground Railway / Subway System
- Railway Tunnel (OS Mapping)
- Abandoned or Dismantled Railway (OpenStreetMap)
- Railway Track (OS Mapping)
- Railway Track (OpenStreetMap)
- High Speed 2
- Crossrail 1
- Railway and/or Tunnel Feature from Historical Mapping

7 Railways and Tunnels

7.1 Tunnels

This data is derived from OpenStreetMap and provides information on the possible locations of underground railway systems in the UK - the London Underground, the Tyne & Wear Metro and the Glasgow Subway.

Have any underground railway lines been identified within the study site boundary? No

Have any underground railway lines been identified within 250m of the study site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

This data is derived from Ordnance Survey mapping and provides information on the possible locations of railway tunnels forming part of the UK overground railway network.

Have any other railway tunnels been identified within the site boundary? No

Have any other railway tunnels been identified within 250m of the site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

7.2 Historical Railway and Tunnel Features

This data is derived from Groundsure's unique Historical Land-use Database and contains features relating to tunnels, railway tracks or associated works that have been identified from historical Ordnance Survey mapping.

Have any historical railway or tunnel features been identified within the study site boundary? No

Have any historical railway or tunnel features been identified within 250m of the study site boundary? No

Database searched and no data found.

Any records that have been identified are represented on the Railways and Tunnels Map.

7.3 Historical Railways

This data is derived from OpenStreetMap and provides information on the possible alignments of abandoned or dismantled railway lines in proximity to the study site.

Have any historical railway lines been identified within the study site boundary?	No
Have any historical railway lines been identified within 250m of the study site boundary?	No

Database searched and no data found.

Note: multiple sections of the same track may be listed in the detail above

Any records that have been identified are represented on the Railways and Tunnels Map.

7.4 Active Railways

These datasets are derived from Ordnance Survey mapping and OpenStreetMap and provide information on the possible locations of active railway lines in proximity to the study site.

Have any active railway lines been identified within the study site boundary?	No
Have any active railway lines been identified within 250m of the study site boundary?	No

Database searched and no data found.

Note: multiple sections of the same track may be listed in the detail above
Any records that have been identified are represented on the Railways and Tunnels Map.

7.5 Railway Projects

These datasets provide information on the location of large scale railway projects High Speed 2 and Crossrail 1 .

Is the study site within 5km of the route of the High Speed 2 rail project?	No
Is the study site within 500m of the route of the Crossrail 1 rail project?	No

*Further information on proximity to these routes, the project construction status and associated works can be obtained through the purchase of a **Groundsure HS2 and Crossrail 1 Report**.*

The route data has been digitised from publicly available maps by Groundsure. The route as provided relates to the Crossrail 1 project only, and does not include any details of the Crossrail 2 project, as final details of the route for Crossrail 2 are still under consultation.

Contact Details

Groundsure Helpline

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British Geological Survey Enquiries

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Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email:**enquiries@bgs.ac.uk**
Web:**www.bgs.ac.uk**
BGS Geological Hazards Reports and general geological enquiries

British Gypsum

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LE12 6HX

The Coal Authority

200 Lichfield Lane
Mansfield
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www.coal.gov.uk

Public Health England

Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
https://www.gov.uk/government/organisations/public-health-england
Email: **enquiries@phe.gov.uk**
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Getmapping PLC

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Contact Details

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Tel: +44 (0)118 950 0761 E-mail:**reading@pba.co.uk**
Website:**http://www.peterbrett.com/home**

Standard Terms and Conditions

1 Definitions

I**n these terms and conditions unless the context otherwise requires:**
"Beneficiary" means the person or entity for whose benefit the Client has obtained the Services.
"Client" means the party or parties entering into a Contract with Groundsure.
"Commercial" means any building or property which is not Residential.
"Confidential Information" means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than
(i) information which the Client can prove was rightfully in its possession prior to disclosure by Groundsure and
(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).
"Support Services" means Support Services provided by Groundsure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.
"Contract" means the contract between Groundsure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.
"Third Party Data Provider" means any third party providing Third Party Content to Groundsure.
"Data Reports" means reports comprising factual data with no accompanying interpretation.
"Fees" has the meaning set out in clause 5.1.
"Groundsure" means Groundsure Limited, a company registered in England and Wales under number 03421028.
"Groundsure Materials" means all materials prepared by Groundsure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.
"Intellectual Property" means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.
"Mapping" means a map, map data or a combination of historical maps of various ages, time periods and scales.
"Order" means an electronic, written or other order form submitted by the Client requesting Services from Groundsure in respect of a specified Site.
"Ordnance Survey" means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.
"Order Website" means the online platform through which Orders may be placed by the Client and accepted by Groundsure.
"Report" means a Risk Screening Report or Data Report for Commercial or Residential property.
"Residential" means any building or property used as or intended to be used as a single dwelling.
"Risk Screening Report" means a risk screening report comprising factual data with an accompanying interpretation by Groundsure.
"Services" means any Report, Mapping and/or Support Services which Groundsure has agreed to provide by accepting an Order pursuant to clause 2.6.
"Site" means the area of land in respect of which the Client has requested Groundsure to provide the Services.
"Third Party Content" means data, database information or other information which is provided to Groundsure by a Third Party Data Provider.
"User Guide" means the user guide, as amended from time to time, available upon request from Groundsure and on the website (www.Groundsure.com) and forming part of this Contract.

2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 Groundsure agrees to provide the Services in accordance with the Contract.
2.2 Groundsure shall exercise reasonable skill and care in the provision of the Services.
2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of Groundsure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.
2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.
2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, Groundsure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and Groundsure will have no liability therefor. In addition you acknowledge and agree that Groundsure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.
2.6 Groundsure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by Groundsure. Groundsure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by Groundsure. Groundsure's acceptance of an Order shall be binding only when made in writing and signed by Groundsure's authorised representative or when accepted through the Order Website.

3 The Client's obligations

3.1The Client shall comply with the terms of this Contract and
(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and
(ii) be liable to Groundsure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.
3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.
3.3 The Client shall supply to Groundsure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as Groundsure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.
3.4 Where the Client's approval or decision is required to enable Groundsure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.
3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the Groundsure Materials, or use the Groundsure Materials in a manner for which they were not intended. The Client may make the Groundsure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.
3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that Groundsure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1The Client acknowledges that the Services provided by Groundsure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by Groundsure to be reliable.
4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;
(i) the Beneficiary,
(ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),
(iv) the first purchaser or first tenant of the Site, and
(v) the professional advisers and lenders of the first purchaser or tenant of the Site.
4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.
4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by Groundsure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1Groundsure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by Groundsure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").
5.2 The Client shall pay all outstanding Fees to Groundsure in full without deduction, counterclaim or set off within 30 days of the date of Groundsure's invoice or such other period as may be agreed in writing between Groundsure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.
5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of Groundsure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to
(i) full payment of all relevant Fees and
(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the Groundsure Materials.
6.2 All Intellectual Property in the Groundsure Materials are and shall remain owned by Groundsure or Groundsure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure

acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.
6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.
6.4 The Client shall, and shall procure that any recipients of the Groundsure Materials shall:

(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to Groundsure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the Groundsure Materials in order to advise the Beneficiary in a professional capacity. However, Groundsure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.
6.6 The Client shall procure that any person to whom the Services are made available shall notify Groundsure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7.Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of Groundsure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

(i) any breach of contract, including any deliberate breach of the Contract by Groundsure or its employees, agents or subcontractors;

(ii) any use made of the Reports, Services, Materials or any part of them; and

(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.
7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.
7.4 Groundsure shall not be liable for

(i) loss of profits;
(ii) loss of business;
(iii) depletion of goodwill and/or similar losses;
(iv) loss of anticipated savings;
(v) loss of goods;
(vi) loss of contract;
(vii) loss of use;
(viii) loss or corruption of data or information;
(ix) business interruption;
(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;
(xi) loss or damage that arise as a result of the use of all or part of the Groundsure Materials in breach of the Contract;
(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the Groundsure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;
(xiii) loss or damage to a computer, software, modem, telephone or other property; and
(xiv) loss or damage caused by a delay or loss of use of Groundsure's internet ordering service.

7.5 Groundsure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.
7.6 Groundsure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of Groundsure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against Groundsure in relation to the Services or other matters arising pursuant to the Contract.

8 Groundsure's right to suspend or terminate

8.1 If Groundsure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, Groundsure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.
8.2 Groundsure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to Groundsure within 30 days of the Payment Date; or

(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.
9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon Groundsure's acceptance of the Order; and

(ii) the Reports and/or Mapping provided under this Contract are

(a) supplied to the Client's specification(s) and in any event
(b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(i) Groundsure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in Groundsure's possession or control; and

(ii) the Client shall pay to Groundsure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay Groundsure any additional costs incurred in relation to the termination or suspension of the Contract.

11 Anti-Bribery

11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of Groundsure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to Groundsure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.
12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through Groundsure.
12.3 Groundsure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of Groundsure.
12.4 No failure on the part of Groundsure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.
12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.
12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.
12.7 Groundsure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

(i) the Client or Beneficiary's failure to provide facilities, access or information;
(ii) fire, storm, flood, tempest or epidemic;
(iii) Acts of God or the public enemy;
(iv) riot, civil commotion or war;
(v) strikes, labour disputes or industrial action;
(vi) acts or regulations of any governmental or other agency;
(vii) suspension or delay of services at public registries by Third Party Data Providers;
(viii) changes in law; or
(ix) any other reason beyond Groundsure's reasonable control.

In the event that Groundsure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then Groundsure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

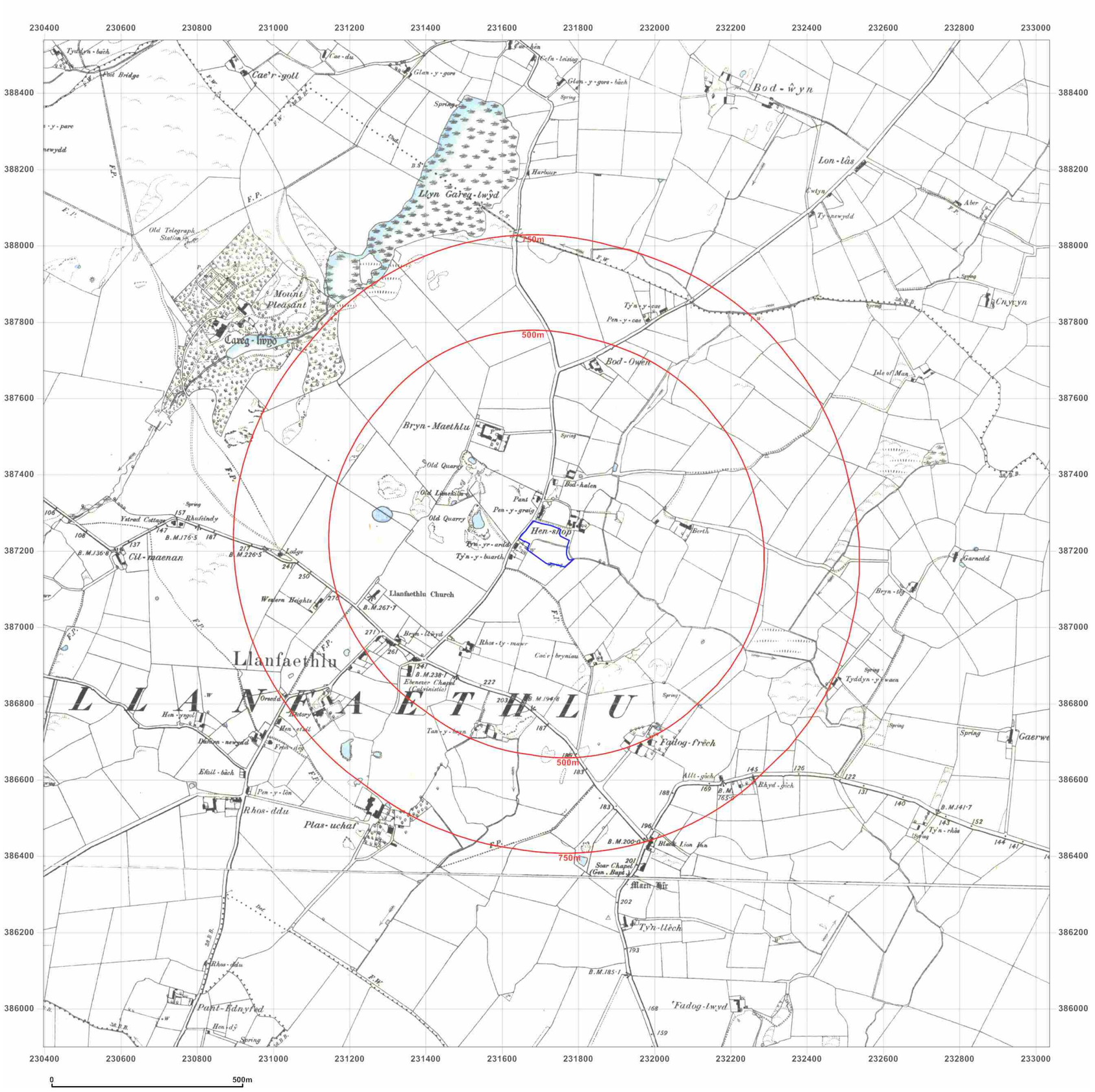
12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 Groundsure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at Groundsure who will respond in a timely manner. In the event you are not satisfied with Groundsure's complaints handling process or you are unable to resolve the complaint, at your discretion you may refer the complaint to The Property Ombudsman Scheme at the following URL/email: website www.tpos.co.uk or email: admin@tpos.co.uk

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent
required by law



Site Details:

HEN SIOP, A5025, HOLYHEAD, LL65 4NW

Client Ref: 60PO8050
Report Ref: GS-2735147
Grid Ref: 231716, 387219

Map Name: County Series

Map date: **1886-1887**

Scale: 1:10,560

Printed at: 1:10,560

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~~Surveyed 1886~~
Revised 1886
Edition N/A
Copyright N/A
Levelled N/A

~~Surveyed 1887~~
Revised 1887
Edition N/A
Copyright N/A
Levelled N/A

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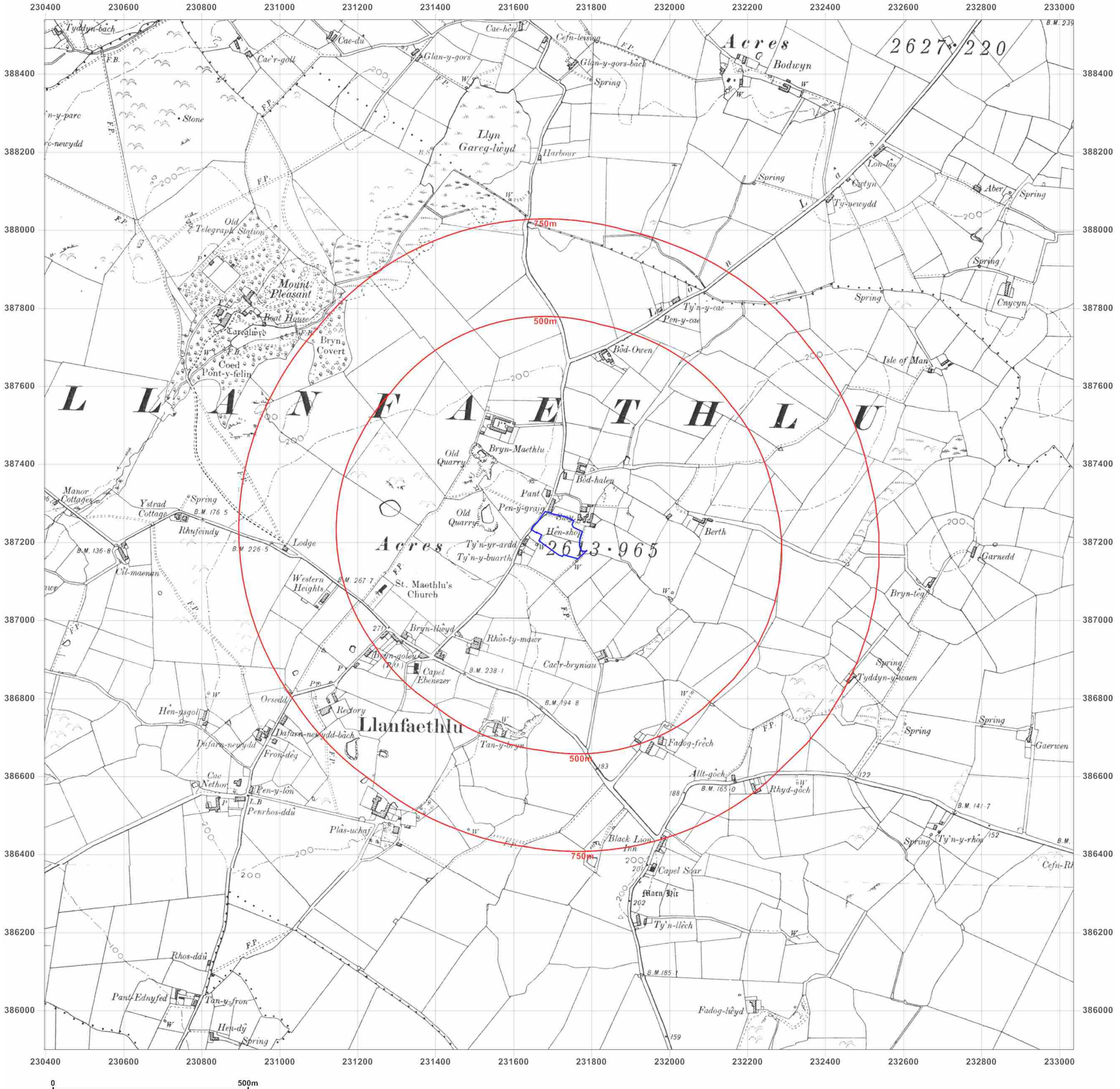

Site Details:

HEN SIOP, A5025, HOLYHEAD, LL65 4NW

Client Ref: 60PO8050
Report Ref: GS-2735147
Grid Ref: 231716, 387219

Map Name: County Series

Map date: **1899**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1887
Revised 1899
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1886
Revised 1899
Edition N/A
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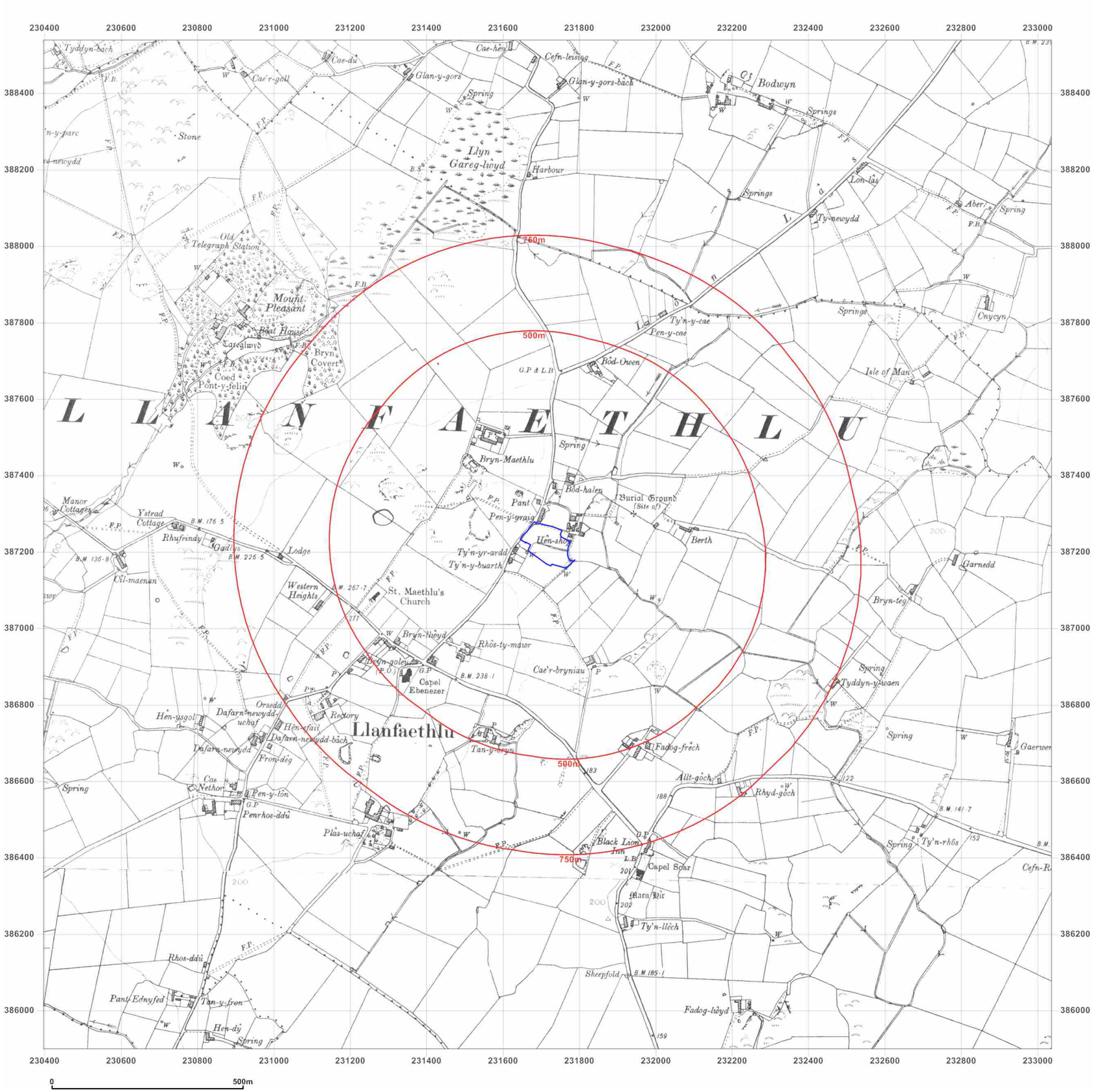

Groundsure INSIGHTS

Site Details:

HEN SIOP, A5025, HOLYHEAD, LL65 4NW

Client Ref: 60PO8050
Report Ref: GS-2735147
Grid Ref: 231716, 387219

Map Name: County Series

Map date: **1926**

Scale: 1:10,560

Printed at: 1:10,560

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~~Surveyed 1887~~
Revised 1926
Edition 1926
Copyright N/A
Levelled N/A

~~Surveyed 1886~~
Revised 1926
Edition 1926
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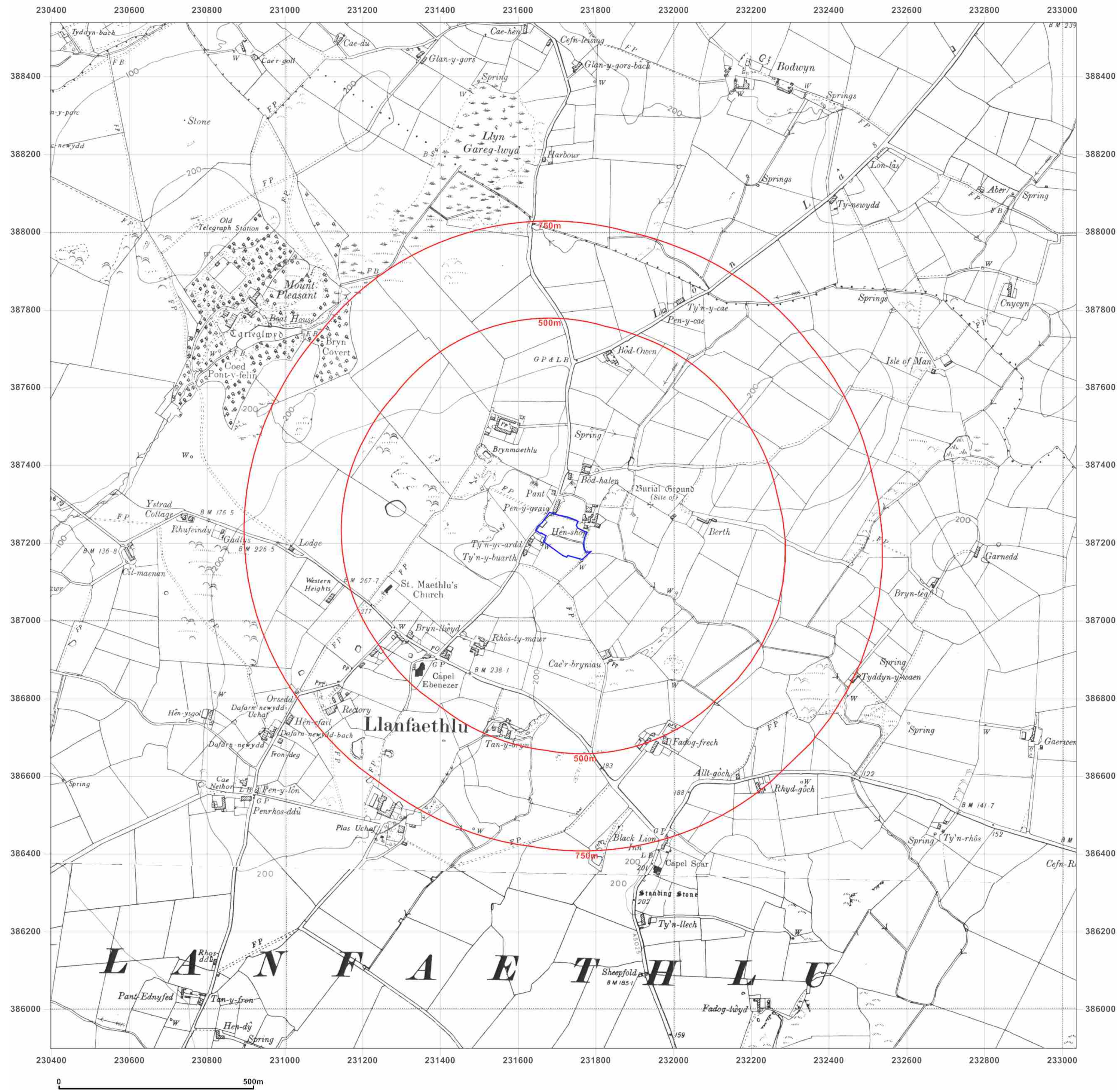

Groundsure INSIGHTS

Site Details:

HEN SIOP, A5025, HOLYHEAD, LL65 4NW

Client Ref: 60PO8050
Report Ref: GS-2735147
Grid Ref: 231716, 387219

Map Name: County Series

Map date: **1949**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1887
Revised 1949
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1886
Revised 1949
Edition N/A
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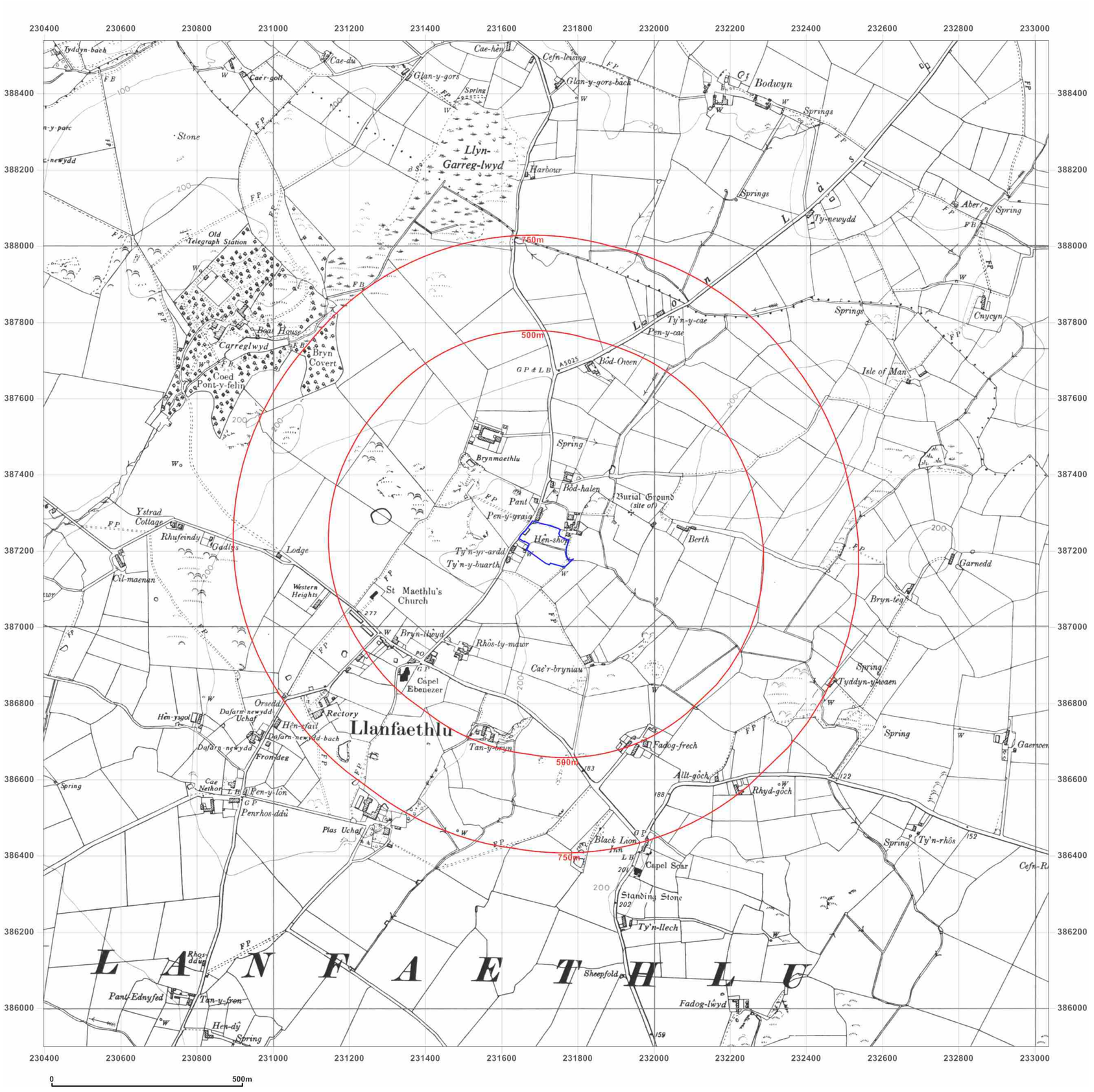

Groundsure INSIGHTS

Site Details:

HEN SIOP, A5025, HOLYHEAD, LL65 4NW

Client Ref: 60PO8050
Report Ref: GS-2735147
Grid Ref: 231716, 387219

Map Name: Provisional
Map date: **1959**
Scale: 1:10,560
Printed at: 1:10,560

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Surveyed 1959
Revised 1959
Edition N/A
Copyright N/A
Levelled N/A

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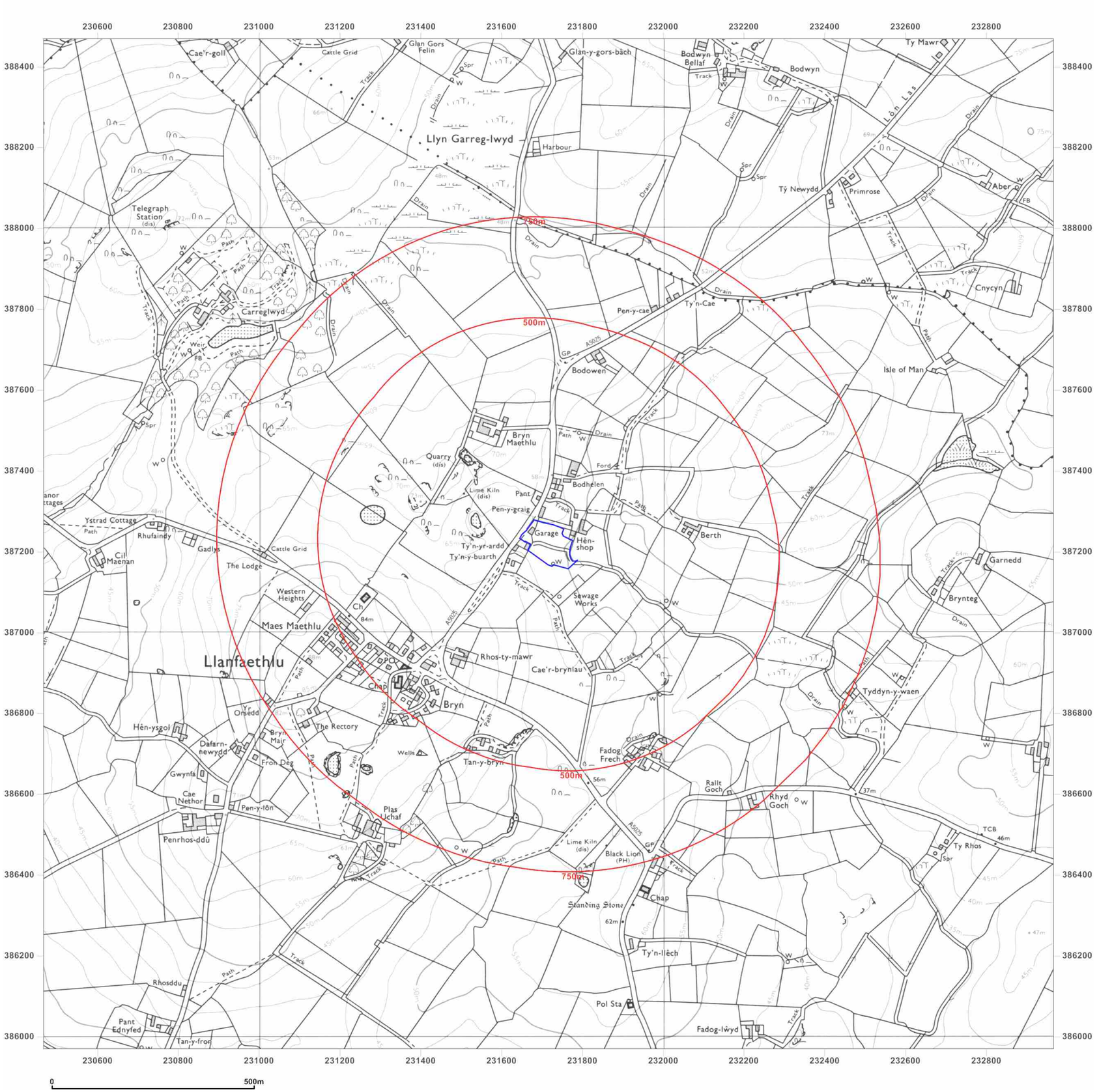

Groundsure INSIGHTS

Site Details:

HEN SIOP, A5025, HOLYHEAD, LL65 4NW

Client Ref: 60PO8050
Report Ref: GS-2735147
Grid Ref: 231716, 387219

Map Name: National Grid

Map date: **1980**

Scale: 1:10,000

Printed at: 1:10,000

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Surveyed 1974
Revised 1980
Edition N/A
Copyright 1980
Levelled 1973

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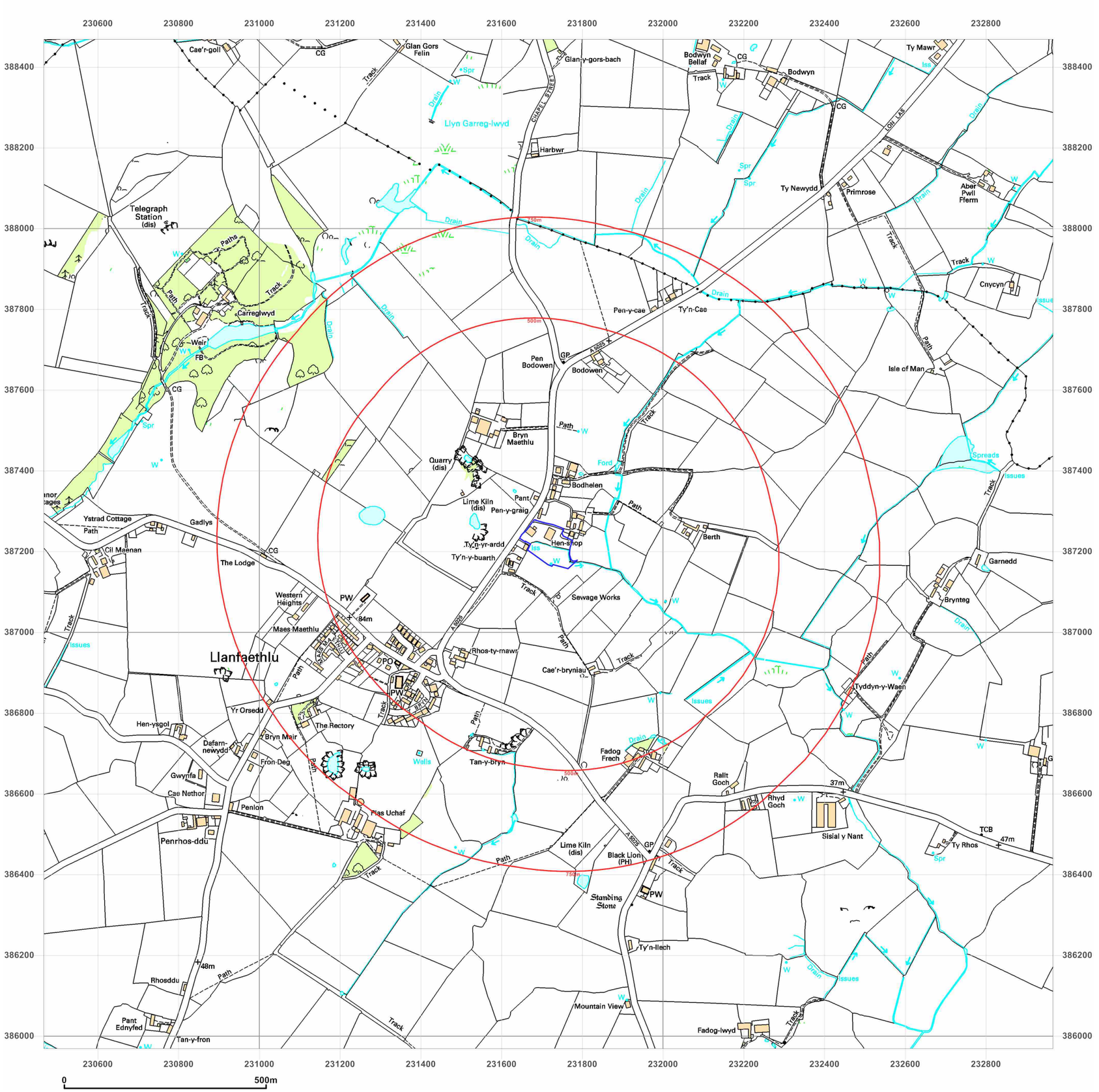

Groundsure INSIGHTS

Site Details:

HEN SIOP, A5025, HOLYHEAD, LL65 4NW

Client Ref: 60PO8050
Report Ref: GS-2735147
Grid Ref: 231716, 387219

Map Name: 1:10,000 Raster

Map date: **2002**

Scale: 1:10,000

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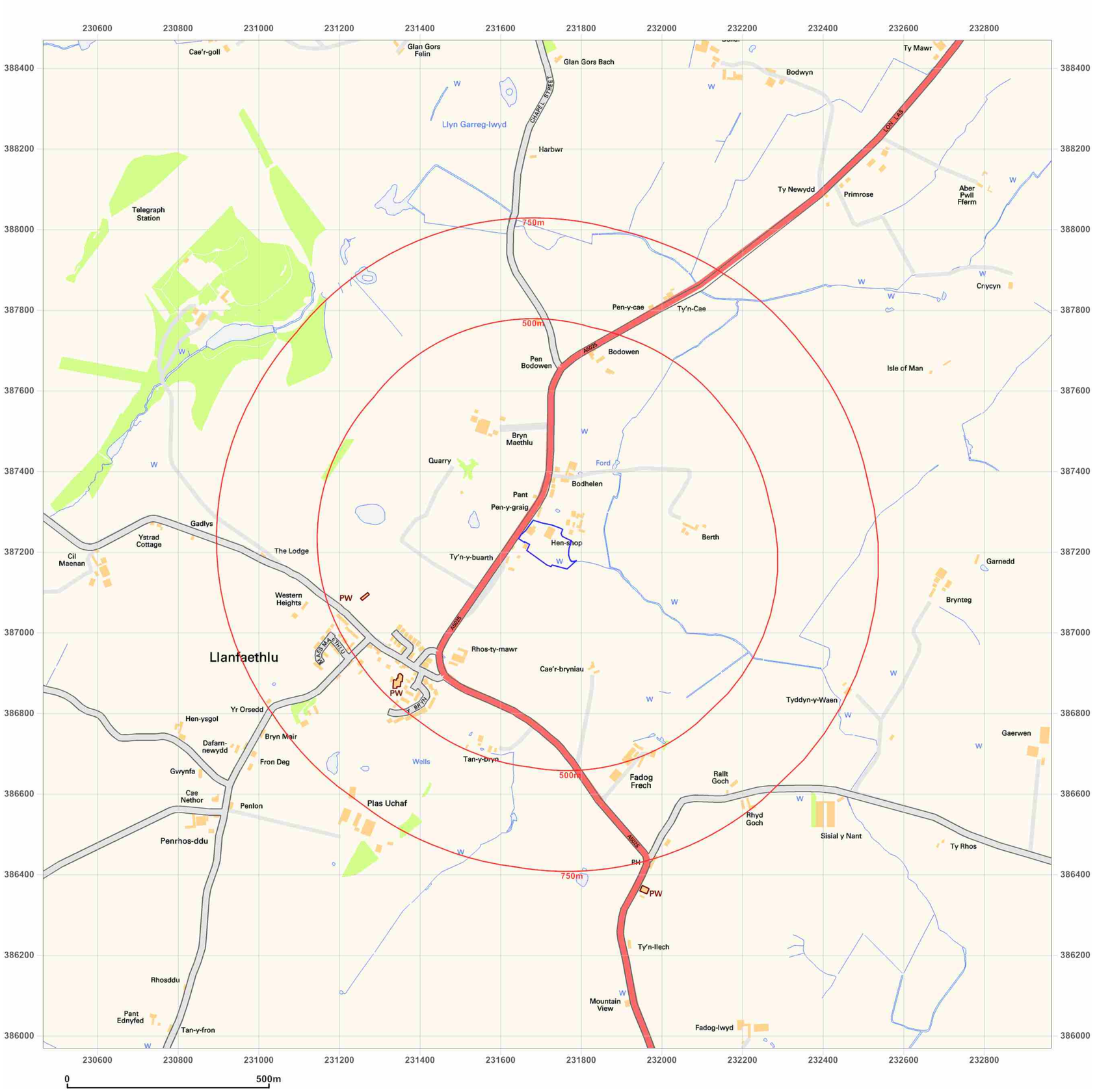

Groundsure INSIGHTS

Site Details:

HEN SIOP, A5025, HOLYHEAD, LL65 4NW

Client Ref: 60PO8050
Report Ref: GS-2735147
Grid Ref: 231716, 387219

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

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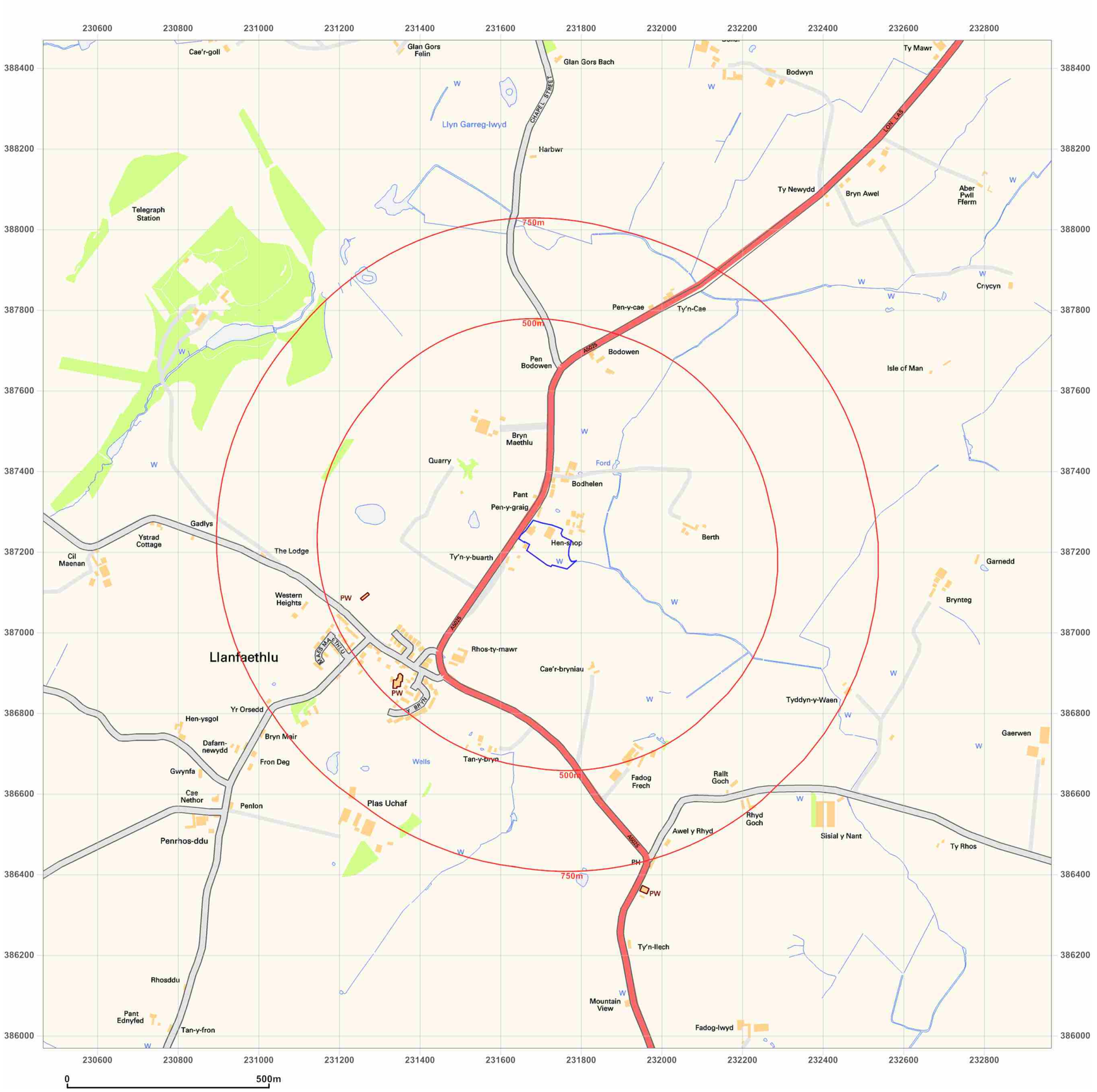

Groundsure INSIGHTS

Site Details:

HEN SIOP, A5025, HOLYHEAD, LL65 4NW

Client Ref: 60PO8050
Report Ref: GS-2735147
Grid Ref: 231716, 387219

Map Name: National Grid

Map date: **2014**

Scale: 1:10,000

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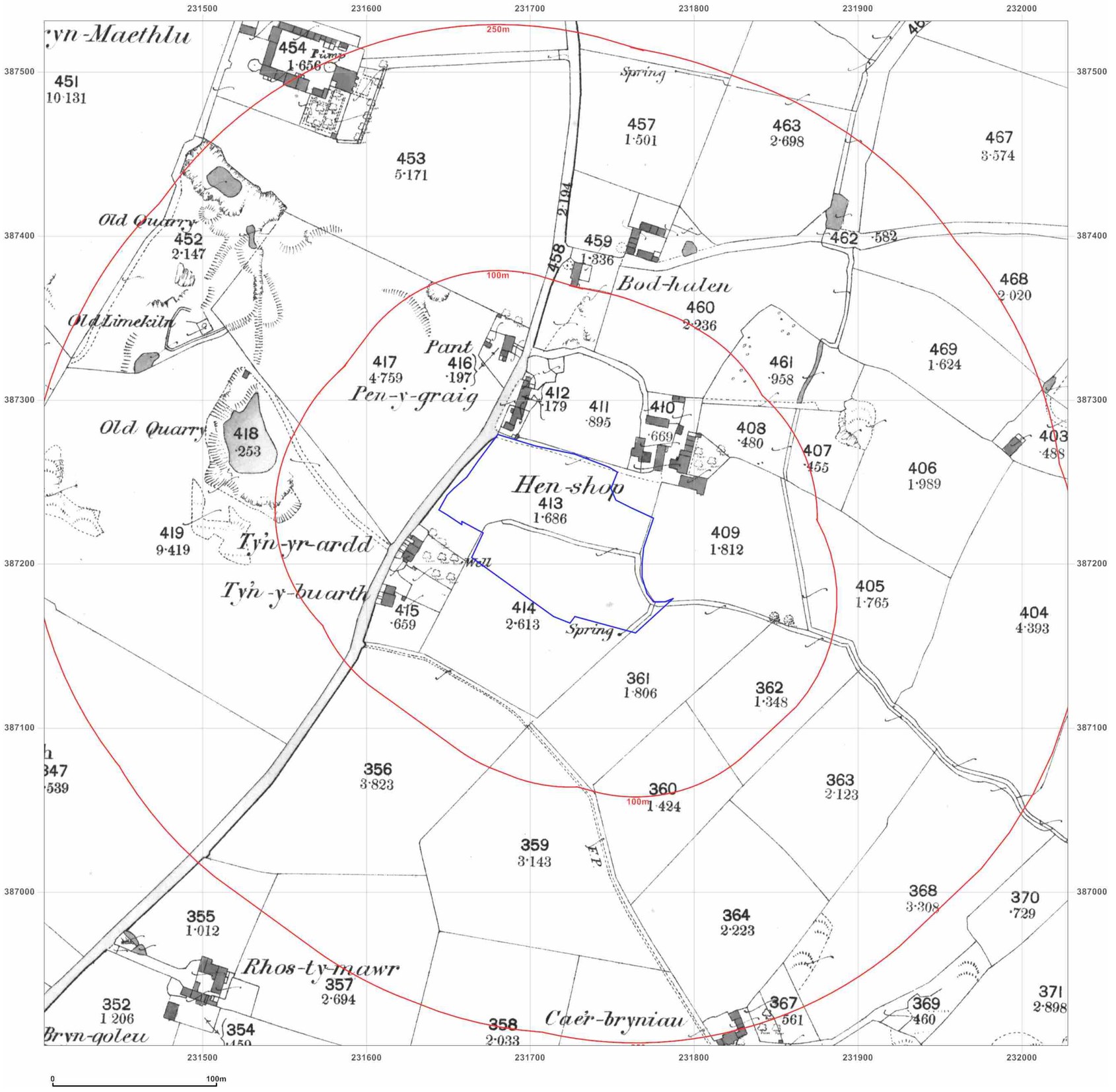

Groundsure INSIGHTS

Site Details:

HEN SIOP, A5025, HOLYHEAD, LL65 4NW

Client Ref: 60PO8050
Report Ref: GS-2735147
Grid Ref: 231716, 387219

Map Name: County Series

Map date: **1889**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1889
Revised 1889
Edition N/A
Copyright N/A
Levelled N/A

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Site Details:

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Client Ref: 60PO8050
Report Ref: GS-2735147
Grid Ref: 231716, 387219

Map Name: County Series

Map date: **1900**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1900
Revised 1900
Edition N/A
Copyright N/A
Levelled N/A

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Production date: 08 February 2016

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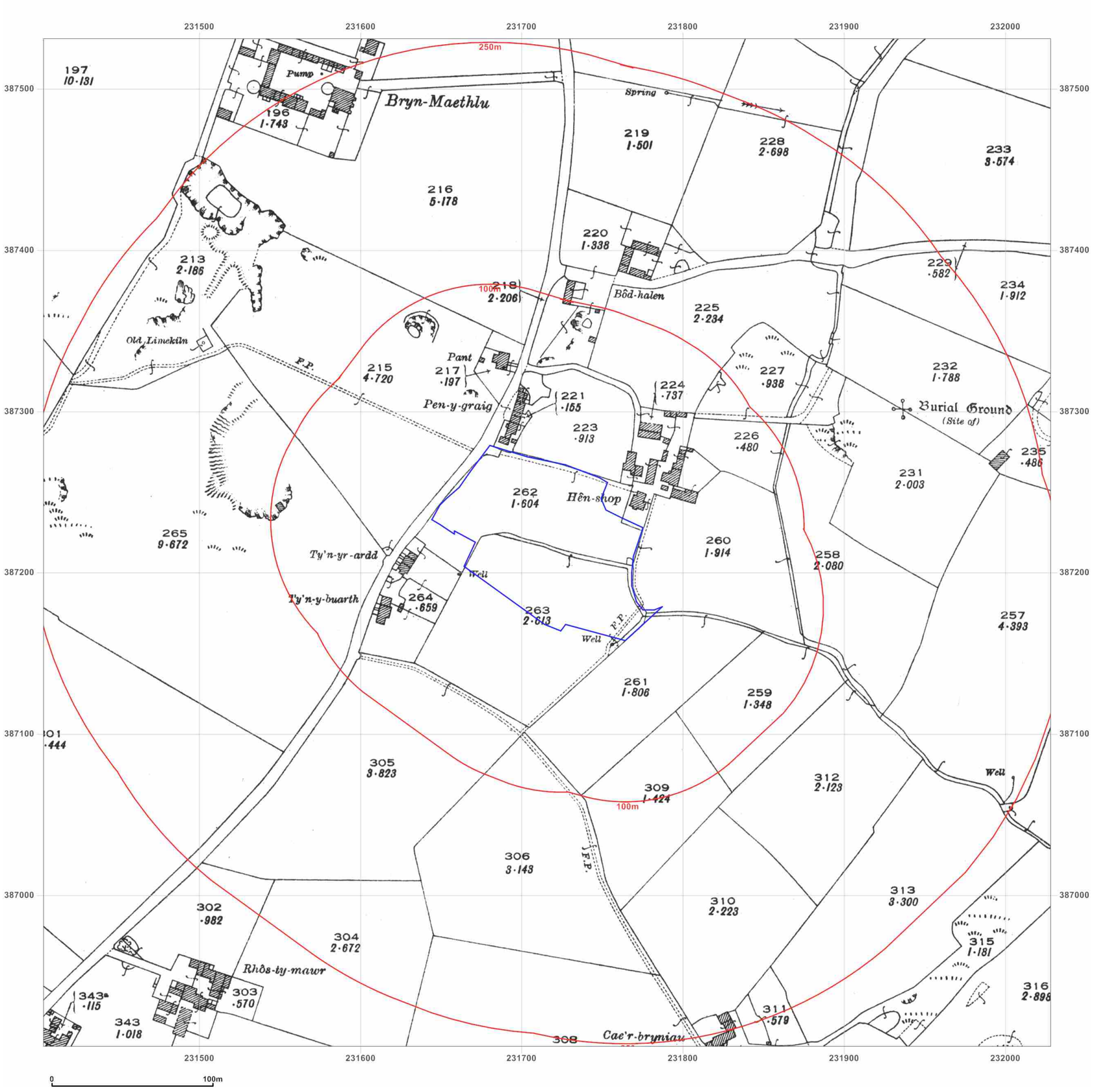

Groundsure INSIGHTS

Site Details:

HEN SIOP, A5025, HOLYHEAD, LL65 4NW

Client Ref: 60PO8050
Report Ref: GS-2735147
Grid Ref: 231716, 387219

Map Name: County Series

Map date: **1924**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1924
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A

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Groundsure INSIGHTS

Site Details:

HEN SIOP, A5025, HOLYHEAD, LL65 4NW

Client Ref: 60PO8050
Report Ref: GS-2735147
Grid Ref: 231716, 387219

Map Name: National Grid

Map date: **1974**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1974
Revised 1974
Edition N/A
Copyright 1975
Levelled 1955

Surveyed 1974
Revised 1974
Edition N/A
Copyright 1975
Levelled 1955

Surveyed 1974
Revised 1974
Edition N/A
Copyright 1975
Levelled 1961

Surveyed 1974
Revised 1974
Edition N/A
Copyright 1975
Levelled 1955

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Production date: 08 February 2016

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Site Details:

HEN SIOP, A5025, HOLYHEAD, LL65 4NW

Client Ref: 60PO8050
Report Ref: GS-2735147
Grid Ref: 231716, 387219

Map Name: National Grid
Map date: **1995**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed N/A
Revised N/A
Edition N/A
Copyright 1995
Levelled N/A

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Copyright 1995
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Surveyed N/A
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