AGRICULTURAL QUALITY
OF LAND WEST OF PENTWYN ROAD
LLANRHOS

Report 2519/1

4th March 2025

Land Research ASSOCIATES
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Report 2519/1
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SUMMARY

An agricultural land quality survey has been undertaken of 6.1 ha of land west of Pentwyn Road, Llanrhos in January 2025.

The land has mainly slowly permeable fine loamy and fine loamy over clayey soils, with agricultural quality limited to Subgrade 3b by wetness. A small area of moderately steep slopes has shallow soils and is limited to Subgrade 3b by gradient.

1.0 Introduction

1.1 This report provides information on the agricultural quality of 6.1 ha of land west of Pentwyn Road, Llanrhos, Conwy. The report is based on a survey of the land in January 2025.

SITE ENVIRONMENT

1.2 The survey area comprises two fields, bordered to the east by Pentwyn Road, to the north by residential gardens, to the west by a caravan park, to the south-west by derelict former hospital buildings and to the south-east by adjoining agricultural land.

1.3 The land in the west is slightly elevated, falling via moderately steep slopes to the lower ground in the east. Average elevation is approximately 37.5 m AOD.

1.4 The land is under grass, ungrazed at the time of survey.

PUBLISHED INFORMATION

1.5 British Geological Survey 1:50,000 scale information records the underlying geology as Devensian glacial till, variably over mudstone (Conwy and Llandovery Rocks Formations) or interbedded mudstone, siltstone and sandstone (Denbigh Grits Formation).

1.6 The National Soil Map (published at 1:250,000 scale) records the land as Cegin Association: mainly slowly permeable fine loams and clays formed in drift, with some better draining soils where drift thins over bedrock [1].

1.7 The Welsh Government Predictive Agricultural Land Classification map[2] shows the land as a mix of Grade 2, Subgrade 3a and Urban.

[1] Rudeforth, C. C., *et al*., 1984. *Soils and their use in Wales.* Soil survey of England and Wales, Bulletin No. 11, Harpenden.

[2] https://datamap.gov.wales/layers/inspire-wg:wg_predictive_alc2

2.0 Soils

2.1 A soils and agricultural land quality survey was carried out in January 2025 in accordance with MAFF (1988) Agricultural Land Classification guidelines[3]. It was based on observations at intersects of a 100 m grid, giving a density of one observation per hectare. One additional point was added to provide additional information.

2.2 During the survey, soils were examined by hand augerings and pits to a maximum depth of 1.2 m A log of the sampling points and a map (Map 1) showing their location is in an appendix to this report.

2.3 The soils were found to be formed in thin drift and comprise heavy clay loam or sandy clay loam topsoil over permeable sandy clay loam or clay loam upper subsoil. The lower subsoil is a slowly permeable clay loam or clay, grading to slaty mudstone bedrock, which also constitutes a slowly permeable layer (layers of finely bedded rock in a structureless clay matrix). The subsoils show evidence of seasonal waterlogging (greyish colours and ochreous mottles) to shallow depth. On steeper slopes in the centre of the site the drift thins over bedrock, which directly underlies the topsoil.

2.4 The soils are mainly judged to be imperfectly to poorly-draining (Soil Wetness Class III to IV) under the local climate. The shallow soils on slopes are judged to be freely-draining (Soil Wetness Class I).

2.5 Example soil profiles descriptions from pit excavations are attached to this report as an appendix.

[3]MAFF, (1988).*Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*.

3.0 Agricultural land quality

3.1 To assist in assessing land quality, the Ministry of Agriculture, Fisheries and Food (MAFF) developed a method for classifying agricultural land by grade according to the extent to which physical or chemical characteristics impose long-term limitations on agricultural use for food production. The MAFF ALC system classifies land into five grades numbered 1 to 5, with grade 3 divided into two subgrades (3a and 3b). The system was devised and introduced in the 1960s and revised in 1988.

3.2 The agricultural climate is an important factor in assessing the agricultural quality of land and has been calculated using the Climatological Data for Agricultural Land Classification[4].

3.3 The relevant site data for an average elevation of 37.5 m and a central point at grid reference SH 791,798 is given below.

- Average annual rainfall: 794 mm
- January-June accumulated temperature >0°C 1434 day°
- Field capacity period 185 days
- Summer moisture deficits for: wheat: 99 mm
potatoes: 90 mm

3.4 The survey described in the previous section was used in conjunction with the agro-climatic data above to classify the site using the revised guidelines for ALC issued in 1988 by MAFF[5]. There are no overriding climatic limitations at this locality.

SURVEY RESULTS

3.5 The agricultural quality of the land is primarily limited by wetness and in places by gradient. Other factors have been assessed but do not affect the land grade. Land of Grade 3 has been identified.

Subgrade 3b

3.6 The land has high or moderately high topsoil clay content and imperfect to poor drainage (Soil Wetness Class III to IV). This combination means the land is normally too wet for spring cultivations and arable cropping is mainly restricted to autumn sowings as a result. Some observations suggest a greater degree of wetness limitation (heavy topsoil and poor drainage). However, it is judged on balance that the site is capable of supporting arable cropping provided suitable drainage measures were in place and the land is therefore all graded as Subgrade 3b.

[4]Meteorological Office, (1989).*Climatological Data for Agricultural Land Classification*.
[5]MAFF, (1988).*Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*.

3.7 An area in the centre of the site has moderately steep slopes (7-11 degrees) with shallow soils. The slopes would present limitations to the use of some agricultural machinery. The soils are shallow to bedrock, but it is judged that the soils could be deepened by cultivation and depth is therefore not considered a limiting factor.

Grade areas

3.8 The land grade is shown on Map 2 and the areas occupied shown below.

Table 1: Areas occupied by the different land grades (ha)

Grade/subgrade	*Area (ha)*	*% of the land*
Subgrade 3b	6.1	100
Total	6.1	100

APPENDIX

DETAILS OF OBSERVATIONS

MAPS

LABORATORY ANALYSIS

Land west of Pentwyn Road, Llanrhos: Soils and ALC survey – Details of observations at each sampling point

Obs	Topsoil			Upper subsoil			Lower subsoil			Slope	Wetness	Agricultural quality	
No	Depth (cm)	Texture	Stones >20 mm (%)	Depth (cm)	Texture	Mottling	Depth (cm)	Texture	Mottling	(°)	Class	Grade	Main limitation
1	0-31	SCL	<5	31-36	SCL	xxx	36-63 63+	HCL R	xxx	2	IV	3b	W
2	0-23	HCL	<5	23-41	HCL(r)	xxx	41-74 74+	C(r) R	xxx	3	IV	4	W
3	0-22	HCL	<5	22+	R					8	I	3b	G
4	0-23	HCL	<5	23-35	HCL	o	35-60 60+	HCL R	xxx	3	IV	4	W
5	0-25	HCL	<5	25-50	HCL	xxx	50-61 61	HCL/rock rubble R		2	III/IV	3b/4	W

Soil log key

Gley indicators[1]

o	unmottled
x	1-2% ochreous mottles and brownish matrix (or a few to common root mottles (topsoils))[3]
xx	>2% ochreous mottles and brownish matrix and/or dull structure faces (slightly gleyed horizon)
xxx	>2% ochreous mottles and greyish or pale matrix (gleyed horizon) or reddish matrix and >2% greyish, brownish or ochreous mottles and pale ped faces mottles or fmn concentrations (gleyed horizon)
xxxx	dominantly blueish/greenish matrix, often with some reddish mottles (gleyed horizon)

Texture[2]

C – clay
ZC - silty clay
SC - sandy clay
CL - clay loam (H-heavy, M-medium)
ZCL - silty clay loam (H-heavy, M-medium)
SZL - sandy silt loam (F-fine, M-medium,C-coarse)
LS - loamy sand (F-fine, M-medium, C-coarse)
SL - sandy loam (F-fine, M-medium, C-coarse)
S - sand (F-fine, M-medium, C-coarse)
SCL - sandy clay loam
P - peat (H-humified, SF-semi-fibrous, F-fibrous)
LP - loamy peat; PL - peaty loam

Limitations:

W - wetness/workability
D - droughtiness
De - depth
F - flooding
St – stoniness
G - gradient
T – topography/microrelief
C - Climate

Suffixes & prefixes:

o - organic

(vsl, sl, m, v, x)**st** – (very slightly, slightly, moderately, very, extremely) **stony**[6]

(vsl, sl, m, v, x)**ca**
(very slightly, slightly, moderately, very, extremely) **calcareous**[7]

Slowly permeable layers[4]

a depth underlined (e.g. 50) indicates the top of a slowly permeable layer

A wavy underline (e.g. 50 indicates the top of a layer borderline to slowly permeable

Wetness Class[5]

I (freely drained) to VI (very poorly drained)

Other abbreviations

fmn - ferri-manganiferous concentrations
dist - disturbed soil layer; chky - chalky
R – bedrock (CH – chalk, SST – sandstone LST – limestone, MST – Mudstone)
r-reddish, gn – greenish

[1]Gley indicators in accordance with Hodgson, J.M., 1997. Soil Survey Field Handbook (third edition). Soil survey technical monograph No. 5
[2]Texture in accordance with particle size classes in Hodgson (1997)
[3] Occasionally recorded in the texture box
[4]Permeability is estimated for auger borings and must be confirmed by full pit observations in accordance with the definitions in: Revised Guidelines for grading the quality of Agricultural Land (Maff 1988)
[5]Soil Wetness Classes are defined in Hodgson (1997)
[6]stoniness classes as defined in Hodgson (1997)
[7]calcareous classes as defined in Hodgson (1997)

Grades shown as intergrade e.g. **3a**/3b are close to the grade boundary. The estimate of which side of the boundary the grading falls is the shown first (in bold here)
grades in brackets eg. (3a) raised by one grade due to calcareous topsoil

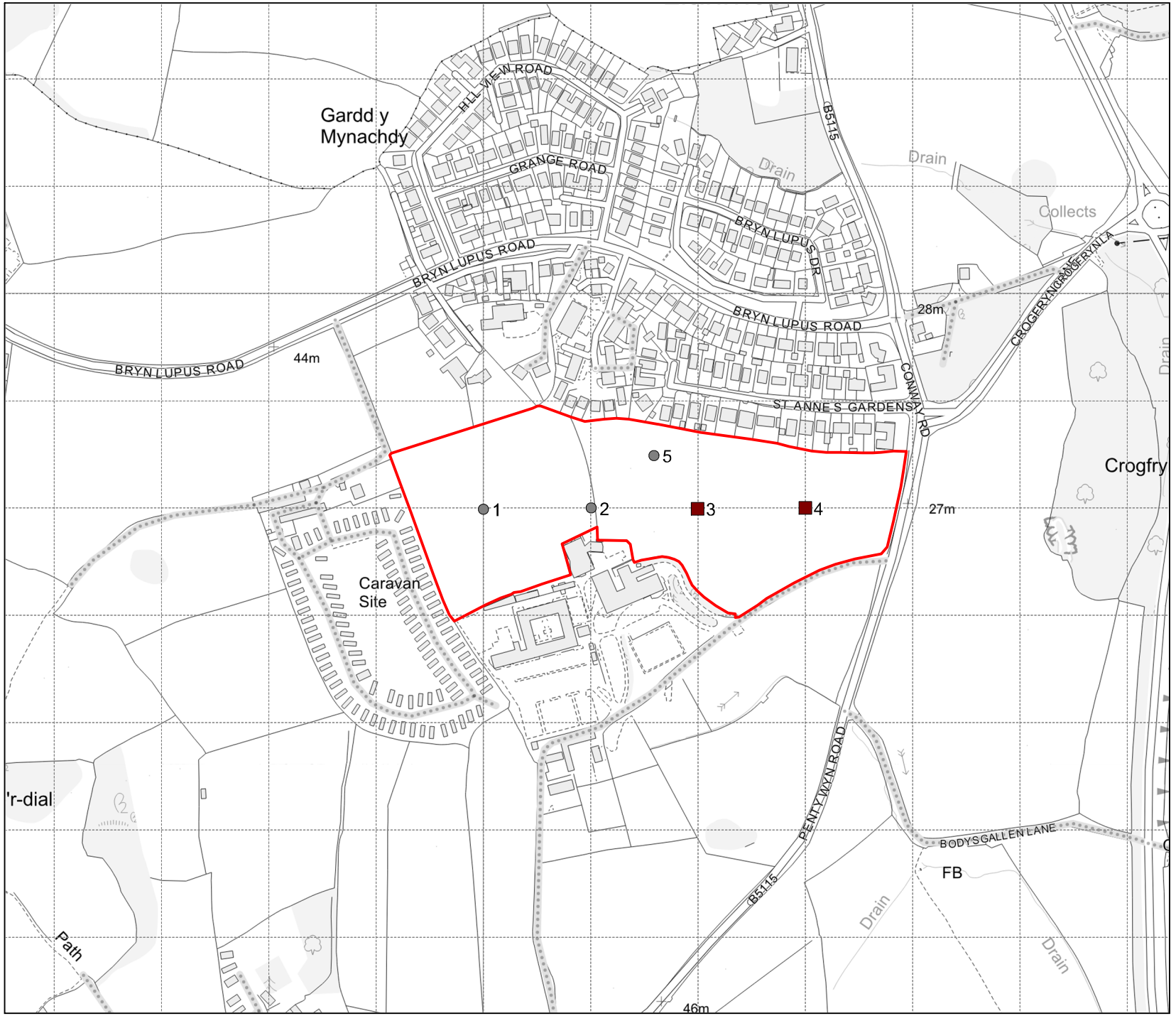
SOIL PIT DESCRIPTIONS

Observation 3

0-23 cm	Dark greyish brown (2.5.Y 4/2) heavy clay loam; 2-3% medium hard slaty mudstone; strongly developed medium sub-angular blocky structure; friable; common fine fibrous roots; gradual smooth boundary to:
23 cm+	Hard slaty mudstone bedrock.
	Soil Wetness Class: I

Observation 4

0-23 cm	Dark greyish brown (2.5.Y 4/2) heavy clay loam; <1% stones; moderately developed medium and fine sub-angular blocky structure; friable; common fine fibrous roots; gradual smooth boundary to:
23-35 cm	Light olive brown (2.5Y 5/3) heavy clay loam; stoneless; moderately developed coarse sub-angular blocky structure; friable; few fine fibrous roots; gradual smooth boundary to:
35-60 cm	Very pale brown (10YR 7/4) heavy clay loam with 20% medium reddish yellow (7.5YR 6/8) and yellowish red (5YR 5/8) mottles; slightly stony (10% small hard slate and few mixed large hard rounded stones); weakly developed coarse angular blocky structure; firm; <0.5% macro-pores; few fine fibrous roots; gradual smooth boundary to:
60-75 cm	Light brownish grey (5PB 6/1) clay with 30% fine and medium yellowish brown (10YR 5/6) mottles and 10% fine dark reddish grey (5YR 2.5/2) ferri-manganiferous concentrations; 50% hard slaty mudstone with rock bedding structures weathered slate; structureless; massive;
75 cm+	Impenetrable bedrock.
	Soil Wetness Class: IV



KEY

- Auger observations
- Pits
- Site boundary

Site:

Pentwyn Road
Llanrhos

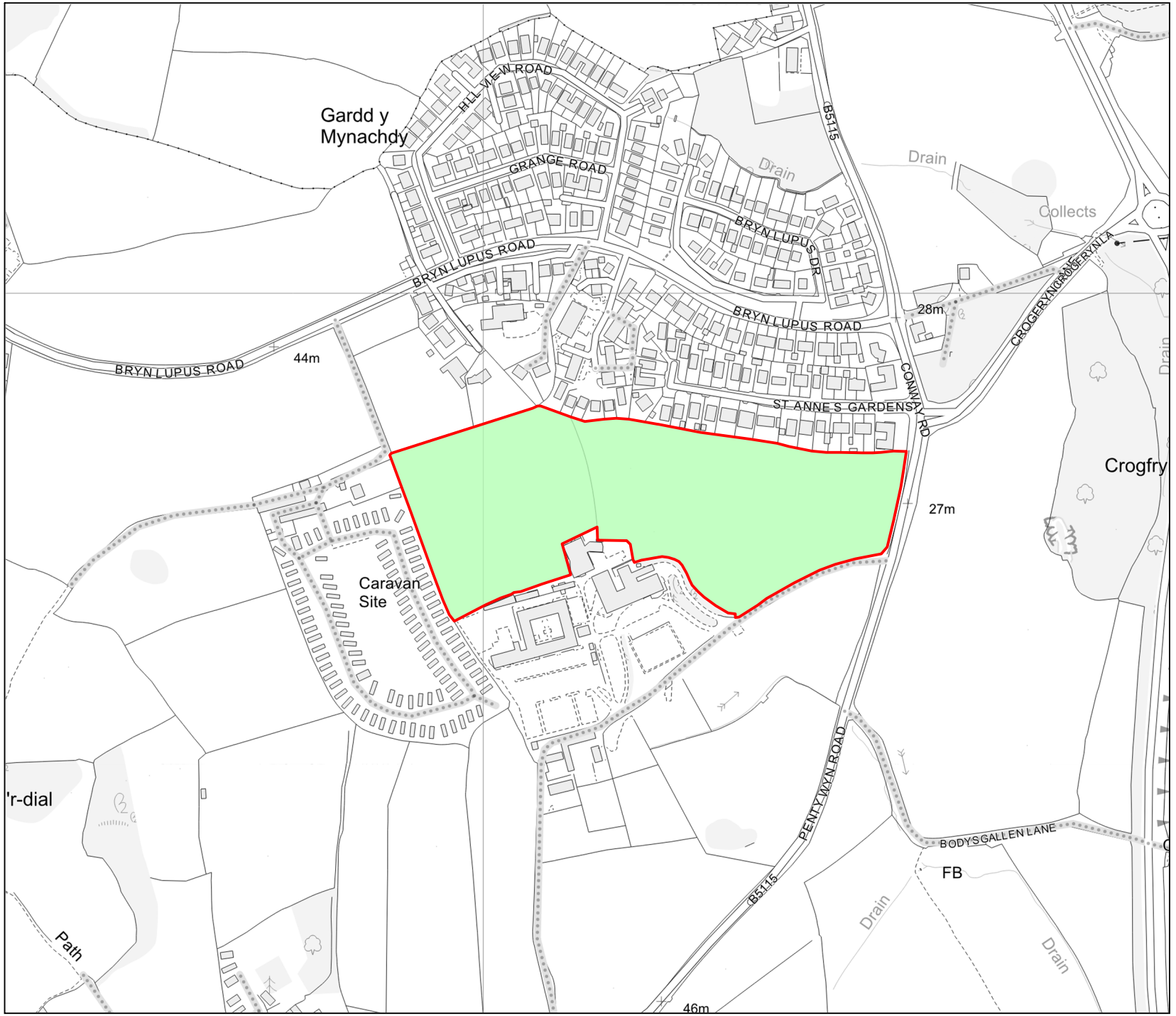
Map title:

MAP 1
Observations

Land Research ASSOCIATES
Tapton Innovation Centre
Brimington Road
Chesterfield
S41 0TZ
www.lra.co.uk

Date: 04/03/2025

Scale: 1:5,000



KEY

Subgrade 3b

Site boundary

Site:

Pentwyn Road
Llanrhos

Map title:

MAP 2
Agricultural Land
Classification

Land Research ASSOCIATES
Tapton Innovation Centre
Brimington Road
Chesterfield
S41 0TZ
www.lra.co.uk

Date: 04/03/2025

Scale: 1:5,000

ANALYTICAL REPORT

Report Number	**76624-25**	**H579**	**MR MIKE PALMER**
Date Received	**03-FEB-2025**		**LAND RESEARCH ASSOCIATES**
Date Reported	**18-FEB-2025**		**TAPTON PARK INNOVATION**
Project	**SOIL**		**CENTRE**
Reference	**PENTWYN ROAD**		**BRIMINGTON ROAD**
Order Number			**CHESTERFIELD S41 0TZ**

Laboratory Reference		**SOIL735820**
Sample Reference		4
Determinand	**Unit**	**SOIL**
Sand 2.00-0.063mm	% w/w	30
Silt 0.063-0.002mm	% w/w	38
Clay <0.002mm	% w/w	32
Textural Class **		HCL

Notes

Analysis Notes

The sample submitted was of adequate size to complete all analysis requested.
The results as reported relate only to the item(s) submitted for testing.
The results are presented on a dry matter basis unless otherwise stipulated.

Document Control

This test report shall not be reproduced, except in full, without the written approval of the laboratory.

** Please see the attached document for the definition of textural classes.

Reported by

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ADAS (UK) Textural Class Abbreviations

The texture classes are denoted by the following abbreviations:

Class	Code
Sand	S
Loamy sand	LS
Sandy loam	SL
Sandy Silt loam	SZL
Silt loam	ZL
Sandy clay loam	SCL
Clay loam	CL
Silt clay loam	ZCL
Clay	C
Silty clay	ZC
Sandy clay	SC

For the *sand, loamy sand, sandy loam* and *sandy silt loam* classes the predominant size of sand fraction may be indicated by the use of prefixes, thus:

- vf Very Fine (more than 2/3's of sand less than 0.106 mm)
- f Fine (more than 2/3's of sand less than 0.212 mm)
- c Coarse (more than 1/3 of sand greater than 0.6 mm)
- m Medium (less than 2/3's fine sand and less than 1/3 coarse sand).

The subdivisions of *clay loam* and *silty clay loam classes* according to clay content are indicated as follows:

- M medium (less than 27% clay)
- H heavy (27-35% clay)

Organic soils i.e. those with an organic matter greater than 10% will be preceded with a letter O.

Peaty soils i.e. those with an organic matter greater than 20% will be preceded with a letter P.