

**AGRICULTURAL QUALITY
OF LAND AT CRAIG Y PERCHYCH
GLAIS**

Report 1887/3

13th December 2022

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Report 1887/3
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SUMMARY

An agricultural land quality survey has been undertaken of 50.0 ha of land at Craig Y Perchych, Glais in November 2021.

The land has a mixture of shallow and deeper loamy soils over sandstone, with some slowly permeable clays in the east. Most of the land is of subgrade 3b or grade 4 agricultural quality, limited by adverse climate, soil wetness and soil depth limitations. Small areas of very steep land are of grade 5 quality.

1.0 Introduction

- 1.1 This report provides information on the soils and agricultural quality of 50.0 ha of land at Craig Y Perchych, Glais, Swansea. The report is based on a survey of the land in November 2021. The 50 ha includes a 26 ha photovoltaic deployment area.

SITE ENVIRONMENT

- 1.2 The site comprises two elements: an elongate hill summit (Craig Ola) and part of its southerly flanks, land south and east of the Craig Ola and the head and south facing flanks of a small valley. The land is bordered to the south-west by adjoining grassland, and on all other sides by woodland. The land is mainly gently to moderately sloping, but the hill summit is bordered to the north, south and west by very steep slopes. Elevation varies between 210 m and 140 m, with an average elevation of approximately 180 m AOD.
- 1.3 The lower ground (in the south and east) is under semi-improved rushy pasture. The hill summit forms an open area with derelict field boundaries, forming a mosaic of semi-improved pasture and rough grazing (consisting of bracken and gorse/birch scrub). At the time of survey the land was extensively grazed by ponies.

PUBLISHED INFORMATION

- 1.4 1:50,000 scale BGS information records the geology of the land as Swansea Member: sandstone on the hill summit and inter-bedded mudstone, siltstone and sandstone on the lower ground. Glacial till deposits are recorded to overlie the solid geology in the south.
- 1.5 The National Soil Map (published at 1:250,000 scale) records the land as Withnell 1 Association: mainly acid loamy soils over sandstone on steep slopes, with some slowly permeable soils in deeper drift¹.
- 1.6 The Predictive Agricultural Land Classification map of Wales estimates the land as grade 4 quality, with small areas of subgrade 3b and grade 5.

¹Rudeforth C.C. *et al.*, (1984). *Soils and their use in Wales*, Soil Survey of England and Wales. Bulletin No. 11, Harpenden.

2.0 Soils

2.1 A detailed soils and agricultural quality survey was carried out in November 2021 in strict accordance with MAFF (1988) guidelines². It was based on observations at intersects of a 100 m grid, giving a density of one observation per hectare. During the survey, soils were examined by a combination of pits and augerings to a maximum depth of 1.0 m. A log of the sampling points and a map (Map 1) showing their locations are in an appendix to this report.

2.2 The soils were found to vary in depth and drainage, as described below.

SHALLOW LOAMY SOILS

2.3 These soils occupy most of the land, particularly the higher ground and steeper slopes. They comprise slightly to moderately stony sandy clay loam topsoil, either over a thin stony subsoil of similar texture or directly over sandstone bedrock. These soils are mainly freely-draining (Soil Wetness Class I). Some deeper soils (>60 cm) were encountered where the lower subsoil showed evidence of seasonal waterlogging (greyish colouration with ochreous mottles), in places the subsoil is poorly structured and slowly permeable (Soil Wetness Class III or IV).

2.4 A typical profile is described below from a pit at observation 18 (Map 1).

0-21 cm	Very dark greyish brown (10YR 3/2) sandy clay loam; 10% medium hard tabular sandstone; moderately developed fine sub-angular blocky structure; friable; common fine fibrous roots; smooth gradual boundary to:
21-45 cm	Yellowish brown (10YR 5/4) sandy clay loam; 25% small and medium hard tabular sandstone; moderately developed medium and coarse sub-angular blocky structure; friable; low packing density; common fine fibrous roots; uneven gradual boundary to:
45 cm+	Hard broken sandstone.

SLOWLY PERMEABLE HEAVY SOILS

2.5 These soils occur predominantly in the east. They comprise stoneless silty clay loam topsoil, over dense slowly permeable clay or heavy silty clay loam at shallow depth. Under the wet local climate these soils are poorly to very poorly-draining (Soil Wetness Class IV to V).

2.6 An example profile is described below from a pit at observation 2 (Map 1).

²MAFF, (1988). *Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*.

0-24 cm	Very dark greyish brown (10YR 3/2) heavy silty clay loam with 20% distinct fine yellowish red (5YR 4/6) root channel mottles; stoneless; moderately developed fine sub-angular blocky structure; friable; many fine fibrous roots; smooth clear boundary to:
24-33 cm	Light grey (10YR 7/1) clay with 40% distinct medium and coarse reddish yellow (7.5YR 6/8) mottles; stoneless; weakly developed very coarse angular blocky structure; very firm; high packing density; 2% fine and medium bio-pores; common fine fibrous roots; smooth diffuse boundary to:
33-100 cm+	Light grey (10YR 7/1) clay with 40% distinct medium and coarse yellowish red (5YR 4/6) mottles; stoneless; structureless (massive); very firm and plastic; no macro-pores; high packing density.

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 Classification³. The relevant site data for an average elevation of 180 m is given below.

- Average annual rainfall: 1535 mm
- January-June accumulated temperature >0°C 1352 day°
- Field capacity period 293 days
(when the soils are fully replete with water) mid Aug-late May
- Summer moisture deficits for: wheat: 39 mm
potatoes: 14 mm

3.3 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 MAFF⁴. The cool, moist local climate limits land quality to a maximum of subgrade 3b or grade 4, with the division between the two grades at approximately 185 m elevation.

SURVEY RESULTS

3.4 This report describes the main limitations affecting ALC grades at this site. The agricultural quality of the land is primarily determined by adverse climate, wetness, soil depth and slope gradient. Other factors were assessed but did not affect the overall grading.

3.5 Land of grades 3, 4 and 5 has been identified.

³Meteorological Office, (1989). *Climatological Data for Agricultural Land Classification*.

⁴MAFF, (1988). *Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*.

Subgrade 3b

- 3.6 This land comprises permeable loamy soils on land at lower elevations (less than 185 m). All of this land is limited by the adverse climate of the area, with a short growing season and late frost risk. Wetness where soils are deeper, and soil depth where soils are shallowest are often equally limiting factors.
- 3.7 In reality it is unlikely that the land on the hill summit could practically be used for cultivated agriculture due to the lack of suitable access for heavy machinery, meaning this land may be judged to be of lower quality. These issues are considered to be outside the scope of this assessment however, and land below 185 m on the summit is therefore included in this subgrade.

Grade 4

- 3.8 The higher ground (above 185 m) is limited to this grade by adverse upland climate, which means arable cropping is unlikely to be successful. Limited areas also slope at between 11 and 18 degrees, which is equally limiting.
- 3.9 Areas in the east have heavy wet soils. This land could not be cultivated with any regularity due to the duration of waterlogging under the local climate.

Grade 5

- 3.10 This grade includes areas with the steepest slopes (in excess of 18 degrees). Access for farm machinery on these gradients is very difficult and land use is generally limited to rough grazing.
- 3.11 Small areas on lower slopes in the south of the site have organic topsoil and very poor drainage leading to wetness constraints which would also limit these areas to grade 5. However, as they cannot be mapped accurately at the mapping scale they are included in the average grade for the surrounding area (grade 4).

Other land

- 3.12 This includes a former farm steading, farm tracks and blocks of woodland and woody scrub.

Grade areas

- 3.13 The land grades are shown on Map 2 and the areas occupied shown below.

Table 1: Areas occupied by the different land grades

<i>Grade/subgrade</i>	<i>area (ha)</i>	<i>% of the land</i>
Subgrade 3b	11.0	22
Grade 4	32.6	65
Grade 5	0.5	1
Other land	5.9	12
Total	50.0	100

APPENDIX
DETAILS OF OBSERVATIONS
MAPS

Land at Craig Y Perchych: 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	0-20	HZCL	0	20-80+	ZC	xxx				3	V	4	W/C
2	0-24	HZCL	0	24-33	C	xxx	33-100+	C	xxx	3	V	4	W/C
3	0-23	SCL	5-10	23-37	mstSCL	o	37+	SST		5	I	4	C
4	0-16	SCL	<5	16-26	SCL	o	26+	SST		4	I	3b	De/C
5	0-25	SCL	5-10	25-90+	SCL	xxx				3	III	4	C
6	0-16	SCL	5-10	16-29	SCL	o	29+	SST		6	I	4	C
7	Former farmyard-non agricultural												
8	0-28	SCL	5-10	28+	SST					4	I	3b	De/C
9	0-21	SCL	15-20	21+	SST					9	I	4	C
10	0-18	SCL(org)	5-10	18-43	SCL	o	43+	SST		4	I	4	C
11	0-23	SCL	5-10	23+	SST					3	I	4	C
12	0-21	SCL	<5	21-52	SCL	o	52+	SST		8	I	3b	SI/C
13	0-9	SCL(org)	<5	9-23	SCL	o	23-44 44+	SST rubble SST		5	I	4	C
14	0-28	SCL	<5	28-63	SCL	xx	63-90+	SCL(wet)	xxx	1	III	4	C
15	0-23	SCL	10-15	23-44	SCL	xxx	44-63 63+	HCL SST	xxx	4	IV	3b	W/C
16	0-16	SCL(org)	10	16-37	mstSCL	o	37+	SST		8	I	3b	SI/C
17	0-17	SCL(org)	5-10	17-50	mstSCL	o	50+	SST		6	I	3b	C
18	0-21	SCL	10	21-45	mstSCL	o	45+	SST		4	I	3b	C
19	0-16	SCL(org)	5-10	16-36	mstSCL	o	36+	SST		4	I	3b	C
20	Inaccessible gorse scrub												
21	0-10	SCL	5-10	10-53	SCL	xx	53-90+	SCL	xxx	3	III	3b	C/W
22	Non-agricultural-woodland												
23	0-18	MCL	<5	18-47	MCL	xxx	47-80+	C	xxx	8	IV	4	C
24	Non-agricultural-woodland? GPS error?												
25	0-25	MCL	<5	25-50	HCL	xxx	50-65 65+	HCL R	xxx	9	IV	4	C
26	0-22	HCL	0	22-26	HCL	xxx	29-50 50+	C Wet	xxx	5	V	4	W/C
27	0-16	MCL	<5	16-23	MCL	xxx	23+	R		4	IV	4	C
28	0-16	MZCL	0	16-33	MZCL	xxx	33-50 50+	C Wet	xxx	4	V	4	W/C
29	0-30	MZCL	0	30-48	HZCL	xxx	48-80+	HZCL	xxx	4	IV	4	C
30	0-22	HZCL	0	22-45	HZCL	xxx	45-90+	HZCL	xxx	4	IV	4	W/C
31	0-22	HZCL	0	22-42	HZCL	xxx	42-65 65+	C R	xxx	3	IV	4	W/C

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
32	0-24	HCL	<5	24-52	HCL	xxx	52-80+	HZCL	xxx	3	IV	4	C
33	0-19	MCL	<5	19-36	MCL	xx	36+	R		2	I	4	C
34	0-23	HZCL	0	23-44	HZCL	xxx	44 -80+	C	xxx	3	IV	4	W
35	0-18	MZCL	0	18-27	MZCL	xxx	27 -80+	C	xxx	4	V	4	W
36	0-25	MZCL	0	25-72	MZCL	xxx	72 -90+	HZCL	xxx	2	IV	4	C
37	Non-agricultural-woodland												
38	0-22	MZCL	0	22-38	MZCL	xxx	38-62 62-80+	HZCL HZCL	xxx xxx	4	IV/V	3b/4	W
39	0-20	M/HZCL(org)	0	20-33	HZCL	xxx	33 -60+	C	xxx	4	V	4/5	W
40	0-23	HZCL(org)	0	23-44	HZCL	xxx	44 -70+	C	xxx	3	IV/V	4/5	W
41	Gorse scrub (not accessed)												
42	0-23	SCL	<5	23-42	SCL	xx	42+	SST		8	I	3b	C/SI
43	0-22	LP	0	22 -49	HZCL	xxx	49 -70+	ZC	xxx	4	V	5	W
44	0-23	HZCL	0	23 -60+	ZC(wet)	xxx				3	V	4	W
45	0-22	HZCL	0	22 -43	HZCL	xxx	43 -70+	HZCL	xxx	2	IV/V	4	W

*Gley indicators*¹

o unmottled

*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

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

³ Occasionally recorded in the texture box

C - clay

*Wetness Class*⁵
I (freely drained) to VI (very poorly drained)

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

W - wetness/workability
D - droughtiness
De - depth
F - flooding
St - stoniness
Sl - slope
T - topography/microrelief

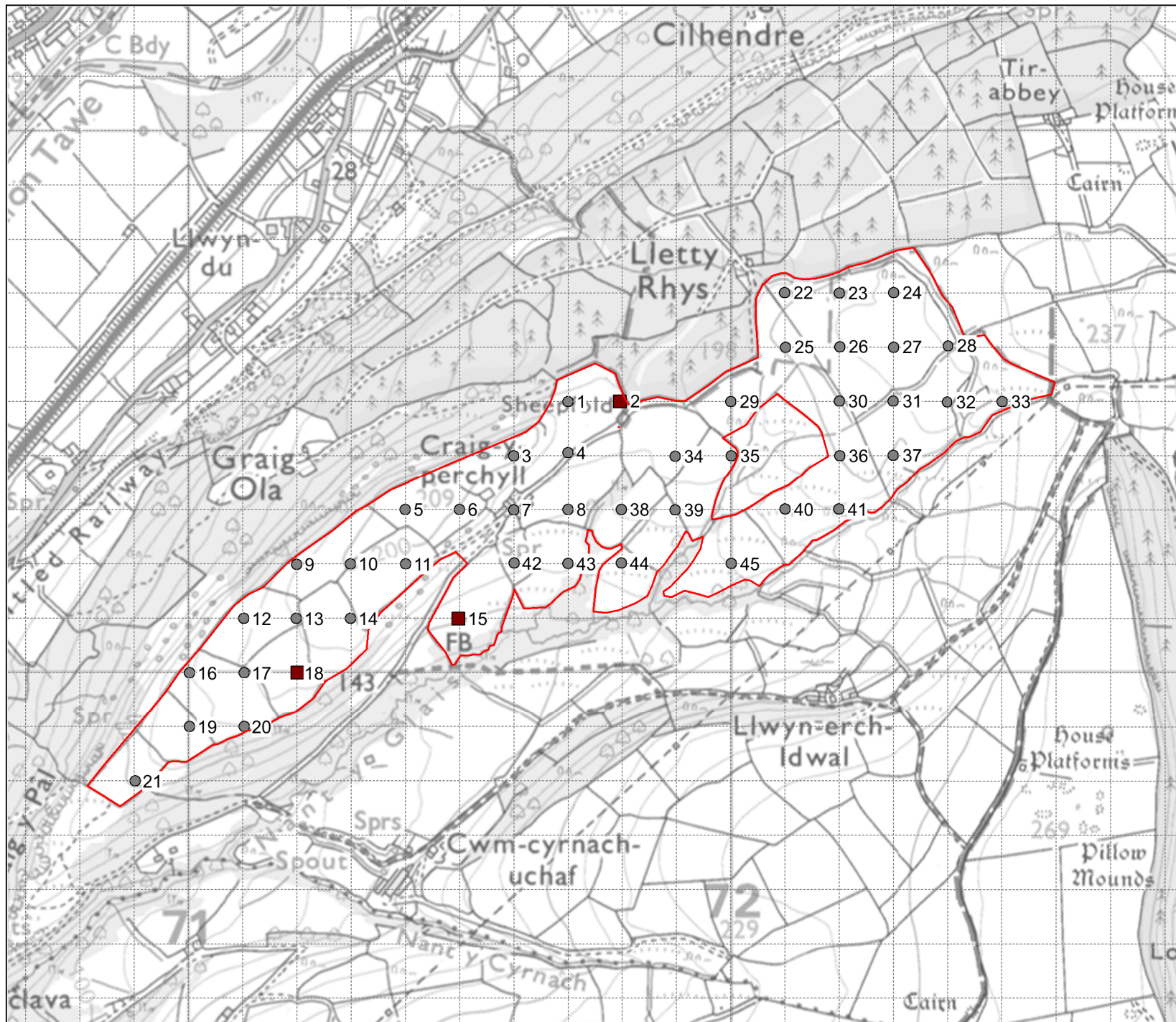
W - wetness/workability
D - droughtiness
De - depth
F - flooding
St - stoniness
Sl - slope
T - topography/microrelief

r-reddish, gn – greenish
o - organic
(m, v, x)st – (moderately, very,
extremely) stony, chky-chalky
(vsl, sl, m, v, x)(very slightly, slightly,
moderately very, extremely) calcareous

r-reddish, gn – greenish
o - organic
(m, v, x)st – (moderately, very,
extremely) stony, chky-chalky
(vsl, sl, m, v, x)(very slightly, slightly,
moderately very, extremely) calcareous

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

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dist - disturbed soil layer;
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KEY

- Auger observations
- Pits
- Site boundary

Site:

Craig Y Perchych

Map title:

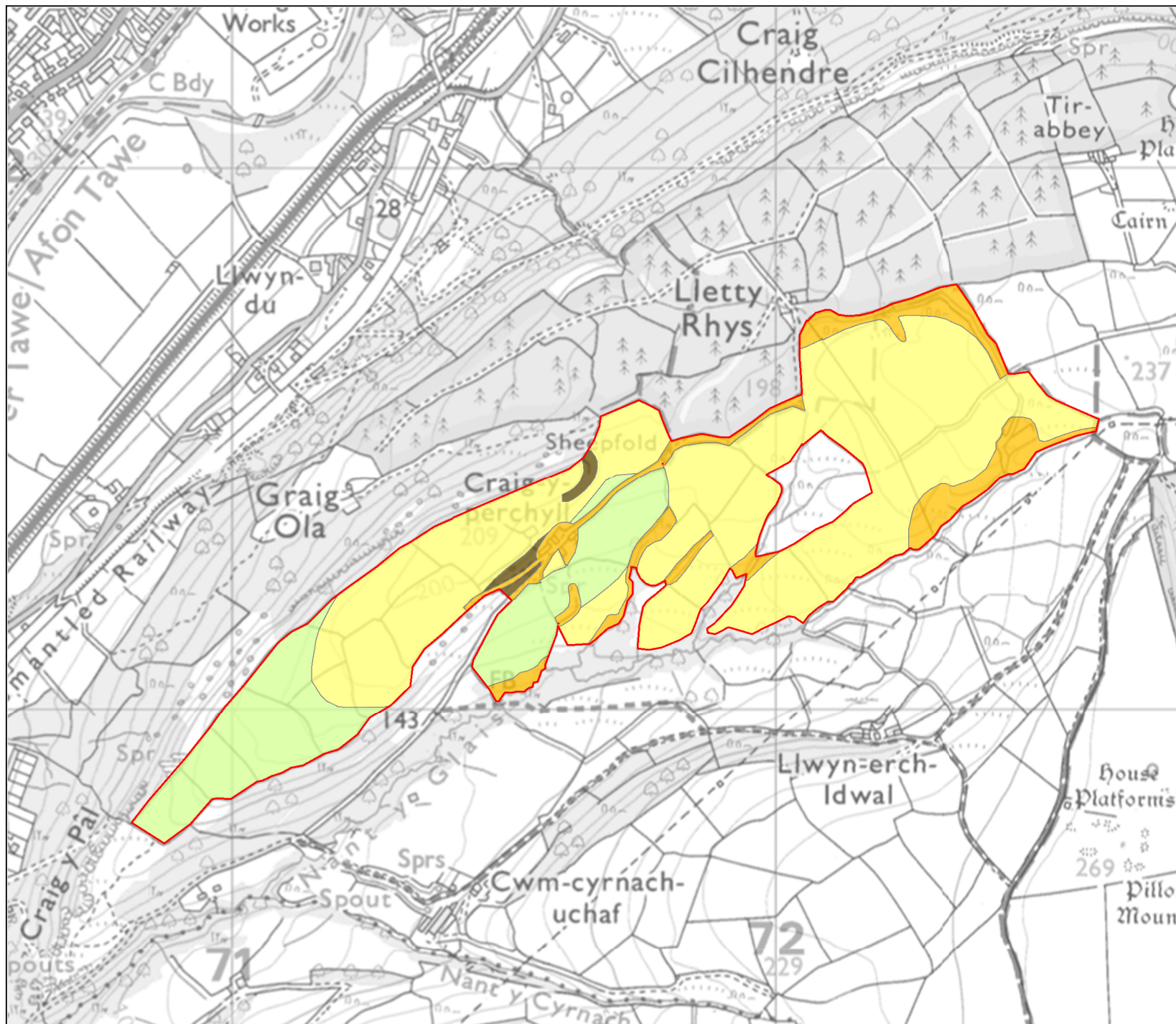
MAP 1
Observations

Land
Research
ASSOCIATES

Lockington Hall
Lockington
Derby
DE74 2RH
www.lra.co.uk

Date: 13/12/2022

Scale: 1:10,000



KEY

Subgrade 3b

Grade 4

Grade 5

Other land

Site boundary

Site:

Craig Y Perchych

Map title:

MAP 2
Agricultural Land
Classification

Land
Research
ASSOCIATES

Lockington Hall
Lockington
Derby
DE74 2RH
www.lra.co.uk

Date: 13/12/2022

Scale: 1:10,000