Land at Holywell Road, Ewloe Green, Flintshire

Agricultural Land Classification

Reference No: 1010290/Ewloe
Issued by: Darren Ingram *MI Soil Sci, MIAgrEng*
Date: December 2018

Submitted to:

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Prepared by:

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Quality Assurance

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Disclaimer

1   Executive Summary

The Agricultural Land Classification of approximately 7.5 ha of land at Holywell Road, Ewloe Green, Flintshire was assessed in November 2018. The land was surveyed to provide information on the Agricultural Land Classification of the site.

At the time of the survey the land was under grass and being used for cattle grazing. The land is classified as Subgrade 3a (good quality agricultural land) with a small area of Grade 2 (very good quality agricultural land).

2   Introduction

ADAS was instructed ███ to undertake an Agricultural Land Classification (ALC) on an area of land lying to the north west of Ewloe and to the south of the B5125 road. The site extends in a south westerly direction towards Green Lane at Ewloe Green. The eastern boundary of the site partly adjoins existing residential properties, the north eastern boundary adjoins Holywell Road (B5125), the southern boundary adjoins residential properties and the other boundaries adjoin fields.   A public footpath runs from the north eastern corner of the site at Holywell Road to Green Lane.

The land was classified using the system outlined in the Ministry of Agriculture, Fisheries and Food (MAFF now Defra) publication: 'Agricultural Land Classification of England and Wales - Revised guidelines and criteria for grading the quality of agricultural land' (October 1988).

3   Methodology

3.1   Fieldwork

A desk study of soils and climatic information was undertaken using reference material held by ADAS. Fieldwork was undertaken to study soil and site limitations.

Using a 100m Ordnance Survey aligned grid seven auger borings were examined to determine the quality of the sample points (*Appendix 1*) and the findings are given in *Appendix 2*. One soil pit was dug to examine the subsoil characteristics. Fieldwork was undertaken with a hand held 50mm diameter "Dutch" auger to a depth of 1.2m where possible. Where auger penetration to 120cm was not possible the profile depth has been extended to 120cm using nearby profile information to enable soil droughtiness calculations to be made.   Two soil samples were taken for laboratory particle size analysis to confirm the soil textures (*Appendix 5*).

The fieldwork was carried out on 23rd November 2018.

3.2   The Agricultural Land Classification System

The Agricultural Land Classification System (ALC) provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use. The limitations can operate in one or more of four principal ways.

They may affect:
- the range of crops which can be grown
- the level of yield
- the consistency of yield
- the cost of obtaining the crop

The classification system gives considerable weight to flexibility of cropping, whether actual or potential, but the ability of some land to produce consistently high yields of a somewhat narrower range of crops is also taken into account.

The principal physical factors influencing agricultural production are climate, site (including relief) and soil. By assessing these factors, it is possible to assign land into one of five land classification grades, Grade 1 land being the highest quality and Grade 5 the lowest quality land. Grade 3 is sub-divided into Subgrades 3a and 3b, to identify good quality agricultural land from moderate quality land (see **Appendix 5page 2** for a description of the grades used in the ALC system). By considering site specific climate, site and soil factors the land can be classified into 1 of 5 agricultural grades or certain non-agricultural grades.

4   Geology, Soils and Present Land Use

4.1   Geology

The geology map[1] shows that much of the area is underlain by Hollin Rock, a sandstone, formed approximately 310 to 315 million years ago in the Carboniferous Period. Towards Green Lane the southern part of the site is underlain by mudstone, siltstones and sandstones of the Pennine Middle Coal Measures Formation. The area is covered by superficial deposits of Till, deposits sand and clay with pebbles, formed in the Glacial Period. Close to Holywell Road a small area of deposits (clay, sand and siltstone) are found over the sandstone.

4.2   Soils

The soils of the site are mapped on the soil map[2] as Clifton Association, described as having slowly permeable seasonally waterlogged reddish fine and coarse loamy soils, and similar soils with slight seasonal waterlogging. A typical profile is described as having a dark greyish brown clay loam or sandy clay loam topsoil overlying an upper subsoil of sandy loam or sandy clay loam over reddish brown clay loam and slightly stony throughout the profile. The soils are described as being slowly permeable and seasonally waterlogged (Wetness Class 4) and with drainage measures the duration of the waterlogging can be significantly reduced (Wetness Class 3).

4.3   Present Land Use

The land was under grass and there was evidence of a recent presence of cattle.

5   Previous Land Classification Surveys

There are no detailed surveys of the site. The Welsh Government's Predictive interactive Agricultural Land Classification[3] model for Wales is based on the principles of the Agricultural Land Classification System of England & Wales, the Revised Guidelines & Criteria for Grading the Quality of Agricultural Land (MAFF 1988). The interactive maps shows that the survey site has a predicted ALC grade of Subgrade 3a.

The Predictive map shows the predicted ALC grades beyond the survey site as mainly Subgrade 3b to the south of the A494 road and in the direction of Buckley.   Within 1km of the survey site to the north of Holywell Road the predicted ALC grades are Grade 1, 2 and Subgrade 3a.

6   Results

The sections below illustrate the main considerations and limitations to the grading of the land.

6.1   Climate

The site climatic variables have been interpolated from grid point data surrounding the site, as follows:

Table 1: Climatic Variables

Grid Reference (mid-point of site)	3291 3668
Altitude (m)	80
Accumulated Temperature (day °C)	1380
Average Annual Rainfall (mm)	781
Overall Climatic Grade	1
Field Capacity Days	181
Moisture deficit (mm): Wheat	90
Moisture deficit (mm): Potatoes	77

There is no overall climatic limitation to the agricultural use of the land at the survey site.

6.2   Site Limitations

Gradient: The survey area is generally level at an altitude of around 80m A.O.D (Above Ordnance Datum).   In the eastern part of the site there is a slight slope where the gradient is 7°. Gradient is not a limiting factor in classifying the land.

Flooding: there is no known flood risk at the survey site.

6.3   Soil and Interactive Limitations

The soil profiles show signs of seasonal wetness in the form of pale soil colours and mottling below 35cm depth. With a Field Capacity Day figure of 181 where there is a slowly permeable layer starting below 49cm and within 77cm depth the profiles are placed in Wetness Class 3. Where there are no signs of seasonal wetness in the form of pale colours and mottling above 70 cm depth and no slowly permeable layer within 80cm depth the profiles are placed in Wetness Class 1. The combination of the topsoil texture, the Wetness Class and Field Capacity Day figure of 181 influence the ALC grade.

Soil droughtiness is not a limitation at the site. The combination of the available water in the profile, which is influenced by soil texture and structure, and the moisture deficit give a resultant moisture balance and influence the ALC grade.

The main factor affecting agricultural land quality is:

- Soil texture and wetness class, which mainly affect the ALC grade due to a wetness limitation.

6.4   Land Quality

A brief description of the findings is given below.

6.4.1 Grade 1
No land has been placed in this grade.

6.4.2 Grade 2
The profile has a medium clay loam topsoil to a depth of 38cm overlying a subsoil of sandy clay loam. The soil profile is placed in Wetness Class 1 as there are no signs of seasonal wetness in the form of pale soil colours and mottling above 70cm and no slowly permeable layer starting within 80cm depth. The combination of the topsoil texture, the Wetness Class and Field Capacity Day figure of 181 place the soils in Grade 2.

6.4.3 Grade 3, Subgrade 3a
The profile typically has either a medium clay loam or sandy clay loam or organic sandy clay loam topsoil to depths of between 20cm and 38cm overlying an upper subsoil of medium clay loam or sandy clay loam and a lower subsoil of clay. The stone content in the topsoil and subsoils is described as very slightly stony. The soil profiles are placed in Wetness Class 3

where they show signs of seasonal wetness in the form of pale soil colours and mottling below 35cm and have a slowly permeable layer starting below 49cm depth and within 77cm depth. The combination of the topsoil texture, the Wetness Class and Field Capacity Day figure of 181 place the soils in Subgrade 3a.

6.4.4 Grade 3, Subgrade 3b
No land has been placed in this grade.

6.4.5 Grade 4

No land has been placed in this grade.

6.4.6 Grade 5
No land has been placed in this grade.

6.4.7 Other land
No land has been placed in this grade.

6.5   Summary of Land Quality in the Survey Area

Table 2: Agricultural Land Classification Measurements

Grade	Area (ha)	% of Total Area
1	-	-
2	0.12	1.6
3a	7.46	98.4
3b	-	-
4	-	-
5	-	-
Other land	-	-
Total	**7.58**	**100**

7   Conclusions

- There are no recorded existing detailed ALC maps of the site.
- Planning Policy Wales (Edition 10 December 2018)[4] sets out the land use planning policies of the Welsh Government. The planning policy in paragraphs 3.54 states that 'agricultural land of grades 1, 2 and 3a of the Agricultural Land Classification system (ALC) is the best and most versatile, and should be conserved as a finite resource for the future'. The planning policy (paragraph 3.54) states that 'land in grades 1, 2 and 3a should only be developed if there is an overriding need for the development' or 'if land in lower agricultural grades is unavailable'.
- The Predictive Agricultural Land Classification (ALC) map uses the best available information to predict the grade of land on a national basis and replaced the

published Provisional 1:250,000 Agricultural Land Classification map of Wales in 2017. The predictive ALC model for Wales is based on the principles of the Agricultural Land Classification System of England & Wales, the Revised Guidelines & Criteria for Grading the Quality of Agricultural Land (MAFF 1988). The map is designed on a 50m raster (gridded squares) and is a modelled prediction based on the best available information. It is not a definitive map and a definitive grade can only be given by a detailed site survey.

- The Predictive ALC map shows the immediate area close to the survey site and around Northop Hall as Subgrade 3a land. To the north of the B5125 road and extending towards Connah's Quay the map shows areas mainly of Subgrade 3a and Grade 1 land. To the east of the A494 road near Aston the map shows Subgrade 3a and to the south east of Ewloe an area of Grade 2 and Subgrade 3b. Land to the south west of the A55 road is mainly shown as Subgrade 3b.

- The agricultural land of the site is limited by soil wetness to Grade 2 and Subgrade 3a land. The grades of land mapped by the detailed survey are typical for the area and reflect the grades of the Predictive ALC map.

- If the land is developed surplus soil should be kept on site or used to restore other sites which are short of soil, to preserve the soil and retain soil functions such as water and carbon storage.

APPENDIX 1:

Agricultural Land Classification Maps and Location of Soil investigation points

(see following page)
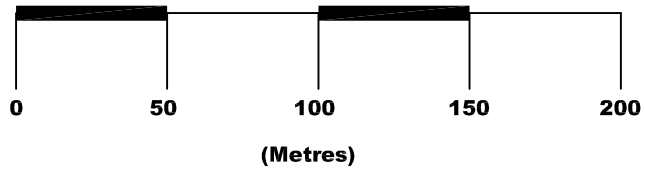
AGRICULTURAL LAND CLASSIFICATION

× 1−7	Auger Boring
× p1	Pit Location

▮	Grade 1
▮	Grade 2
▮	Grade 3a
▮	Grade 3b
▮	Grade 4
▮	Grade 5
▮	Land predominantly in urban use.
▮	Other land primarily in non−agricultural use
——	Survey boundary

(Metres)

0   50   100   150   200

HOLYWELL ROAD

Newbridge Farm

×1   ×2

×3   p1 ×4   ×5

×6   ×7

APPENDIX 2: Soil Profile Descriptions

Pit 1		Soil				
	Depth to horizon base (cm)	Texture	Colour	Mottling	Structure	Porosity (biopores >0.5mm diam)
Topsoil	25	MCL (medium clay loam)	7.5YR3/3 (dark brown)		n/a	n/a
Subsoil 1	40	MCL (medium clay loam)	7.5YR3/2 (dark brown)		Weakly developed medium subangular blocky; Consistency friable;many roots present	>0.5%
Subsoil 2	55	C (clay)	5YR5/3 (reddish brown)	Ochreous, many	Moderately developed coarse prismatic breaking into medium/coarse angular blocky; Consistency very firm; fine roots common	<0.5%
Subsoil 3						

Stone content: Topsoil total stone content 3% ; >2cm in size 3%; hard stones; 25-40cm total stone content 2%	
Gleyed at: 55cm	Slowly Permeable Layer at: 55cm
Wetness Class: 3	Wetness grade: Subgrade 3a
AP Wheat: 90mm	MB +39mm
AP Potatoes: 77mm	MB +29mm
Droughtiness grade: 1	
Main limitation: soil wetness	**ALC Subgrade 3a**

Auger Boring 1		Soil			
	Depth to horizon base (cm)	Texture	Colour	Mottling	% Stone content
Topsoil	25	MCL (medium clay loam)	7.5YR3/2 (dark brown)		3
Subsoil 1	35	SCL (sandy clay loam)	7.5YR3/2 (dark brown)	Common faint ochreous mottling	2
Subsoil 2	50	MCL (medium clay loam)	7.5YR4/2 (dark grayish brown)	Common faint ochreous mottling	2
Subsoil 3	Difficult to auger 50cm+; soil very dry and possible stone; from pit record assume C present below 50cm				0

Gleyed at: 35cm	SPL at: 50cm
Wetness Class: 3	Wetness grade: 3a
AP Wheat: 133mm	MB +44mm
AP Potatoes: 110mm	MB +34mm
Droughtiness grade: 1	
Main limitation: soil wetness	**ALC Subgrade 3a**

ADAS

Auger Boring 2		Soil			
	Depth to horizon base (cm)	Texture	Colour	Mottling	% Stone content
Topsoil	20	OSCL (organic sandy clay loam)	7.5YR3/2 (dark brown)		3
Subsoil 1	30	SCL (sandy clay loam)	10YR3/2 (very dark grayish brown)		2
Subsoil 2	55	SCL (sandy clay loam)	7.5YR4/3 (brown)		2
Subsoil 3	Difficult to auger 55cm due to stone. Assume C present below 55cm				

Gleyed at: >55cm	SPL at: >55cm
Wetness Class: 3	Wetness grade: 3a
AP Wheat: 142mm	MB +52mm
AP Potatoes: 118mm	MB +41mm
Droughtiness grade: 1	
Main limitation: soil wetness	**ALC Subgrade 3a**

ADAS

Auger Boring 3		Soil			
	Depth to horizon base (cm)	Texture	Colour	Mottling	% Stone content
Topsoil	30	MCL(medium clay loam)	7.5YR3/2(dark brown)		3
Subsoil 1	35	MCL(medium clay loam)	7.5YR3/1 (very dark gray)		2
Subsoil 2	40	MCL(medium clay loam)	7.5YR3/2 (dark brown)		2
Subsoil 3	45	HCL(heavy clay loam)	5YR4/1 (dark gray)	Common ochreous mottles and ferri-manganiferous concretions	2
Subsoil 4	50 Difficult to auger 50cm+ stone; assume C 50cm+	SCL (sandy clay loam)	5YR4/2 (dark reddish gray)		2

Gleyed at: 40cm	SPL at: 50cm
Wetness Class: 3	Wetness grade: 3a
AP Wheat: 130mm	MB +40mm
AP Potatoes: 101mm	MB +30mm
Droughtiness grade: 1	
Main limitation: soil wetness	**ALC Subgrade 3a**

ADAS

Auger Boring 4		Soil			
	Depth to horizon base (cm)	Texture	Colour	Mottling	% Stone content
Topsoil	30	MCL (medium clay loam)	7.5YR3/2(dark brown)		3
Subsoil 1	40	MCL (medium clay loam)	7.5YR3/3 (dark brown)		2
Subsoil2	80	C (clay)	5YR4/3 (reddish brown)	Common ochreous mottles and ferri-manganiferous concretions	2

Gleyed at: 40cm	SPL at: 40cm
Wetness Class: 3	Wetness grade: 3a
AP Wheat: 130mm	MB +40mm
AP Potatoes: 107mm	MB +30mm
Droughtiness grade: 1	
Main limitation: soil wetness	**ALC Subgrade 3a**

Auger Boring 5		Soil			
	Depth to horizon base (cm)	Texture	Colour	Mottling	% Stone content
Topsoil	38	MCL (medium clay loam)/MSL (medium sandy loam)	7.5YR3/2 (dark brown)		3
Subsoil 1	40	SCL (sandy clay loam)	7.5YR3/2 (dark brown)		2
Subsoil2	70	SCL (sandy clay loam)	7.5YR3/2 (dark brown)		2
Subsoil 3	80	SCL (sandy clay loam)	7.5YR4/3 (brown)	Few ochreous mottles and ferri-manganiferous concretions	2
Subsoil 4	100	MCL (medium clay loam)	7.5YR5/3 (brown)	Common ochreous mottles	2

Gleyed at: >70cm	SPL at: >80cm
Wetness Class: 1	Wetness grade: 2
AP Wheat: 134mm	MB +44mm
AP Potatoes: 114mm	MB +37mm
Droughtiness grade: 1	
Main limitation: soil wetness	**ALC Grade 2**

Auger Boring 6		Soil			
	Depth to horizon base (cm)	Texture	Colour	Mottling	% Stone content
Topsoil	25	MCL(medium clay loam)	7.5YR3/3(dark brown)		3
Subsoil 1	55	MCL(medium clay loam)	7.5YR3/2 (dark brown)	Few ferri-manganiferous concretions	2
Subsoil2	90	C (clay)	5YR4/3 (reddish brown)	Common ferri-manganiferous concretions; pale colours	2

Gleyed at: 55cm	SPL at: 55cm
Wetness Class: 3	Wetness grade: 3a
AP Wheat: 133mm	MB +43mm
AP Potatoes: 110mm	MB +33mm
Droughtiness grade: 1	
Main limitation: soil wetness	**ALC Subgrade 3a**

ADAS

Auger Boring 7		Soil			
	Depth to horizon base (cm)	Texture	Colour	Mottling	% Stone content
Topsoil	30	MCL(medium clay loam)/SCL (sandy clay loam)	7.5YR3/1(very dark gray)		3
Subsoil 1	40	SCL(sandy clay loam)	7.5YR3/2 (dark brown)		2
Subsoil2	50	SCL(sandy clay loam)	7.5YR4/3 (reddish brown)	Common ferri-manganiferous concretions	2
Subsoil 3	Difficult to auger 50cm due to stone. Assume C present below 55cm				2

Gleyed at: >50cm	SPL at: >50cm
Wetness Class: 3	Wetness grade: 3a
AP Wheat:128mm	MB +38mm
AP Potatoes:105mm	MB +38mm
Droughtiness grade: 1	
Main limitation: soil wetness	**ALC Subgrade 3a**

APPENDIX 3: Photographs

Soil pit with clay lower subsoil

Soil pit profile

APPENDIX 4:

Laboratory Results

(see following page)

ANALYTICAL REPORT

Report Number	35561-18		**K740**	DARREN INGRAM		Client ROSEMAUND
Date Received	28-NOV-2018			RSK ADAS LTD		
Date Reported	04-DEC-2018			PRESTON WYNNE		
Project	101290 SOIL 23 11 2018			HEREFORD		
Reference	ROSEMAUND			HR1 3PG		
Order Number	P69102DI0911					

Laboratory Reference		SOIL413972								
Sample Reference		EWLOE PIT4 TS								
Determinand	**Unit**	**SOIL**								
Sand 2.00-0.063mm	% w/w	43								
Silt 0.063-0.002mm	% w/w	36								
Clay <0.002mm	% w/w	21								
Organic Matter LOI	% w/w	6.1								
Textural Class **		MCL								

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.

For further information on all analyses and services available from NRM Laboratories contact us on:
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APPENDIX 5: Description of the Grades and Sub-grades

The ALC grades and Sub-grades are described below in terms of the types of limitation which can occur, typical cropping range and the expected level and consistency of yield. In practice, the grades are defined by reference to the land's physical characteristics, for which the cut-offs are described in Section 3 of Ministry of Agriculture, Fisheries and Food (MAFF now Defra) publication: 'Agricultural Land Classification of England and Wales - Revised guidelines and criteria for grading the quality of agricultural land' (October 1988). The most productive and flexible land falls into Grades 1, 2 and Sub-grade 3a and collectively comprises about one-third of the agricultural land in England and Wales. About half the land is either of moderate quality (Sub-grade 3b) or poor quality (Grade 4). Although less significant on a national scale, such land can be locally valuable to agriculture and the rural economy where poorer farmland predominates. The remainder is very poor quality land in Grade 5, which mostly occurs in the uplands.

Descriptions are also given of other land categories which may be used on ALC maps.

Grade 1 - excellent quality agricultural land
Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

Grade 2 - very good quality agricultural land
Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than on Grade 1 land.

Grade 3 - good to moderate quality agricultural land
Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.

 Sub-grade 3a - good quality agricultural land
 Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.

 Sub-grade 3b - moderate quality agricultural land
 Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

Grade 4 - poor quality agricultural land
Land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable.   In moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.

Grade 5 - very poor quality agriculture land
Land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

Descriptions of other land categories used on ALC maps
Urban
Built-up or 'hard uses with relatively little potential for a return to agriculture including housing, industry, commerce, education, transport, religious buildings, cemeteries.

Non-agricultural
'Soft' uses where most of the land could be returned relatively easily to agriculture, including golf courses, private parkland, public open spaces, sports fields, allotments and soft-unsurfaced areas on airport/airfields.

Open water
Includes lakes, ponds and river as map scale permits.

APPENDIX 6: References

1) British Geological Society: http://www.bgs.ac.uk/data/mapViewers/
2) Soils of England and Wales Sheet 3 Midland and Western England
3) Welsh Government Predictive Agricultural Land Classification Map (Wales)
   The Hollington Map Guidance Note November 2017.
   https://beta.gov.wales/sites/default/files/publications/2018-02/agricultural-land-classification-predictive-map-guidance.pdf

4) Planning Policy Wales Edition 10 December 2018 https://beta.gov.wales/planning-policy-wales

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