READING AGRICULTURAL CONSULTANTS

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R. Roberts & Son

Agricultural Land Quality

at

Land to the rear of Heol Martin, Eglwysbach

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1 Introduction

1.1 Reading Agricultural Consultants Ltd (RAC) is instructed by R. Roberts & Son to carry out a desk appraisal of the agricultural quality of land to the rear of Heol Martin, Eglwysbach.

1.2 Guidance for assessing the quality of agricultural land in England and Wales is set out in the Ministry of Agriculture, Fisheries and Food/Welsh Office Agriculture Department revised guidelines and criteria for grading the quality of agricultural land[1].

1.3 Agricultural land in England and Wales is graded between 1 and 5, depending on the extent to which physical or chemical characteristics impose long-term limitations on agricultural use. The principal physical factors influencing grading are climate, site and soil which, together with interactions between them, form the basis for classifying land into one of the five grades.

1.4 Grade 1 land is excellent quality agricultural land with very minor or no limitations to agricultural use. Grade 2 is very good quality agricultural land, with minor limitations which affect crop yield, cultivations or harvesting. Grade 3 land has moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield, and is subdivided into Subgrade 3a (good quality land) and Subgrade 3b (moderate quality land). Grade 4 land is poor quality agricultural land with severe limitations which significantly restrict the range of crops and/or level of yields. Grade 5 is very poor quality land, with very severe limitations which restrict use to permanent pasture or rough grazing.

1.5 Land which is classified as Grades 1, 2 and 3a is defined in paragraph 3.54 of Planning Policy Wales as the best and most versatile (BMV) agricultural land, which should be conserved as a finite resource for the future. Paragraph 3.55 states that considerable weight should be given to protecting BMV land from development because of its special importance, and that it should only be developed if there is an overriding need for the development and either previously developed land or land in lower agricultural grades is unavailable, or if available lower grade land has a recognised environmental value.

1.6 Natural Resources Wales published a Predictive Agricultural Land Classification (ALC) Map in November 2017 which has undergone a subsequent revision. The map is designed on a 50m grid. Criteria including climate, slope, soil wetness, droughtiness and stone contents have been

[1] **MAFF/WOAD (1988).** *Agricultural Land Classification of England and Wales. Revised guidelines and criteria for grading the quality of agricultural land.* MAFF Publications.

considered and used to determine the most likely limitation to agricultural land quality within each grid square.

1.7 The Predictive ALC Map shows the site as Subgrade 3a with an indicative wetness and workability limitation.

2 Site and climatic conditions

General features, land form and drainage

2.1 The site extends to 0.7ha of grassland. The site is roughly triangular and is bounded to the north and east by the settlement of Eglwysbach, and to the south-west by the Afon Hiraethlyn which flows northwards into the Afon Conwy.

2.2 The site is located in a valley bottom in which the topography is mostly level at around 30m above Ordnance Datum (AOD).

Agro-climatic conditions

2.3 Agro-climatic data for the site have been interpolated from the Meteorological Office's standard 5km grid point dataset and are given in Table 1. The site has a wet and relatively warm climate with moderately small to moderate crop moisture deficits. The number of Field Capacity Days (FCD) is large and is unfavourable for providing opportunities for agricultural field work.

Table 1: Local agro-climatic conditions

Parameter	Measurement
Altitude (AOD)	30m
Average Annual Rainfall	959mm
Accumulated Temperatures >0°C	1,446 day°
Field Capacity Days	217 days
Average Moisture Deficit, wheat	87mm
Average Moisture Deficit, potatoes	74mm
Climatic ALC Grade	Grade 1

Soil parent material and soil type

2.4 The principal underlying geology mapped by the British Geological Survey[2] is Denbigh Grits comprising poorly sorted greywacke (sandstone) with siltstones and mudstones, derived from detrital debris flowing from the continental shelf into the sea.

[2] **British Geological Survey (2020).** *Geology of Britain viewer*, http://mapapps.bgs.ac.uk/geologyofbritain/home.html

2.5 Superficial river terrace deposits are mapped across much of the site, comprising sand and gravel. To the west, adjacent to the watercourse are superficial deposits of alluvium, which can include clay, silt, sand and gravel.

2.6 The Soil Survey of England and Wales soil association mapping[3] (1:250,000 scale) shows the Denbigh 1 association to be present at the site, with the similar Manod association to the west. Denbigh 1 soils are characterised by stony, fine loamy and fine silty soils overlying rock at variable depth. Most of the soils are naturally well drained, of Wetness Class (WC) I, however water storage in the profile can be limited by rock, resulting in some surface run-off. Manod soils become more widespread as elevation increases[4].

3 Agricultural land quality

Likely agricultural land classification and site limitations

3.1 The site is provisionally mapped as Subgrade 3a quality. There is no existing detailed ALC data available for the site.

3.2 The main component soils of the type mapped as being present at the site typically comprise slightly stony clay loam topsoil of around 25cm depth. Upper subsoil is characteristically of slightly or moderately stony clay loam and overlies lower subsoils of very stony clay loam or mudstone from around 60cm depth.

3.3 The main soils are of WC I. Under the climatic conditions of the site, with 217 FCD, well drained profiles with medium clay loam topsoil are limited slightly by wetness and workability to Grade 2. Profiles with heavy clay loam topsoil are limited further to Subgrade 3a (as highlighted in Appendix 1).

3.4 Profiles may be affected by a droughtiness limitation, depending upon the stone contents and specific depth to bedrock. The average values of the stone content ranges applicable to each descriptor as given in Hodgson (1997)[5] (which is the recognised source for describing soil profiles and characteristics according to the revised ALC guidelines) have been adopted and used to

[3] **Soil Survey of England and Wales (1984).** *Soils of Wales* (1:250,000), Sheet 2

[4] **Rudeforth et al (1984).** *Soils and Their Use in Wales.* Soil Survey of England and Wales Bulletin 11, Harpenden.

[5] **Hodgson, J. M. (Ed.) (1997).** *Soil survey field handbook.* Soil Survey Technical Monograph No. 5, Silsoe.

calculate the profile moisture balance. The values assume stone contents of 11%, 21% and 53% for topsoil, upper subsoil and lower subsoil respectively.

3.5 Although there is a significant level of stoniness, the crop moisture deficits are moderate to moderately small: the resultant droughtiness limitation is slight, to Grade 2. Substituting the stony clay loam lower subsoil for bedrock continues to result in a droughtiness limitation to Grade 2 (assuming the bedrock to be coarse-grained sandstone akin to Denbigh Grits). Calculations are given in Appendix 2.

3.6 The western boundary of the site adjacent to the river is mostly mapped as being within Flood Zone 3. Inundation of subsoil by water in this area during times of high rainfall may affect cropping. As the mapped soil profiles are inherently freely draining, the resultant limitation is likely to be to Subgrade 3a.

3.7 Based on the published information, the soils at the site are likely to be of BMV quality in Subgrade 3a. Subgrade 3a land is defined in the ALC guidelines as 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.

3.8 However, given the size and location of the site, there are practical and economic constraints to its utilisation and its ability to achieve its inherent quality. The site is small and constrained on all sides by existing housing and a river and thus there is no opportunity to incorporate it into a larger, economically viable parcel for farming commercially. Furthermore the only access to the land is via Heol Martin, a residential cul-de-sac.

4 Conclusion

4.1 The site extends to 0.7ha of agricultural grassland. Natural Resources Wales' predictive ALC mapping shows the site as Subgrade 3a. There is no detailed ALC data available. Analysis of the published data including the mapped soil types indicates that the land is most likely to be classified as Subgrade 3a, which is BMV land, albeit the lowest grade within this category.

4.2 However there are overriding constraints that impose practical limitations on the use of the land and the potential to which its inherent quality can be realised, including its small size, isolation from other agricultural land and unsuitable access for large agricultural machinery. These factors determine that the land cannot be managed according to the description of Subgrade 3a land.

Appendix 1: ALC grade according to wetness (Table 6 of the ALC guidelines)

Wetness Class	Texture[1] of the top 25 cm	Field Capacity Days <126	126-150	151-175	176-225	>225
I	S[2] LS[3] SL SZL	1	1	1	1	2
	ZL MZCL MCL SCL	1	1	1	2	3a
	HZCL HCL	2	2	2	3a	3b
	SC ZC C	3a(2)	3a(2)	3a	3b	3b
II	S[2] LS[3] SL SZL	1	1	1	2	3a
	ZL MZCL MCL SCL	2	2	2	3a	3b
	HZCL HCL	3a(2)	3a(2)	3a	3a	3b
	SC ZC C	3a(2)	3b(3a)	3b	3b	3b
III	S[2] LS SL SZL	2	2	2	3a	3b
	ZL MZCL MCL SCL	3a(2)	3a(2)	3a	3a	3b
	HZCL HCL	3b(3a)	3b(3a)	3b	3b	4
	SC ZC C	3b(3a)	3b(3a)	3b	4	4
IV	S[2] LS SL SZL	3a	3a	3a	3b	3b
	ZL MZCL MCL SCL	3b	3b	3b	3b	3b
	HZCL HCL	3b	3b	3b	4	4
	SC ZC C	3b	3b	3b	4	5
V	S LS SL SZL	4	4	4	4	4
	ZL MZCL MCL SCL	4	4	4	4	4
	HZCL HCL	4	4	4	4	4
	SC ZC C	4	4	4	5	5
Soils in Wetness Class VI - Grade 5						

Appendix 2: Example profile summaries

Depth cm		Texture	stone% hard		APwheat mm	AP potato mm
0	25	CL	11	-	40	40
25	60	CL	21		40	44
60	120	CL	53		31	8
				Total	**111**	**92**
				MD	24	18
			Droughtiness grade (DR)		2	1
0	25	CL	11	-	40	40
25	60	CL	21		40	44
60	120	cSston			12	3
				Total	**92**	**87**
				MD	5	13
			Droughtiness grade (DR)		2	1