READING AGRICULTURAL CONSULTANTS

November 2023

Castle Green Homes

Agricultural Land Quality

at

Land at Quarry Farm, Oakenholt

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Contents

1 Introduction

1.1 Reading Agricultural Consultants Ltd (RAC) is instructed by Castle Green Homes to carry out an appraisal of the agricultural quality of land at Quarry Farm, Oakenholt.

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 (MAFF) 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 conditions and soil which, together with interactions between them, form the basis for classifying land into one of the five grades.

1.4 Grade 1 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 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 3.58 of Planning Policy Wales[2] as the best and most versatile (BMV) agricultural land.

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

[2] **Welsh Government (2021).** Planning Policy Wales, Edition 11, February 2021 https://gov.wales/sites/default/files/publications/2021-02/planning-policy-wales-edition-11_0.pdf

2 Site and climatic conditions

General features and land form

2.1 The site is located to the south-east of the settlement of Pentre Ffwrndan, east of Flint, and is bordered to the north by Chester Road, to the east by Leadbrook Drive, to the south by the access track for Little Leadbrook Farm and to the north-west by residential properties. Other agricultural land forms the remaining boundary to the south-west.

2.2 Topography within the site gently slopes from the south-east down to the west and north. The highest elevation is located in the south-east at 33m-34m above Ordnance Datum (AOD), and the lowest is in the north at 13m-14m 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 moderately warm and moist climate with moderate crop moisture deficits. The number of Field Capacity Days (FCD) is large and is unfavourable for providing opportunities for agricultural field work. There are however no limitations to agricultural land quality based solely on climate.

Table 1: Local agro-climatic conditions

Parameter	Measurement
Altitude (AOD)	23m
Average Annual Rainfall	756mm
Accumulated Temperatures >0°C	1,443 day°
Field Capacity Days	181 days
Average Moisture Deficit, wheat	98mm
Average Moisture Deficit, potatoes	87mm

Soil parent material and soil type

2.4 The principal bedrock geology mapped by the British Geological Survey[3] across the site is the Pennine Lower Coal Measures Formation comprising interbedded grey mudstone, siltstone and pale grey sandstone. This formation contains coal seams, which are more numerous in its upper portion.

[3] **British Geological Survey (2023).** *Geology of Britain viewer*, http://mapapps.bgs.ac.uk/geologyofbritain/home.html

2.5 Superficial diamicton till deposits are mapped across the north and south-west of the site, comprising non-sorted or poorly sorted sediment of varied size. No superficial deposits are mapped across the remainder of the site.

2.6 The Soil Survey of England and Wales soil association mapping[4] (1:250,000 scale) shows the Clifton association across the site, characterised by slowly permeable, reddish, fine and coarse loamy soils. Soil profiles are typically waterlogged and assessed as Wetness Class (WC) IV[5]. Where drainage measures are in place, improvement to WC III is possible.

3 Agricultural land quality

Predictive ALC

3.1 The Welsh Government has published a Predictive ALC Map for Wales[6]. The map is designed on a 50m grid. Criteria including climate, slope, soil wetness, droughtiness and stone contents have been considered and used to determine the most likely limitation to agricultural land quality within each grid square. The map predicts the site to be of Subgrade 3a quality in the south and to the west of the northern field. Subgrade 3b is mapped across the remainder of the site.

3.2 Grade 3 is defined as good to moderate quality agricultural land and is described in the ALC guidelines as:

> *"Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or level of yield. Where more demanding crops are grown, yields are generally lower or more variable than on land in Grades 1 and 2."*

3.3 Grade 3 is subdivided into good quality Subgrade 3a land, described 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"*

and moderate quality Subgrade 3b land, described as:

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

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

[6] **Welsh Government (2019)**. *Predictive Agricultural Land Classification (ALC) Map for Wales.* https://datamap.gov.wales/maps/new?layer=inspire-wg:wg_predictive_alc2#/

"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."

3.4 However, as explained by the Welsh Government's Frequently Asked Questions on ALC [7], the only way to accurately determine the agricultural grade of land is by a detailed field survey in accordance with the ALC guidelines.

Published ALC data

3.5 All of the site, with the exception of a small area to the very south, has been surveyed and classified as part of a reconnaissance soil survey of the wider area undertaken by the Welsh Government in 1988[8] in respect of proposals for the A548 Flint Bypass. The survey classified the land within the current site boundary as mostly Subgrade 3b with a smaller area of Subgrade 3a. The survey report is attached as Appendix 1.

3.6 As the ALC is concerned with the long-term inherent physical characteristics of land and soil, rather than short-term management or use, the findings of the 1988 survey remain valid.

3.7 The Welsh Government survey covers an extensive area surrounding Flint and was conducted at an observation density of approximately 1 observation in every 4 hectares. The site has been graded in accordance with observations made in the immediate vicinity. Two observations are mapped close to the west of the site and classified as Subgrade 3a, and two are located to the east and south-west, and classified as Subgrade 3b.

3.8 The soil profiles classified as Subgrade 3a are described as:

"*Profiles in this grade are somewhat varied in nature though are typically composed of either medium clay loam textures throughout or alternatively such textures overlie clay or clayey red till at depth in the subsoil. Profiles fall into Wetness Class 2 or 3, which coupled with their topsoil textures in this range of field capacity days has resulted in their allocation to this grade chiefly in terms of soil wetness and moderate problems of workability.'*

3.9 The soil profiles classified as Subgrade 3b are described as:

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[7] **Welsh Government (2020).** *Agricultural Land Classification, Frequently Asked Questions.* https://gov.wales/sites/default/files/publications/2020-06/agricultural-land-classification-frequently-asked-questions.pdf

[8] **Welsh Government (1989).** *Agricultural Land Classification, A548 Proposed Flint Bypass.*

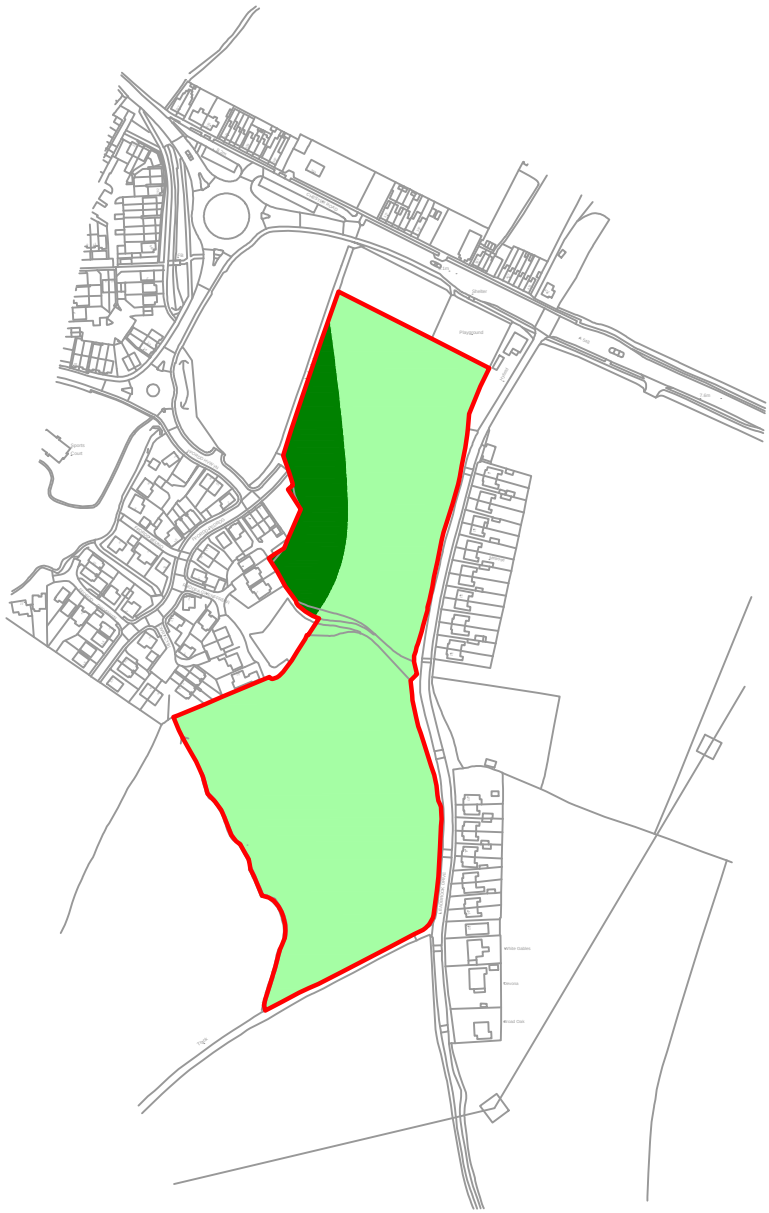
"Profiles are typically composed of sandy loam, medium clay loam or less frequently sandy clay loam topsoils generally overlying clayey red till at c 40-50cm from the soil surface. Profiles fall typically into Soil Wetness Class 4 which coupled with their topsoil textures in this range of field capacity days has resulted in their allocation to this grade in terms of moderate problems of wetness and relatively difficult workability."

3.10 The site has been mapped in line with the findings of the Welsh Government report with the small unmapped area of the site to the south incorporated into the surrounding Subgrade 3b unit.

3.11 The ALC distribution is shown in Figure RAC/10185/1 and the areas of each grade at the site are given in Table 2.

Table 2: ALC areas

Grade	Description	Hectares	%
Subgrade 3a	Good quality	0.6	12
Subgrade 3b	Moderate quality	4.3	88
Total		4.9	100



KEY			
Grade 1		Grade 4	
Grade 2		Grade 5	
Subgrade 3a		Non–agricultural	
Subgrade 3b		Not present	

1:5,000

0 100m 200m

Drawing title AGRICULTURAL LAND CLASSIFICATION	Ref. RAC/10185/1	Rev.			
Contract LAND AT QUARRY FARM, OAKENHOLT	Scales AGM	Checked by AIF			
	Scales 1:5,000@A4	Date 11/2023	Rev.	Comment	Date

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Appendix 1: Welsh Government ALC Report

ADAS LAND MANAGEMENT SERVICES

AGRICULTURAL LAND CLASSIFICATION
A548 PROPOSED FLINT BY PASS

A D A S

AGRICULTURAL LAND CLASSIFICATION

A548 PROPOSED FLINT BY PASS

Background

The site covers approximately 488ha of land around the town of Flint in Clwyd. Land surveyed falls into two broad areas - the first running along the marshland on the shores of the River Dee, the second forming a broad arc around the southern outskirts of Flint from Bagillt in the west to Oakenholt in the east.

The site was surveyed using a 120cm Dutch auger with samples being taken at approximately 200m intervals, normally coincident with the national grid. Additional information was provided by the examination of soil pits at selected locations.

Land Use

At time of survey (July 1988) the majority of the land surveyed was under pasture though with occasional fields of cereals to the north and west of Cornist Hall. However, on land alongside the River Dee, saltmarsh vegetation was dominant.

PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

Over the majority of the area surveyed relief was generally level (as in the marshland areas) or gently undulating with gradient not presenting significant limitations to agricultural land quality. However, areas of steeper gradients (ie in excess of 7 degrees) were noted to occur quite commonly between Bagillt and the Coed Onn Road. Such gradients were significant in determining the final ALC grading.

Climate

The marshland areas of this site lie at approximately 5m OD whilst the land surveyed lying south of this area ranges between c 25 and 75m OD. The average annual rainfall for this area is approximately 705mm alongside the River Dee rising to c 803mm on the higher altitude land to the south of Flint. The median accumulated temperature above zero degrees C for the period January to June (a measure of the relative warmth of a locality) ranges from 1477 to 1398 day degrees as altitude increases inland from the Dee. The combination of these two parameters (ie rainfall and accumulated temperature) means that the site is not subject to significant climatic limitations per se.

Soils on the site are at Field Capacity for between c 177 and 192 days/annum (relatively high in relation to the national average) whilst the moisture deficits present range between 95-109mm for wheat and 89-101mm for potatoes.

Geology and Soils

The Geological Survey of Great Britain Sheet 108 shows the site to be dominated by Carboniferous Middle and Upper Coal Measures. However, a strip of post glacial Alluvium is shown to exist along the side of the River Dee and immediately south of the existing A548 Holywell Road to the west of Flint.

The Soil Survey of England and Wales Sheet 2 "Soils of Wales" shows the marshland area of the site to belong to the Wisbech association (calcareous alluvial gley soils related to marine alluvium) whilst the majority of land to the south of Flint is shown to belong to the Clifton association (typical stagnogleys associated with fine reddish loamy till and related glaciofluvial deposits). However, a narrow strip of the Wick 1 association (typical brown earths) is shown to extend south eastwards from Bagillt towards Cornist Hall.

AGRICULTURAL LAND CLASSIFICATION

Appendix 1 gives a generalised description of the grades used in this classification.

Grade 2

Areas of this grade occur extensively on land between Bagillt at the west and the Northop Road at the east. Profiles are typically composed of a variety of topsoil textures though medium clay loam, sandy clay loam and sandy silt loam textures were noted to occur most frequently. Such topsoils typically overlie sandy clay loam in the subsoil, though less frequently medium clay loam and sandy loam textures were noted.

Profiles are chiefly limited by their topsoil textures - the moderate clay contents present, in combination with the Field Capacity Day values for this site are likely to result in slight problems related to soil workability. Profiles in this grade were occasionally also subject to slight limitations of topsoil stoniness, with between c 5-10% stones of c 2-5cm diameter being present.

Grade 3a

Areas of this grade occur to the South of Bagillt, the east of the Northop Road and immediately south of the Chester Road, just east of Flint.

Profiles in this grade are somewhat varied in nature though are typically composed of either medium clay loam textures throughout or alternatively such textures overlie clay or clayey red till at depth in the subsoil. Profiles fall into Soil Wetness Class 2 or 3, which coupled with their topsoil textures in this range of Field Capacity Days has resulted in their allocation to this grade chiefly in terms of soil wetness and moderate problems of workability.

Grade 3b

Areas of this grade occur quite extensively throughout all the land to the south of Flint. Profiles are typically composed of sandy loam, medium clay loam or less frequently sandy clay loam topsoils generally overlying clayey red till at c 40-50cm from the soil surface. Profiles fall typically into Soil Wetness Class 4 which coupled with their topsoil textures in this range of Field Capacity Days has resulted in their allocation to this grade in terms of moderate problems of wetness and relatively difficult workability.

However, between Bagillt and the Coed Onn Road numerous areas of land were noted with gradients in the order of 8 to 10 degrees. In such cases, land was allocated to this grade in terms of the moderate agricultural limitations imposed by relatively steep gradient.

Grade 4

Small areas of this grade occur just alongside the Halkyn Road and alongside the Chester Road east of Flint. In the case of land alongside the Halkyn Road, steep gradients in the order of 14 degrees constituted a relatively severe agricultural limitation and the land was allocated to this grade for this reason.

Alongside the Chester Road, however, profiles were typically composed of heavy clay loam topsoils directly overlying clay in the subsoil. Such profiles fall into Soil Wetness Class 4, which coupled with their relatively heavy topsoil textures in this relatively high range of Field Capacity Days has resulted in their allocation to this grade in terms of severe problems of wetness and workability.

Grade 5

This grade occurs along the marshes bordering the River Dee. Profiles are typically composed of clay or silty clay textures throughout, though occasional subsoils of fine sandy loam or medium clay loam were noted.

Being saltmarsh, such land is subject to high salt contents and tidal inundation, which along with the heavy soil textures present constitute in very severe agricultural limitations which has resulted in the land being allocated to this grade.

Areas of Grades

Total area of site	488.0 ha
Land predominantly in urban use	46.7 ha
Land predominantly in non agricultural use	44.0 ha
Farm buildings	5.5 ha
Total area of agricultural land	391.8 ha

Grade 2	130.3 ha	(33.2% total agricultural land)
Grade 3a	51.3 ha	(13.1% total agricultural land)
Grade 3b	142.9 ha	(36.5% total agricultural land)
Grade 4	12.1 ha	(3.1% total agricultural land)
Grade 5	55.2 ha	(14.1% total agricultural land)

REFERENCES

MAFF 1988 Agricultural Land Classification of England and Wales (Revised guidelines and criteria for grading the quality of agricultural land)

Met Office 1989 Climatological Data Sets for Agricultural Land Classification

Geological Survey of Great Britain 1972 (England and Wales) Sheet 108 "Flint" 1:50000

Soil Survey of England and Wales 1983 Sheet 2 "Soils of Wales" 1:250000, plus accompanying memoir

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DESCRIPTION OF THE GRADES AND SUBGRADES

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 Grade 1.

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.

Subgrade 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.

Subgrade 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 (eg 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 agricultural land

Land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

A D A S

Flint Bypass, Clwyd.

Agricultural Land Classification

Agricultural Land

Grade 1 *

Grade 2

Grade 3a

Grade 3b

Grade 4

Grade 5

Non-Agricultural Land

Land predominantly in urban use

Other land primarily in non-agricultural use

Agricultural buildings

Open water *

Not surveyed *

* Indicates grades which do not occur within this site.

Further details contained in Revised Agricultural Land Classification M.A.F.F. 1988.

Scale 1:15000

This map is based upon the 1:10 000 Ordnance Survey sheets SJ 27 SW and SJ 27 SE, with the permission of Her Majesty's Stationery Office.
Surveyed by the Resource Planning Group, and drawn by the Cartographic Unit, A.D.A.S., Trawsgoed.

A D A S

Flint Bypass, Clwyd.

Auger Borings and Soil Pits

Auger Boring ●5

Soil Pit □

Scale 1:15000