

***AGRICULTURAL LAND CLASSIFICATION***

**Castlemead**

**Land at Llay New Road  
Rhosrobin**



Our Ref: SES/CM/LNR/#1

Date: 19<sup>th</sup> March 2014

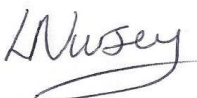
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## **AGRICULTURAL LAND CLASSIFICATION**

### **Land off Llay New Road Rhosrobin**

A report prepared on behalf of *Soil Environment Services* by:



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INSTITUTE OF PROFESSIONAL SOIL SCIENTISTS

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## **EXECUTIVE SUMMARY**

An Agricultural Land Classification was carried out on 6.4 ha of land adjacent to Llay New Road, Rhosrobin on the 12<sup>th</sup> March 2014. The classification included an initial desktop investigation of previously mapped soils, followed by a field survey using hand augering to examine soil profiles. This data was combined with local climatological data to determine the ALC Grade for the current survey. The grading according to climate is ALC Grade 1. Three general soil types were noted. The soils in the east and west of the site are analogous to the Wick Series of the Wick 1 Association (Type 1), the soils in the south of the site are not analogous to any soils in the surrounding area (Type 2) and the soils across the majority of the site are slightly analogous to the Brickfield Series of the Wick 1 Association (Type 3). These soils are generally sandy silt loams and overlay mudstone. Grading on the MAFF 1988 map indicated ALC Grade 2 and Urban across the site. The current grading is ALC Grade 3a and 3b, with the soils being limited by wetness and the pattern effect (Type 1).

Given that a large proportion of the site is not of the 'Best Most Versatile' agricultural land, and the restricted access currently available, it is unlikely that this site would be used in arable production.

## 1. INTRODUCTION

An Agricultural Land Classification (ALC)<sup>1,2</sup> has been carried out on 6.4 ha of land adjacent to Llay New Road, Rhosrobin (Drawing ALC/1). The site is centred on Grid Ref. 333048, 352965.

The survey was conducted in accordance with the current guidelines on the 12<sup>th</sup> March 2014.

Agricultural land is classified into the following categories according to the 1988 guidelines<sup>1</sup>:

Grade	Description
1	<b>Excellent quality agricultural land</b> with no or very minor limitations to agricultural use.
2	<b>Very good quality agricultural land</b> with minor limitations which affect crop yield, cultivation or harvesting.
3a	<b>Good quality agricultural land</b> capable of producing moderate to high yields of a narrow range of arable crops or moderate yields of a wider range of crops.
3b	<b>Moderate quality agricultural land</b> capable of producing moderate yields of a narrow range of crops or lower yields of a wider range of crops.
4	<b>Poor quality agricultural land</b> with severe limitations which significantly restrict the range of crops and/or level of yields.
5	<b>Very poor quality agricultural land</b> with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

## 2. METHODOLOGY

The classification includes an initial desktop investigation to examine previously mapped soil types and to note the drift and solid geology. This included consultation from:

*Soil Survey of England and Wales 1:250 000*  
*British Geological Survey 1:50 000 solid and drift map.*

The field survey consisted of a number of hand auger borings to a depth of 1.2 m (where possible) to examine soil profiles, using standard soil survey methods<sup>3</sup>. Pit excavations were conducted to determine sub soil structure where necessary. This data was used to map the principal soil types for determining the ALC. The soil removed during augering and pit excavations was examined in accordance with:

*Soil Survey Field Handbook*  
*Describing and Sampling Soil Profiles*  
*Soil Survey of England and Wales, Technical Monograph No. 5, 1976*

*Soil Classification for Soil Survey*  
*Monographs on Soil Survey*  
*Butler, B E (1980) Clarendon Press, Oxford*

Climatological data<sup>4</sup> was used to determine the overriding site limitation and for interaction with soil parameters (Appendix A). The above information was cross referenced with geological surveys<sup>8</sup>, previous soil surveys<sup>6</sup> and the national 1:250 000 series ALC survey<sup>7</sup> relevant for this site to substantiate the findings. The ALC grade was then determined for this site and for the current survey, and is detailed on Drawing ALC/2.

Other factors used for ALC grading, but which give no limitation at this site, are not discussed.

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### 3. BASELINE CONDITIONS

#### 3.1. Climate and flooding

The climatological data (Table 1) indicates average temperature, below average rainfall and a below average number of field capacity days for the region.

<b>Table 1</b>		
<b>Climatological information</b>		
<b>Factor</b>	<b>Units</b>	<b>Value</b>
Altitude AOD	m	85
Accumulated temperature	day°C (Jan-June)	1379.5
Average Annual Rainfall	mm	848.0
Field Capacity Days	days	194.9
Moisture Deficit Wheat	mm	90.2
Moisture Deficit Potatoes	mm	77.0

Grading according to climate is **ALC Grade 1**.

The site is assessed to not be at any significant flood risk which would affect ALC grade.

#### 3.2. Soils, geology and topography

The soils are generally sandy silt loams. These overlay mudstone.

Three general soil types were noted for the purposes of ALC grading. The soils in the east and west of the site are analogous to the Wick Series of the Wick 1 Association (Type 1), the soils in the south of the site are not analogous to any soils in the surrounding area (Type 2) and the soils across the majority of the site are slightly analogous to the Brickfield Series of the Wick 1 Association (Type 3).

#### **Geology**

*1:50 000 scale superficial deposits description: Till, Devensian - Diamicton.  
Superficial Deposits formed up to 2 million years ago in the Quaternary Period. Local environment previously dominated by ice age conditions.*

*1:50 000 scale bedrock geology description: Halesowen Formation - Mudstone, Siltstone and Sandstone. Sedimentary Bedrock formed approximately 307 to 309 million years ago in the Carboniferous Period. Local environment previously dominated by rivers.*

*North of site*

*1:50 000 scale superficial deposits description: Glaciofluvial Sheet Deposits, Devensian - Sand and Gravel. Superficial Deposits formed up to 2 million years ago in the Quaternary Period. Local environment previously dominated by ice age conditions.*

Texture of the topsoil does not vary significantly across the site.

The slopes are relatively gentle and in general are not a limiting factor.

A summary of the features of the dominant soil type/s are listed in Table 2.

<b>Table 2. Soil Type descriptions</b>			
Profile description	Soil types		
	Type 1	Type 2	
Horizon 1 (topsoil)	0-22 cm Dark brown, no mottles, slightly stony sandy silt loam; moderate medium SAB structure	0-28 cm Dark greyish brown, no mottles, slightly stony sandy silt loam; moderate medium SAB structure	0-28 cm Brown, no mottles, slightly stony sandy silt loam; moderate medium SAB structure
Horizon 2 (subsoil 1)	22-49 cm Yellowish brown, no mottles, slightly stony sandy loam; moderate medium SAB structure	28-75 cm Greyish brown with many large ochreous mottles, slightly stony clay; moderate coarse prismatic structure	28-120 cm Yellowish brown, no mottles, moderately stony clay loam; moderate medium SAB structure
Horizon 3 (subsoil 2)	49-120 cm Light olive brown, no mottles, slightly stony sandy loam; weak fine SAB structure	75 – 120 cm Yellowish brown with many large ochreous mottles, slightly stony clay; massive structure	
Survey points (Drawing ALC/1) and soil types: BHs 1,8=Type 1 soil 4 to 7=Type 2 soil 2,3,9,11 to 15=Type 3 soil  SAB=Sub Angular Blocky			



**Photo 1. BH location 1-Soil Type 1**



**Photo 2. BH location 5-Soil Type 2**



**Photo 3. BH location 12-Soil Type 3**



### **3.3. Agriculture**

On the survey date the field consisted of rough grassland.

## 4. AGRICULTURAL LAND CLASSIFICATION

### 4.1. National 1:250 000 map grading

Grading on the MAFF (1983) 1:625 000 map<sup>7</sup> indicated **ALC Grade 2 and Urban** across the site.

### 4.2. Current grading

This survey has resulted in an Agricultural Land Classification of the following grades (Drawing ALC/2):

<b>Grade</b>	<b>Area (ha)</b>	<b>Limitation</b>
1		
2		
3a	4.8	Wetness-Type 1 and 3 soil
3b	1.6	Wetness-Type 2 soil
4		
5		
Non-agricultural		

#### ***Type 1 soils – Wetness and Pattern effect***

The combination of topsoil texture (sandy silt loam), the wetness class (I) and number of field capacity days (194.9) results in an ALC grading of 1 for Type 1 soils. However given the small area of land within this grade and the practical inability to farm differently from adjacent soils (Type 3), this soil type area has been graded as ALC Grade 3a.

#### ***Type 2 soils - Wetness limitation***

The combination of topsoil texture (sandy silt loam), the wetness class (IV) and number of field capacity days (194.9) results in an ALC grading of 3b for Type 2 soils.

#### ***Type 3 soils - Wetness limitation***

The combination of topsoil texture (sandy silt loam), the wetness class (III) and number of field capacity days (194.9) results in an ALC grading of 3a for Type 3 soils.

## INFORMATION SOURCES

1. *Agricultural Land Classification of England and Wales*. Guidance and criteria for grading the quality of agricultural land. MAFF. 1988.
2. *Agricultural Land Classification of England and Wales*. Guidance and criteria for grading the quality of agricultural land. Second Revision MAFF. DRAFT May 1996.
3. *Soil Survey Field Handbook*. Technical Monograph No.5. Soil Survey of England and Wales.1976.
4. *Climatological Data for Agricultural Land Classification*, The Met. Office 1989.
5. *Soil Map of England and Wales: 1:250 000*. Soil Survey of England and Wales, Harpenden.
6. *Soils and Their Use in Wales*. Soil Survey of England and Wales, Harpenden.
7. *Agricultural Land Classification Map* 1:625 000. MAFF 1983.
8. *British Geological Survey* 1:50 000 national map.

# **DRAWING ALC/1**

**BH locations and soil type**

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## Soil Type

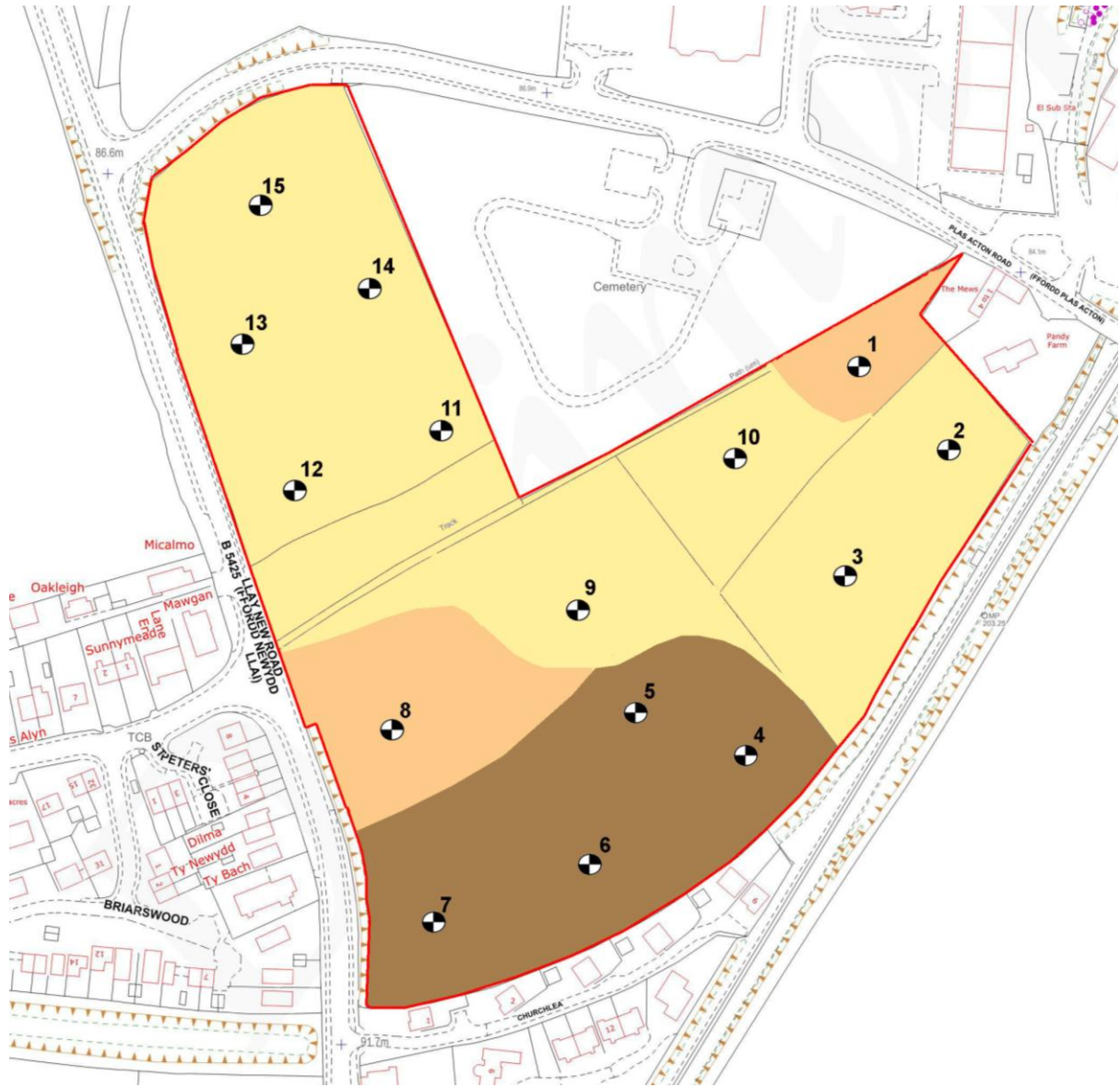
- Type 1 soil
- Type 2 soil
- Type 3 soil

Drawing Title: BH locations and soil type

Drawing No.: ALC/1

Scale: 1:2500

Date: 19/03/14



# **DRAWING ALC/2**

**ALC grade**

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## ALC Grades

- Grade 1
- Grade 2
- Grade 3a
- Grade 3b
- Grade 4
- Grade 5
- Non agricultural land

Drawing Title: ALC grade

Drawing No.: ALC/2

Scale: 1:2500

Date: 19/03/14



# **APPENDIX A**

**Climatological data for**  
*Agricultural Land Classification*





## Droughtiness (moisture balance) determination for each soil type and restored profile

Moisture availability data for each texture from MAFF ALC Guidelines 1996

Moisture Balance (MB) = AP - MD for wheat and potatoes (adjusted for stones)

	Horizon	Type 1		Type 2		Type 3	
		texture	water	texture	water	texture	water
TAvt - Topsoil water available (mm)		SZL	16.30	SZL	16.30	SZL	16.30
LTt - Topsoil thickness (cm)		0	22.00	0	28.00	0	28.00
TAvs - Subsoil total available	1	SL	12.90	C	13.75	CL	15.92
	2	SL	12.90	C	13.75	0	0.00
	3	0	0.00	0	0.00	0	0.00
EAvs - Subsoil (SS) easily available	1	SL	9.43	C	6.88	CL	8.58
	2	SL	9.43	C	6.88	0	0.00
	3	0	0.00	0	0.00	0	0.00
LT50 - Thickness ss layers to 50cm	1	SL	27.00	C	22.00	CL	22.00
	2	SL	1.00	C	0.00	0	0.00
	3	0	0.00	0	0.00	0	0.00
LT120 - Thickness ss layers 50 to 120cm	1	SL	0.00	C	25.00	CL	70.00
	2	SL	70.00	C	45.00	0	0.00
	3	0	0.00	0	0.00	0	0.00
LT0 - Thickness ss layers to 70cm	1	SL	27.00	C	42.00	CL	42.00
	2	SL	21.00	C	0.00	0	0.00
	3	0	0.00	0	0.00	0	0.00
Total profile thickness for soil type cm		0	120		120	0	120

### SOIL Droughtiness (moisture balance) results

Type	Grade	Notes	
Type 1	Results		
	AP wheat =	138.0	
	Moisture balance wheat =	47.8	1
	AP potatoes =	97.8	
	Moisture balance potatoes =	20.8	1
Type 2	Results		
	AP wheat =	124.0	
	Moisture balance wheat =	33.9	1
	AP potatoes =	103.4	
	Moisture balance potatoes =	26.4	1
Type 3	Results		
	AP wheat =	140.7	
	Moisture balance wheat =	50.5	1
	AP potatoes =	112.5	
	Moisture balance potatoes =	35.5	1
		<b>ALC Grade</b>	<b>Moisture Balance Limits wheat potatoes</b>
		1	30 10
		2	5 -10
		3a	-20 -30
		3b	-50 -55
		4	<-50 <-55