WALNUT TREE FARM, BARTHOMLEY

Agricultural Land Classification
ALC Map and Report

April 1999

Resource Planning Team
Northern Region
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AGRICULTURAL LAND CLASSIFICATION REPORT

WALNUT TREE FARM, BARTHOMLEY

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 44 ha. of land at Walnut Tree Farm, north of Bartholmey, Cheshire. The survey was carried out in April 1999.

2. The survey was undertaken by the Farming and Rural Conservation Agency (FRCA)[1] on behalf of the Ministry of Agriculture, Fisheries and Food (MAFF). The work was carried out in order to determine the agricultural quality of land affected by proposals for a quad biking circuit. Whilst this area had previously been surveyed at a less detailed scale, this survey supersedes any previous ALC information for this land.

3. The work was conducted by members of the Resource Planning Team in the Northern Region of FRCA. The land has been graded in accordance with the published MAFF *ALC guidelines and criteria* (MAFF, 1988). *A description of the ALC grades and* subgrades is given in Appendix I.

4. At the time of survey the predominant agricultural land use on the site was grass, both silage and grazing. A field in the north-east of the site bordering the motorway was under winter cereals. The areas mapped as 'Other land' include Walnut Tree farm and surrounding outbuildings, silage clamps, hard farm tracks, fishing ponds and a copse.

SUMMARY

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:10,000. It is accurate at this scale but any enlargement would be misleading.

6. The area and proportions of the ALC grades and subgrades on the surveyed land are summarised in Table 1.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
1			
2			
3a			
3b			
4			
5			
Agricultural land not surveyed			
Other land		-	
Total survey area		100	
Total site area		-	100

[1] FRCA is an executive agency of MAFF and the Welsh Office

7. The fieldwork was conducted at an average density of 1 boring per hectare of agricultural land. A total of 44 borings and 2 soil pits were described.

8. The agricultural land on this site has been classified as Grade 2 (very good quality), Subgrade 3a (good quality), Subgrade 3b (moderate quality) and Grade 4 (poor quality). The principal agricultural limitations are soil wetness, soil droughtiness and gradient.

9. Land of very good quality (Grade 2) is found predominantly on the higher ground towards the centre of the site. Soils are well drained and generally comprise medium sandy loam topsoils over loamy medium sand and medium sand subsoils. Occasionally finer textured (sandy clay loam, heavy clay loam and clay) lower subsoils were found. Soil droughtiness was the principle agricultural limitation in these soils.

10. Three areas of good quality (Subgrade 3a) land are found across the site. Two broad soil profiles were distinguished within this subgrade. In the first, medium sandy loam topsoils overlie loamy medium sand and medium sand subsoils. Soil droughtiness is the principle agricultural limitation in these soils. The second soil profile consisted of medium sandy loam topsoils over sandy clay loam, medium clay loam, heavy clay loam and clay subsoils. Generally clay content in these subsoils increases with depth. Soil wetness is the principle agricultural limitation in these soils.

11. Land of moderate quality (Subgrade 3b) is found across the north and south of the survey area. Gradient imposes an overriding limitation to agricultural land quality, where slopes exceed 7°. This occurs across much of the north-west of the area designated as Subgrade 3b, and in the south of the survey area, where land slopes down toward the streams. On the remainder of the area designated as Subgrade 3b, soils comprise medium sandy and medium clay loam topsoils, which overlie sandy clay loam, medium clay loam, heavy clay loam and clay subsoils. Soil wetness is the principle agricultural limitation in these soils.

12. Land of poor quality (Grade 4) is found along the northern boundary of the survey area. Gradient imposes an overriding limitation to agricultural land quality, where slopes exceed 11°.

FACTORS INFLUENCING ALC GRADE

Climate

13. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.

14. The key climatic variables used for grading this site are given in Table 2 and were obtained from the published 5km grid datasets using the standard interpolation procedures (Met. Office, 1989).

Table 2: Climatic and altitude data

Factor	Units	Values	
Grid reference	N/A	SJ 765 538	SJ 769 537
Altitude	m, AOD	80	85
Accumulated Temperature	day°C (Jan-June)	1374	1369
Average Annual Rainfall	mm	760	764
Field Capacity Days	days	178	179
Moisture Deficit, Wheat	mm	89	89
Moisture Deficit, Potatoes	mm	77	76
Overall climatic grade	N/A	Grade 1	Grade 1

15. The climatic criteria are considered first when classifying land as climate can be overriding in the sense that severe limitations will restrict land to low grades irrespective of favourable site or soil conditions.

16. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR), as a measure of overall wetness, and accumulated temperature (AT0, January to June), as a measure of the relative warmth of a locality.

17. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation. The site is climatically Grade 1.

Site

18. The site lies at an altitude of 70-85m AOD. The site is bordered to the north, south an west by Valley Brook and a small tributary stream.

19. Land falls from a central ridge of higher land to lower land adjacent to the streams. In places these slopes exceed 7°, where they preclude land from being classified any higher than Subgrade 3b.

20. In the north-eastern corner of the site, uneven microrelief also constitutes a limitation to agriculture.

Geology and soils

21. The most detailed published geological information for this area (BGS, 1902) maps the entire site as being underlain by Triassic Keuper Red Marl. No published drift geological information is available for the site.

22. The most detailed published soils information for this area (SSEW, 1983) shows the site to comprise soils of the Salwick and Wick 1 associations. The Salwick association, developed in reddish till and glaciofluvial drift, consists of fine loamy soils with slight seasonal waterlogging, and well drained coarse loamy soils. The Wick 1 association comprises soils described as "deep well drained coarse loamy typical brown earths".

23. Upon detailed field examination, soil textures consistent with the above descriptions were found across the site.

AGRICULTURAL LAND CLASSIFICATION

24. The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1, page 1.

Grade 2

25. Land of very good quality occupies 12 ha. (28%) of the site, and was found across much of the higher ground in the centre of the survey area. The principal agricultural limitation to this land is soil droughtiness.

26. Within the Grade 2 mapping unit, the topsoils are very slightly stony, and consist of medium sandy loams, or occasionally sandy clay loams and loamy medium sands. In the subsoils, medium sandy loam, sandy clay loam, loamy medium sand and medium sand textures are predominant. These subsoils are very slightly to moderately stony. All profiles were found to extend to at least 120cm. Although a number of the profiles observed in this mapping unit show evidence of seasonal soil wetness (gleying) in their subsoils, these were of a porous nature, and therefore these soils are assigned to Wetness Classes I and II. Moisture balance calculations which take into account the soil characteristics in relation to the local climatic regime, indicate that these soils experience a droughtiness restriction consistent with land of Grade 2 quality.

Subgrade 3a

27. Good quality land occupies 6 ha. (14%) of the site, and is found in the centre and east of the site. The principal agricultural limitations to this land are soil wetness and droughtiness.

28. Soils within the Subgrade 3a mapping units fall into two main variants. Some soils are well drained and consist of very slightly stony, sandy loam or loamy medium sand topsoils. These overlie very slightly stony medium sandy loam, loamy medium sand and medium sand upper subsoils, and stoneless medium sand lower subsoils. All profiles extend to at least 120cm. These soils are assessed as Wetness Class I. Moisture balance calculations which take into account the soil characteristics in relation to the local climatic regime, indicate that these soils experience a droughtiness restriction consistent with land of Subgrade 3a quality.

29. In the second soil variant within the Subgrade 3a mapping units, very slightly stony sandy loam topsoils overlie sandy loam, sandy clay loam, heavy clay loam and clay subsoils. Subsoil clay content generally increases with depth. All profiles extend to at least 120cm. Observed signs of seasonal soil wetness (gleying) and restricted subsoil drainage (slowly permeable layers) in relation to the local climatic regime, places these soils into Wetness Class III. This imposes a soil wetness restriction consistent with land of Subgrade 3a.

Subgrade 3b

30. Moderate quality land occupies 20 ha. (56%) of the site, and occurs to the north and south of the survey area. The principal agricultural limitations to this land are soil wetness, gradient and microrelief.

31. Where gradients are within the range 7-11° the safe and efficient use of conventional farm machinery is restricted. The land cannot be classified higher than Subgrade 3b. Areas of these steeper slopes were found where land sloped down to the streams along the northern and southern site boundaries.

32. Within the remainder of the Subgrade 3b mapping unit, land is affected by a soil wetness limitation. Topsoils are very slightly stony, and comprise medium sandy loam, sandy clay loam and medium clay loams. Organic silty clay loam topsoils were found adjacent to the stream on the survey areas southern boundary. These topsoils overlie medium clay loam, sandy clay loam, sandy loam, heavy clay loam and clay subsoils, with organic medium and silty clay loam subsoil textures also being recorded along the southern boundary of the site. Evidence of seasonal soil wetness (gleying), was observed in the upper subsoils, and restricted subsoil drainage (slowly permeable soil) in the lower subsoils. All profiles extend to at least 120cm. The depths at which gleying and slowly permeable soil was observed, in relation to the local climatic regime places these soils into Wetness Class IV. This imposes a soil wetness restriction consistent with land of Subgrade 3b.

Grade 4

33. Land of poor quality occupies 2 ha. (5%) of the site, and has been mapped to the north of the survey area, where gradient imposes restrictions on land quality.

34. Where gradients are within the range 11-18° the safe and efficient use of conventional farm machinery is restricted. The land cannot be classified higher than Grade 4. Areas of these steeper slopes were found to the north of the survey area, on either side of Valley Brook.

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SOURCES OF REFERENCE

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BGS: London.

Ministry of Agriculture, Fisheries and Food (1988) *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.*
MAFF: London.

Met. Office (1989) *Climatological Data for Agricultural Land Classification.*
Met. Office: Bracknell.

Soil Survey of England and Wales (1983) *Sheet 3, Soils of Midland and Western England.*
SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in Midland and Western England*
SSEW: Harpenden

APPENDIX I

DESCRIPTIONS 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 or horticultural crops can usually be grown but on some land of this 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 land.

Grade 3: Good to Moderate Quality Land

Land with moderate limitations which affect the choice of crops, the timing and type of cultivation, harvesting or the level of yield. When 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 the 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 Agricultural Land

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

SAMPLE NO.	GRID REF	USE	ASPECT	GRDNT	GLEY	SPL	WETNESS CLASS	WETNESS GRADE	WHEAT AP	WHEAT MB	POTS AP	POTS MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS	
1	SJ76805400	PGR	N	08			1	1	77	-12	48	-28	3A				GR	3B		
1P	SJ76905360	PGR	SW				1	1	123	34	85	9	2				DR	2		NEARLY 1
2	SJ77005400	PGR	S	16	030		2	2	129	40	109	33	1				GR	4		
2P	SJ76605370	PGR	SW	01	036	036	4	3B	84	-5	94	18	3A				WE	3B		
3	SJ77105400	CER	N	05			1	1	97	8	80	4	2				DR	2	DTA STNE	NEARLY 3A
4	SJ77205400	CER	N	06			1	1	117	28	101	25	2				DR	2	MNATBOTT	NEARLY 1
5	SJ76505390	PGR	N	02	025	034	4	3B	110	21	108	32	2				WE	3B		
5A	SJ76305398	PGR	S	12	026		1	1	112	23	93	17	2				GR	4		
6	SJ76605390	PGR			025	065	3	3A	122	33	108	32	1				WE	3A	3B FTSLP	
7	SJ76705390	PGR	N	02	000	029	4	3B	104	15	102	26	2				WE	3B		
8	SJ76805390	PGR	N	10	024	034	4	3B	101	12	106	30	2				WE	3B	R A FURR	
9	SJ76905390	PGR	N	09	024	024	4	3B	117	28	102	26	2				GR	3B		
10	SJ77005390	PGR	W	02	025	025	4	3B	124	35	100	24	1				WE	3B		
11	SJ77105390	PGR	NW	01	025	025	4	3B	127	38	102	26	1				WE	3B		
12	SJ77205390	CER	N	02	027	065	3	3A	124	35	107	31	1				WE	3A		
13	SJ76505380	PGR	SW	01	037		1	1	111	22	95	19	2				DR	2	WET 70CM	
14	SJ76605380	PGR	SW	01			1	1	127	38	113	37	1					1		
16	SJ76805380	PGR	N	01	028	065	3	3A	134	45	115	39	1				WE	3A		
17	SJ76905380	PGR	N	01	000	045	4	3B	126	37	109	33	1				WE	3B		NEARLY 3A
18	SJ77005380	LEY	N	01	029	065	3	3A	130	41	113	37	1				WE	3A		
19	SJ77105380	LEY	N	01	028	035	4	3B	119	30	103	27	1				WE	3B		
20	SJ77205380	LEY	S		035	045	4	3B	125	36	109	33	1				WE	3B		NEARLY 3A
21	SJ76505370	PGR	SW	01	045		2	2	112	23	96	20	2				WE	2		
22	SJ76605370	PGR	SW	01	025	037	4	3B	127	38	98	22	1				WE	3B		
24	SJ76805370	PGR	SW		038		1	1	99	10	83	7	2				DR	2		
25	SJ76905370	PGR	S	06			1	1	89	0	72	-4	3A				DR	3A		
26	SJ77005370	PGR	NE	01	020		2	2	145	56	116	40	1				WE	2		
27	SJ77105370	PGR	NE	02	022	078	2	2	133	44	113	37	1				WE	2		NEARLY 3A
28	SJ77205370	LEY	S	05	027	027	4	3B	117	28	99	23	2				WE	3B	SND LENS	
29	SJ76505360	PGR	SW	01	033	042	4	3B	128	39	105	29	1				WE	3B		
30	SJ76605360	PGR	SE	03	037		1	1	107	18	86	10	2				DR	2		
31	SJ76705360	PGR	SW	03	055		1	1	171	82	116	40	1					1		

SAMPLE NO.	GRID REF	USE	ASPECT	GRDNT	GLEY	SPL	WETNESS CLASS	WETNESS GRADE	WHEAT AP	WHEAT MB	POTS AP	POTS MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS	
32	SJ76805360	PGR	SW	01			1	1	103	14	87	11	2				DR	2		
33	SJ76905360	PGR	SE	01	057		1	1	119	30	104	28	1					1		NEARLY 2
34	SJ77005360	PGR	SE	02	033	100	1	1	136	47	101	25	1					1		
35	SJ77105360	PGR	W	01	035	068	3	3A	128	39	110	34	1				WE	3A		
36	SJ77205360	PGR	W	01	065	065	2	2	139	50	117	41	1				WE	2		NEARLY 3A
37	SJ76505350	PGR	S		026	048	4	3B	000	0	000	0					WE	3B	WET SITE	
38	SJ76605350	PGR	S	01	024		4	3B	103	14	85	9	2				WE	3B	WET SITE	
39	SJ76705350	PGR	SE	03			1	1	84	-5	67	-9	3A				DR	3A		
39A	SJ76715343	PGR	S		000		4	3B	38	-51	38	-38	4				WE	3B	CHK ORGS.	POOR DRAIN
40	SJ76805350	PGR	S	08			1	1	119	30	104	28	1				GR	3B		
41	SJ76905350	PGR	S	08	035		1	1	77	-12	64	-12	3A				GR	3B	CLY NODS	
42	SJ77005350	PGR	S	08			1	1	80	-9	63	-13	3A				GR	3B		
43	SJ77105350	PGR					1	1	76	-13	59	-17	3A				DR	3A		
44	SJ77205350	PGR			035	075	3	3A	126	37	110	34	1				WE	3A		NEARLY 2