LEOMINSTER WEST

AGRICULTURAL LAND CLASSIFICATION SURVEY

CONTENTS

BRISTOL 34/99

LEOMINSTER WEST

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SUMMARY

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 101.5 ha of land in the west of Leominster. The area was surveyed as two blocks, Cursneh Hill and Leominster West. The findings of the two surveys have been combined into this single report, Leominster West. Field survey was based on 95 auger borings and 6 soil profile pits, and was completed in August 1999. During the survey 7 samples were analysed for particle size distribution (PSD).

2. The survey was conducted by the Resource Planning Team of FRCA Western Region on behalf of MAFF in its statutory role in the preparation of Herefordshire Plan.

3. Information on climate, geology and soils, and from previous ALC surveys was considered. Apart from the published regional ALC map (MAFF 1977), which shows the site at a reconnaissance scale as Grade 4 along the small brook in the north, Grade 3 around Cursneh Hill and Grade 2 elsewhere, only part of the site had been previously surveyed in 1986 at a scale of 1:10 000 (ADAS 1986). The current survey uses the Revised Guidelines and Criteria for grading the quality of agricultural land (MAFF, 1988) and supersedes any previous ALC survey. Grade descriptions are summarised in Appendix I.

4. Adjacent areas had been surveyed in 1995 and 1996. To the west Grades 1, 2, 3a and 3b are found (ADAS 1995). The main limitation to the better land is droughtiness and to the 3b land soil wetness and gradient. Land to the north and east of the southern block was surveyed in 1996 (ADAS 1996a, ADAS 1996b). This also showed a mix of grades with similar limitations. Land along Ginhall Lane was also surveyed in 1996 (ADAS 1996c, ADAS 1996d) and the findings of these surveys have been incorporated into the current survey. Similar soils to those found in the earlier surveys are present in the current survey areas.

5. At the time of survey land cover was mainly pasture with some arable cropping. Other land not surveyed included an electricity sub-station, farm buildings and residential areas.

6. The distribution of ALC grades is shown on the accompanying 1:10 000 scale ALC map. The detail of information shown at this scale is appropriate to the intensity of field survey but could be misleading if enlarged or applied to small areas. Areas are summarised in the Table 1.

7. Over half of the survey area has been mapped as Grade 1, excellent quality land These soils are well drained and not droughty. The land mapped as Grade 2 and Subgrade 3a is less well drained but still represent best and most versatile land. One quarter of the site is mapped as Subgrade 3b and these soils have a moderate wetness limitation imposed by slowly permeable subsoils. Small areas are downgraded by gradient to Subgrade 3b, Grade 4 and 5.

Table 1: Distribution of ALC grades: Leominster West

Grade	Area (ha)	% Surveyed Area (85.0 ha)
1	42.7	50
2	1.7	2
3a	17.9	21
3b	20.9	25
4	1.1	1
5	0.7	1
Other land	16.5	
Total site area	101.5	

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November 1999

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CLIMATE

8. Estimates of climatic variables for this site were derived from the published agricultural climate dataset "Climatological Data for Agricultural Land Classification" (Meteorological Office, 1989) using standard interpolation procedures. Data for key points around the site are given in Table 2 below.

9. Since the ALC grade of land is determined by the most limiting factor present, overall climate is considered first because it can have an overriding influence by restricting land to a lower grade despite more favourable site and soil conditions. Parameters used for assessing overall climate are accumulated temperature, a measure of relative warmth and average annual rainfall, a measure of overall wetness. The results shown in Table 2 indicate that there is no overall climatic limitation.

Table 2: Climatic Interpolations: Leominster West

Grid Reference		SO 473 592	SO 480 583	SO 486 594
Altitude (m)		80	90	82
Accumulated Temperature (day °C)		1423	1412	1420
Average Annual Rainfall (mm)		741	743	741
Overall Climatic Grade		1	1	1
Field Capacity Days		169	169	168
Moisture deficit (mm):	Wheat	100	99	100
	Potatoes	90	88	90

10. Climatic variables also affect the ALC grade through interactions with soil conditions. The most important interactive variables are Field Capacity Days (FCD) which are used in assessing soil wetness and potential Moisture Deficits calculated for wheat and potatoes, which are compared with the moisture available in each profile in assessing soil droughtiness limitations. These are described in later sections.

RELIEF

11. Altitude ranges from 72 metres along the Kenwater to 108 metres at Cursneh Hill with moderate to steep slopes which in places limits the ALC grade to Subgrade 3b, Grade 4 or Grade 5 mainly around Cursneh Hill.

GEOLOGY AND SOILS

12. The underlying geology of the site is shown on the published geology map (BGS, 1989) as mainly Silurian Raglan Mudstone Formation interspersed with beds of brown or greenish grey calcareous sandstone over most of the site, with a band of Quaternary Till to the west. To the west and east of the site there are also smaller areas of Quaternary Head material. No information at 1:50 000 scale is available for the northern part of the site. However the smaller scale BGS Mid Wales-Marches 1:250 000 Sheet solid geology 1990, shows the whole area as Silurian Downtonian Formations such as Raglan Mudstone Formation therefore it is assumed that this dominates the solid geology across the whole site. The distribution of soils found during the recent survey does not seem to be closely linked to the underlying geology except that the Mudstone formation was evident in some profiles at depth.

13. Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW 1983) as mainly Escrick 1 with a small area of Bromyard south of Ginhall Lane and a larger area of Conway north of Wegnalls Farm.

14. Escrick 1 soils are described as deep well drained reddish coarse loamy soil, with some similar soils having slowly permeable subsoils and slight seasonal waterlogging. The Conway association soils are described as deep stoneless fine silty and clayey soils variably affected by groundwater. Published brief descriptions of typical soil profiles show that these soils can have slowly permeable characteristics. Bromyard association soils are described as deep well drained reddish fine silty soils over shale and siltstone, although these soils are also associated with soils which have slowly permeable subsoils and slight seasonal waterlogging. These soils are also associated with some well drained coarse loamy soils over sandstone.

15. The distribution of the Conway soil association roughly follows the distribution of the Subgrade 3b soils found in the current survey matching the description of the slowly permeable soils found in this mapping unit. The distribution of the Escrick 1 soil association mainly matches the Grade 1 units being well drained reddish loamy soils. There are variations in these soils around Wegnalls Farm and in the southern site, where some poorer soils are found.

AGRICULTURAL LAND CLASSIFICATION

16. The distribution of ALC grades found by the current survey is shown on the accompanying 1:10 000 scale map and areas are summarised in Table 1. The detail of information shown at this scale is appropriate to the intensity of field survey but could be misleading if enlarged or applied to small areas.

Grade 1

17. Half of the survey area has been mapped as Grade 1, excellent quality agricultural land. The soils examined are deep and well drained being assessed as Wetness Class I (see Appendix II) with no droughtiness limitation. Pits 1 and 2 (Cursneh Hill site) and Pits 2 and 3 (Leominster West site) are characteristic of this mapping unit.

18. Pit 1 represents soil profiles that typically comprise silty clay loam or medium clay loam topsoils over medium to heavy clay loam upper subsoils over clay lower subsoils. Dry clayey weathering mudstone was found at depth in some places, however this material was thought to be rootable and therefore not limiting so these profiles were still assessed as Grade 1.

19. Pit 2 (Cursneh Hill site) represents soil profiles that typically comprise silty loam topsoils over silty loam and fine sandy silt loam subsoils.

20. Within the Grade 1 mapping unit a few isolated Grade 2 borings were found with a minor workability limitation due to a heavy clay loam topsoil texture. In addition to this a minor wetness limitation was found at Boring 2 and a minor drought limitation was found at Boring 8 (both Cursneh Hill site).

21. Pit 2 (Leominster West site) shows that despite some mottling in profiles in this area the soils are well drained, Wetness Class I and do not experience a droughtiness limitation despite the presence of a few stones in the profile. Pit 3 (Leominster West) shows the presence of manganese in the profiles but again the profile is assessed as Wetness Class I, Grade 1.

Grade 2

22. A small area of Grade 2 has been mapped in the southern block. Here soils are similar to those found on the adjacent site to the north (ADAS 1996a) which have slowly permeable layers in the lower subsoils with mottling above. In the current survey the soils appeared to be slightly better drained and were assessed as Grade 1, but are included in the Grade 2 unit to the north being more similar to these soils than the Subgrade 3a soils to the south.

Subgrade 3a

23. Two areas of Subgrade 3a have been mapped. In the south the soils have a moderate wetness limitation. Here the topsoils are typically have medium clay loam or medium silty clay loam topsoils over heavier subsoils. The soils are gleyed with 40 cm with slowly permeable lower subsoils. The soils are assessed as Wetness Class III, Subgrade 3a. This

ties in with the adjacent survey (ADAS 1996b) which also shows Subgrade 3a soils limited by a moderate wetness limitation.

24. The northern block of Subgrade 3a also has a moderate wetness limitation but here the evidence of wetness is less pronounced, with generally only manganese present in the red soils. Pit 1 (ADAS 1996c) showed that the subsoil clay was a slowly permeable layer. The borings within this unit although variable are generally assessed as Wetness Class III, having medium clay loam topsoils, Subgrade 3a.

Subgrade 3b

25. Most of the area mapped as Subgrade 3b was found to be limited by wetness. Typically the profiles examined had heavy clay loam or medium clay loam topsoils over clay subsoils. The clay subsoils were found to be gleyed above 40 cm and slowly permeable starting above 45 cm and therefore assessed as Wetness Class IV. Pit 3 (Cursneh Hill site) and Pit 1 (Leominster West site) represent this mapping unit. The soils towards the east of this mapping unit are better, with lighter topsoils. There is some irregular topography including some slopes over 7 degrees at the eastern end which has been downgraded to Subgrade 3b.

26. The main area of Subgrade 3b was to the east. Nonetheless to the far west of the site a distinct area with moderate wetness limitation was found. Although a mixture of grades was found in three borings it was thought appropriate to map the area as Subgrade 3b. Two of the three borings (27 & 28, Cursneh Hill site) displayed slowly permeable clay subsoil characteristics as well as gleying, placing them in Wetness Class IV and III respectively, however it was thought that although boring 26 displayed gleying it did not have a slowly permeable layer. This area tied in with the Subgrade 3b area on the adjacent Barons Cross survey (ADAS 1995).

27. Other land shown as Subgrade 3b was found to be limited by gradient with slopes between 7 and 11 degrees.

28. It should be noted that a small area around the electricity sub-station was found to be marshy. However this is reported to be a recent problem caused by the building of houses south of Ginhall Lane and the land owner is about to undertake a drainage project that should relieve the problem.

Grade 4

29. The area shown as Grade 4 was found to be limited by gradient with slopes between 11 and 18 degrees.

Grade 5

30. The area shown as Grade 5 was found to be limited by gradient with slopes greater than 18 degrees

Edge mapping

31. The previous survey at Barons Cross (ADAS 1995) has graded the land as Grade 2, Subgrade 3a and 3b opposite Cholstrey Road. The small area of Subgrade 3b is downgraded due to a moderate wetness limitation. The current survey also found a moderate wetness limitation of Subgrade 3b which ties in well with the previous survey. The areas mapped as Grade 2 and 3a were limited by soils droughtiness. Further investigation in this area in the light of the findings of the current survey has shown that the droughtiness limitation is not as severe as thought in the area mapped as Grade 2 and this has been upgraded to Grade 1. The soils are similar to those found on the current site. The Subgrade 3a soils were more droughty than the Grade 1 soils to the east.

32. Land to the east of the southern block was surveyed in 1996 (ADAS 1996b). Reassessment of the boring data for the area adjacent to the current survey showed that the droughtiness assessment had been too severe and that this area could be Grade 1 as found on part of the current survey.

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November 1999

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APPENDIX I

DESCRIPTION OF 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 include 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 most 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.

Source: MAFF (1988) Agricultural Land Classification of England and Wales Revised Guidelines and Criteria for Grading the Quality of Agricultural Land, MAFF Publications, Alnwick.

APPENDIX II

DEFINITION OF SOIL WETNESS CLASSES

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile.

Wetness Class I

The soil profile is not wet within 70 cm depth for more than 30 days in most years.

Wetness Class II

The soil profile is wet within 70 cm depth for 31-90 days in most years or, if there is no slowly permeable layer within 80 cm depth, it is wet within 70 cm for more than 90 days, but not wet within 40 cm depth for more than 30 days in most years.

Wetness Class III

The soil profile is wet within 70 cm depth for 91-180 days in most years or, if there is no slowly permeable layer within 80 cm depth, it is wet within 70 cm for more than 180 days, but only wet within 40 cm depth for between 31 and 90 days in most years.

Wetness Class IV

The soil profile is wet within 70 cm depth for more than 180 days but not within 40 cm depth for more than 210 days in most years or, if there is no slowly permeable layer within 80 cm depth, it is wet within 40 cm depth for 91-210 days in most years.

Wetness Class V

The soil profile is wet within 40 cm depth for 211-335 days in most years.

Wetness Class VI

The soil profile is wet within 40 cm depth for more than 335 days in most years.

Notes: The number of days specified is not necessarily a continuous period.

'In most years' is defined as more than 10 out of 20 years.

Source: Hodgson, J M (Ed) (1997) Soil Survey Field Handbook. Soil Survey Technical Monograph No 5, Silsoe.