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EXMINSTER.99

AGRICULTURAL LAND CLASSIFICATION SURVEY

CONTENTS

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INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 28 ha of land in three small sites at Exminster, Devon. Field survey was based on 25 auger borings and 2 soil profile pits, and was completed in February 1999. During the survey 2 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 Teignbridge Local Plan.

3. Information on climate, geology and soils, and from previous ALC surveys was considered and is presented in the relevant section. Apart from the published regional ALC map (MAFF 1977), which shows the site at a reconnaissance scale as mainly Grades 1 and 2 the site had not been surveyed previously. 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. Two previous surveys on land nearby and on similar parent materials to the current survey site (ADAS 1986 Ref: DV36 and ADAS 1987 Ref: DV35) both show mainly Grade 1, although both these surveys were carried out to Guidelines for the Classification of Agricultural Land which have now been superseded. The 1987 survey on land off Deepway Lane was the subject of a public enquiry in 1987 where the major point of technical interest related to the assessment of droughtiness at the site as the criteria and methodology for droughtiness assessment were under review at that time. A more recent survey (ADAS 1993) was carried out using the current guidelines on two other sites within the village, also on similar parent materials to the current survey but found mainly Subgrade 3b limited by droughtiness. However, it should be noted that this survey was somewhat restricted because many of the auger borings were found to be impenetrable at the time and the one soil profile pit was sited in the area underlain by soft sandstone deposits. These are largely stone free but have limited reserves of water available in the profile because of the light soil textures found, which become increasingly sandy with depth. By contrast the main site within the current survey area is underlain by breccia deposits which tend to give rise to more loamy textures throughout the soil profile but with considerably greater stone content which is main cause of any droughtiness limitation.

5. At the time of survey the large site was used mainly for a horticultural enterprise associated with the hospital, whereas the two small sites were under permanent grass. The small areas of other land which were not surveyed were mainly horticultural glasshouses and associated offices, with small areas of residential land.

SUMMARY

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.

Table 1: Distribution of ALC grades: Exminster 99

Grade	Area (ha)	% Surveyed Area (25 ha)
3a	22	88
4	3	12
Other land	3	
Total site area	28	

7. This shows that 88% of the area was found to be best and most versatile, Subgrade 3a limited mainly by droughtiness but with several borings on the edge of the floodplain in the lower sites limited by restricted workability. Small areas of Grade 4 limited mainly by wetness were identified at the eastern edge of the two lower sites.

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.

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.

Table 2: Climatic Interpolations: Exminster 99

Grid Reference		SX 948877	SX 934881
Altitude (m)		5	65
Accumulated Temperature (day °C)		1596	1527
Average Annual Rainfall (mm)		849	900
Overall Climatic Grade		1	1
Field Capacity Days		177	185
Moisture deficit (mm):	Wheat	111	101
	Potatoes	106	93

RELIEF

11. Altitude ranges from around 5 m at the eastern edge of the site to around 65 m at the western edge above the hospital with gentle and moderate slopes which are not limiting.

12. There may be a limitation due to the risk of flooding in lowest parts of the site but this will be restricted to the area shown as Grade 4 which is lower lying than that shown as Subgrade 3a and the limitation due to the risk of flooding is unlikely to be the primary limitation in this area.

GEOLOGY AND SOILS

13. The underlying geology of the site is shown on the published geology map (IGS, 1986) as mainly Permian breccia and conglomerate with alluvium in the floodplain and a small area of Lower Sandstone just showing at the edge of the more northerly small site. This was largely confirmed by current survey although the drier parent materials which lie slightly above the floodplain in the two smaller sites were found to be variable both in relation to stone content and in relation to topsoil texture which frequently was found to be heavy clay loam , perhaps influenced by its proximity to the alluvial floodplain. Also, the limits of the poorly drained alluvium may not be exactly as shown on the published geology map.

14. Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW 1983) as mainly Crediton association on the higher ground with small areas of Bridgnorth association showing in the two smaller sites with Wallasea 1 association shown on the alluvial deposits of the northern smaller site. This distribution is based on the earlier more detailed soils information which is shown in the one inch scale survey of soils of the Exeter District (SSEW 1972) which shows Credition and Bridgnorth series and Exminister series in the area later shown as Wallasea 1 Association.

15. Crediton association is described as comprising well drained gritty reddish loamy soils over breccia, locally less stony and with steep slopes in places. Bridgnorth association is described as comprising well-drained sandy and coarse loamy soils over soft sandstone with occasional deeper soils and the risk of water and wind erosion. Wallasea 1 association is described as deep stoneless non calcareous and calcareous clayey soils, locally with humose or peaty surface horizons, found on flat land with groundwater controlled by ditches and

pumps. This was largely borne out by the current ALC survey, although the area shown as Bridgnorth association in the two lower sites was found to be variable with many heavier profiles not typical of the Bridgnorth series. Also, the area of poorly drained soils of the Exminster series or Wallasea 1 association was found to be significantly less than that shown on the published maps.

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.

Subgrade 3a

17. The area shown as Subgrade 3a in the largest site to the west of the hospital buildings was consistently found to have medium sandy loam topsoil at Wetness Class I as illustrated by Pits 1 and 2. Auger borings in the area indicated limited variability in the soil profiles examined both in respect of texture and stone content, although several borings were found to be impenetrable at around 45 to 65 cm. Perhaps the lightest textures were found in borings in the north west of the site with somewhat lower stone contents in the south east of this site. However stone contents at both pits were assessed by measurement for each soil horizon and were found to range from 20 - 25% in the topsoil to 28 - 47% in the lower subsoil, all mainly small stones less than 2 cm.

18. The areas of Subgrade 3a in the two smaller sites were found to be more variable, frequently with heavy clay loam topsoil, at least in the northern site, but generally Wetness Class I or occasionally Wetness Class II despite the appearance of gleying at several auger borings. Although the northern site appears to be generally low lying, closer inspection reveals a slight but significant distinction in elevation with the area shown as Subgrade 3a raised slightly above the level of the lower lying floodplain which is shown as Grade 4.

Grade 4

19. The small areas of Grade 4 represent the edge of the poorly drained floodplain. Profiles in this area were found to have clay or heavy clay loam topsoil, typically at Wetness Class IV with gleying evident within 40 cm or even from the surface with a distinct clay slowly permeable layer starting within the upper subsoil. This indicates a severe primary limitation due to wetness but it is within this area that there may also be a secondary limitation due the risk of flooding. However this was not investigated in any detail.

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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.