8 FCS 6398

55/94

AGRICULTURAL LAND CLASSIFICATION INCORPORATING PHYSICAL CHARACTERISTICS

LAND AT GREEN ACRE FARM, WINTERBOURNE

REPORT OF SURVEY

1. SUMMARY

The site, an area of 2.4 hectares of land adjacent to the M4 near Winterbourne was graded using the Agricultural Land Classification (ALC) system in May 1994. The survey was carried out on behalf of MAFF as part of its Statutory Role in the consultation with Avon County Council regarding an ad hoc application for the construction of a motorway screen using inert waste.

Information on climate, soils, geology and previous ALC surveys is referred to in the course of this report.

The fieldwork was carried out by ADAS (Resource Planning Team, Taunton Statutory Unit) at a scale of 1:10,000. The information is correct at this scale but could be misleading if enlarged. A total of 5 auger borings and a soil profile pit was examined. The entire site is graded 3a as illustrated on the accompanying map.

The site occupies a single field used for horse grazing. The soils are slightly variable, but typically comprise medium sandy loam topsoils over sandy clay loam upper subsoils. A clay lower subsoil occurs at variable depths and imposes a moderate wetness limitation.

2. INTRODUCTION

An area of 2.4 hectares of land adjacent to the M4 near Winterbourne, was surveyed on behalf of MAFF as part of its statutory role in the consultation with Avon County Council regarding and ad hoc planning application to Avon County Council. The survey was carried out in May 1994 by ADAS (Resource Planning Team, Taunton Statutory Unit) using the Agricultural Land Classification (ALC) system and conducted at a scale of 1:10,000 (approximately one sample point for every hectare of agricultural land). The 5 borings were supplemented by 1 soil inspection pit used to assess subsoil conditions. The information is correct at the scale shown but could be misleading if enlarged.

The published provisional 1" to the mile ALC map of the area (MAFF, 1971) shows all the land to be Grade 3. A survey of land north of Bristol carried out in 1982 at a scale of 1:25,000 included Green Acres Farm. This survey showed the land to be Grade 2 under the original guidelines.

The current survey supersedes any previous work and was undertaken to provide a more detailed representation of the agricultural land quality using the Revised Guidelines and Criteria (MAFF, 1988). These guidelines provide a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on the agricultural use. The grading takes account of the top 120 cm of the soil profile. A description of the grades used in the ALC system can be found in Appendix 2.

3. CLIMATE

The grade of the land is determined by the most limiting factor present. The overall climate is considered first because it can have an overriding influence on restricting land to lower grades despite other favourable conditions.

Climatic data for the site was interpolated from the published agricultural climate dataset (Meteorological Office, 1989). The parameters used for assessing climate are accumulated temperature (a measure of the relative warmth of a locality) and average annual rainfall (a measure of overall wetness). The results shown in Table 1 indicate that there is no overall climatic limitation.

Climatic data on Field Capacity Days (FCD) and moisture deficits for wheat (MDW) and potatoes (MDP) are also shown. This data is used in assessing the soil wetness and droughtiness limitations referred to in Section 6. No local climatic factors such as exposure were noted in the survey area. A description of the Soil Wetness classes used is included in Appendix 3.

Table 1 Climatic interpolations: Green Acres Farm

Grid Reference		ST 637 806
Height (m)		45
Accumulated Temperature (day°)		1493
Average Annual Rainfall (mm)		765
Overall Climatic Grade		1
Field Capacity (days)		171
Moisture deficit:	Wheat (mm)	101
	Potatoes (mm)	92

4. RELIEF AND LANDCOVER

The site occupies a gently sloping field at approximately 45 m AOD. Its present use is permanent grazing for horses.

5. GEOLOGY AND SOILS

The published 1:50,000 scale solid and drift geology map, sheet (Geological Survey of England and Wales, 1971), shows all of the site to comprise First Terrace river gravels with some Keuper Marl in the South east corner.

The soil survey of England and Wales mapped the soils in the area in 1983 at a reconnaissance scale of 1:250,000. This map shows soils to comprise the Wimple 3 Association. These soils are described as seasonally waterlogged reddish fine loamy or fine silty over slowly permeable subsoils.

The recent survey found similar soils to the mapped association comprising medium sand loam topsoils over clay loam upper subsoils over red clay at variable depths. The clay subsoils occur at slightly shallower depths at the bottom of the slope.

6. AGRICULTURAL LAND CLASSIFICATION

All the land has been graded 3a as shown on the accompanying map. The clay lower subsoil is gleyed and slowly permeable from approximately 60 cm. The topsoil texture, prevailing FC Days and wetness assessment (Wetness Class III) impose a moderate wetness limitation of 3a.

7. SOIL RESOURCES

Topsoil

Topsoil is defined as the organic-rich surface horizon. Topsoils across the whole site can be treated as one soil handling unit of medium sandy loam to a depth of 30 cm. Within this unit slightly heavier, sandy clay loam topsoils occur at the

bottom of the slope. The stone content is negligible in this horizon. The topsoil is well rooted and porous with a moderately developed course sub-angular blocky structure. Peds have a firm consistence and a compacted surface structure to approximately 15 cm. A total topsoil resource of 7200 m^3 is available.

Subsoil

Subsoil is defined as the less organic-rich lower horizon. The subsoils across this site can be handled as 2 units: upper and lower subsoils. The sandy clay loam upper subsoils only occur in map unit 1. These soils comprise well rooted, porous soils with a moderately developed course subangular blocky structure to a depth of approximately 60 cm. A total upper subsoil resource in Map Unit 1 of 4500 m^3 is available.

The lower subsoils of map unit 1 and the entire depth of subsoils to 120 cm in map unit II can be stripped and stored together but should be kept separate from subsoil handling unit described above. These red clay subsoils are non calcareous and stone free with variable, although generally low porosity and a weakly developed course subangular blocky structure. These soils are firm in consistence, and contain few roots to depth.

A total lower subsoil resource of 9000 m^3 is available in map unit 1 and a further 5400 m^3 of clay subsoils in map unit II.

APPENDIX 1

REFERENCES

GEOLOGICAL SURVEY OF ENGLAND AND WALES, 1971, Solid and Drift edition, sheet 264, Bristol, 1:50,000 scale

MAFF (1971), Agricultural Land Classification Map, sheet 155, Provisional 1:63,360 scale

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

METEOROLOGICAL OFFICE (1989), published climatic data extracted from the agroclimatic dataset, compiled by the Meteorological Office

SOIL SURVEY OF ENGLAND AND WALES (1983), sheet 5, Soils of South-west England, 1:250,000 scale

APPENDIX 2

DESCRIPTION OF ALC 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.

Descriptions of other land categories used on ALC maps

Urban

Built-up or 'hard' uses with relatively little potential for a return to agriculture including: housing, industry, commerce, education, transport, religious buildings, cemeteries. Also, hard-surfaced sports facilities, permanent caravan sites and vacant land; all types of derelict land, including mineral workings which are only likely to be reclaimed using derelict land grants.

Non-agricultural

'Soft' uses where most of the land could be returned relatively easily to agriculture, including: private park land, public open spaces, sports fields, allotments and soft-surfaced areas on airports/airfields. Also active mineral workings and refuse tips where restoration conditions to 'soft' after-uses may apply.

Agricultural buildings

Includes the normal range of agricultural buildings as well as other relatively permanent structures such as glasshouses. Temporary structures (eg polythene tunnels erected for lambing) may be ignored.

Open water

Includes lakes, ponds and rivers as map scale permits.

Land not surveyed

Agricultural land which has not been surveyed.

Where the land use includes more than one of the above landcover types, eg buildings in large grounds, and where may be shown separately. Otherwise, the most extensive cover type will usually be shown.

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

APPENDIX 3

DEFINITION OF SOIL WETNESS CLASSES

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 (in preparation) Soil Survey Field Handbook (revised edition).

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Materials and Volumes

MAP UNIT	AVERAGE DEPTH (m)	AREA (ha)	SOILS	STONES	VOLUME (m^3)
I	0-30	2.4	MSL	Negligible	7200
I	30-60	1.5	SCL	Negligible	4500
I	60-120	1.5	C	Negligible	9000
II	30-120	0.9	C	Negligible	5400
					14400

Abbreviations

MSL - Medium clay loam
SCL - Sandy clay loam
C - Clay

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Green Acres Farm Winterbourne	Pit 1	2° East	Permanent Pasture	Av Rainfall: 765 mm ATO: 1493 day °C	First Terrace River Gravel
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY	FC Days: 191 Climatic Grade: 1 Exposure Grade: 1	SOIL SAMPLE REFERENCES
55/94	11/5/94	ASP 4	N A Done		

Horizon No.	Lowest Av. Depth (cm)	Texture	Matrix (Ped Face) Colours	Stoniness: Size,Type, and Field Method	Mottling Abundance, Contrast, Size and Colour	Mangan Concs	Structure: Ped Development Size and Shape	Consistence	Structural Condition	Pores (Fissures)	Roots: Abundance and Size	Calcium Carbonate Content	Horizon Boundary: Distinctness and form
1	27	MSL	10YR43	0	-	None	MDCSAB	Firm	-	Porous	Many fine + v. fine	-	Gradual/ smooth
2	60	SCL	75YR54	0	10YR53 few pale	Few	MDCSAB	Friable	M	V Porous	Many	-	Gradual/ smooth
3	120	C	10YR53+ 05Y46	0	CDPM + red 25Y62	Many	WDCSAB	Firm	P	<0.5% (some earthworm channels)	Few	-	

Profile Gleyed From: 60

Depth to Slowly Permeable Horizon: 60

Wetness Class: III

Wetness Grade: 3a

Available Water Wheat: 132 mm

Potatoes: 108 mm

Moisture Deficit Wheat: 101 mm

Potatoes: 92 mm

Moisture Balance Wheat: +31 mm

Potatoes: +16 mm

Droughtiness Grade: 1 (Calculated to 120 cm)

Final ALC Grade: 3a

Main Limiting Factor(s): Wetness

Remarks:

NL336