AGRICULTURAL LAND CLASSIFICATION

COTSWOLD DISTRICT LOCAL PLAN

Report of survey

CONTENTS

COTSWOLD DISTRICT LOCAL PLAN

AGRICULTURAL LAND CLASSIFICATION

Report of Survey

1. SUMMARY

Land at Chipping Campden, Stow-on-the-Wold, Cirencester and Tetbury was graded using the Agricultural Land Classification (ALC) system in April 1994. The survey was carried out on behalf of MAFF as part of its statutory role in the consultation with the Cotswold District Council regarding the Cotswold District Local Plan amendments.

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 at a scale of 1:10,000 providing information correct at this scale but could be misleading if enlarged. The distribution of ALC grades identified in the survey area at each of the 4 towns is detailed below and illustrated on the accompanying map.

Distribution of ALC grades: Chipping Campden

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
3b	0.7	34.2	100	
Urban	1.0	41.6		
Non-agricultural	0.7	34.2		
TOTAL	2.4	100%	100%	(0.7ha)

Nearly all the site comprises buildings associated with Castle Nurseries with only a very small area of agricultural land.

Distribution of ALC grades: Stow-on-the-Wold

Grade	Area (ha)	% of Survey Area	% of Agricultural Land
3a	9.9	100%	100%

Both sites have been graded 3a with a moderate drought limitation imposed by the shallow clayey soils.

Distribution of ALC grades: Cirencester

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
3a	4.5	16.9	19.1	
3b	13.8	51.9	58.4	
4	5.3	20.0	22.5	
Non-agricultural	3.0	11.2		
TOTAL	26.6	100%	100%	(23.6 ha)

The majority of the land at Cirencester experiences a moderately severe wetness limitation, however a small area of best and most versatile land was found in the northern site.

Distribution of ALC grades: Tetbury

Grade	Area (ha)	% of Survey Area	% of Agricultural Land
3b	4.6	100%	100%

All the agricultural land surveyed experiences a moderately severe workability limitation.

2. INTRODUCTION

Land at Chipping Campden (2.4 ha), Stow-on-the-Wold (9.9 ha), Cirencester (26.6 ha) and Tetbury (4.6 ha) was surveyed on behalf of MAFF as part of its statutory role in the consultation with the Cotswold District Council regarding the amendment sites for the Cotswold District Local Plan. The survey was carried out in April 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 41 borings were supplemented by 3 soil inspection pits and were used to assess subsoil conditions. The information is correct at the scale shown but any enlargement could be misleading.

A description of the published soils, geology and ALC information is included in a section for each town as well as a description of any previous ALC survey information.

The current surveys supersedes any previous work and were 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 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 as it can have an overriding influence on restricting land to lower grades despite other favourable conditions.

Climatic data for each 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 for three of the sites but a Grade 2 limitation for all the land over 168 m AOD at Stow-on-the-Wold.

Climatic data on Field Capacity Days (FCD) and Moisture Deficits for wheat (MDW) and potatoes (MDP) are also shown. These data are 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

	Chipping Campden	*Stow-on-the-Wold*	*Cirencester*	*Tetbury*
Grid Reference	SP 163 394	SP 201 257	SP 036 026	ST 886 934
Altitude (m)	124	190	129	115
Accumulated Temperature (day °)	1366	1296	1379	1402
Average Annual Rainfall (mm)	701	750	814	882
Overall Climatic Grade	1	2	1	1
Field Capacity (days)	160	171	187	195
Moisture deficit: Wheat (mm)	98	83	91	85
Potatoes (mm)	86	69	78	71

4. CHIPPING CAMPDEN

4.1 Nearly all the land at Chipping Campden comprises a garden centre and irrigation pond. The 0.7 ha of agricultural land was used for small scale top fruits at the time of survey. The published provisional 1" to the mile ALC map of the area (MAFF, 1972) shows the land to be urban.

4.2 Geology and Soils

The published 1:50,000 scale solid and drift geology map, sheet 217 (Geological Survey of England and Wales, 1974), shows nearly all of the site to comprise Jurassic Middle Lias which is mainly clays. This is overlain by a narrow strip of recent alluvium along the southern part of the Nurseries..

The Soil Survey of England and Wales mapped the soils in 1983 at a reconnaissance scale of 1:250,000. This map shows soils to comprise the Oxpasture Association which is described as fine loamy over clayey and clayey soils with slowly permeable subsoils and slight seasonal waterlogging.

The recent survey found similar soils to the association described with heavy clay loam topsoils and clay subsoils.

4.3 Agricultural Land Classification

All the agricultural land (0.7 ha) was found to be Subgrade 3b as shown on the accompanying ALC map. The combination of topsoil texture and slowly permeable subsoils places the soil into Wetness Class III and Grade 3b with a workability limitation. The map at the end of this report showing this Grade is correct at this scale ,but any enlargement would be misleading.

5. STOW-ON-THE-WOLD

5.1 The larger (7.3 ha) of the two sites at Stow-on-the-Wold, to the west of the town, was in arable cultivation at the time of survey, whilst the smaller site (2.5 ha) was used for horse grazing. Both sites are shown as Grade 3 on the published provisional 1" to the mile ALC maps (MAFF, 1972).

5.2 Geology and Soils

The published 1:50,000 scale solid and drift geology map, sheet 27 (Geological Survey of England and Wales, 1974), shows the western site to comprise bands of Upper Lias and Oolitic limestone all from the Jurassic period. The southern site is underlain by Chipping Norton limestone from the same period.

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 Elmton 1 Association which is described as shallow well drained brashy calcareous fine loamy soils over limestone.

The recent survey found similar soils to these, comprising shallow heavy clay loam topsoils over very stony (50% limestone) clayey subsoils. Below 60 cm depth limestone rock is found.

5.3 Agricultural Land Classification

All the agricultural land was found to be Subgrade 3a. The very stony subsoils reduce the amount of soil available for moisture retention, thus imposing a moderate drought limitation. The map at the end of this report showing this Grade is correct at this scale ,but any enlargement could be misleading.

6. CIRENCESTER

6.1 The site to the north of Cirencester occupies an undulating area of approximately 125 m AOD and all the agricultural land was under set aside at the time of survey. The southern site falls from approximately 115 m AOD to the lowest part on the southern tip of the site which is 104 m AOD. The agricultural land was used for winter cereals and grass leys at the time of survey. Both sites are shown as Grade 3 on the published provisional 1" to the mile ALC maps (MAFF, 1973). A survey of the area was completed in 1980 at a scale of 1:25,000. This survey shows most of the land to be Grade 3b with a small area of Grade 2 in the northern site and narrow strips of Grades 3a and 3c in the southern site.This information was concidered to be of insufficient detail for Local Plan purposes.

6.2 Geology and Soils

The published 1:63,360 scale drift geology map (Geological Survey of England and Wales, 1946) shows the site to comprise Middle Jurassic Forest Marble with a broad band of alluvium across the southern half of the southern site.

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 the northern site as Sherborne Association which is described as shallow well drained brashy calcareous clayey soils over limestone, associated with slowly permeable calcareous clayey soils. The southern site is mapped as Kelmscot Association which is described as calcareous fine loamy soils over gravel, variably affected by groundwater and associated with non-calcareous clayey soils over gravel.

The recent survey found similar soils to the mapped associations, the northern site comprising slightly variable soils with clay and heavy clay loam topsoils over very stony clay subsoils. Heavy clay loam topsoils and occasionally medium clay loam topsoils occur over well drained stony profiles on land adjacent to the Fosse Way.

Land at the southern site comprises well drained clayey profiles with heavy clay loam topsoils (occasional clay topsoils). The valley floor has similar soils although poorly drained subsoils. The stone contents vary across the site with approximately 25% limestone in the topsoil in localised areas on the eastern edge of the site. These overlie very stony clay subsoils (approximately 50% limestone).

6.3 Agricultural Land Classification

The distribution of ALC grades identified in the survey area is detailed in Table 2 and illustrated on the accompanying ALC map. The information is correct at the scale shown but any enlargement could be misleading.

Table 2 Distribution of ALC grades: Cirencester

Grade	Area (ha)	% of Survey Area	% of Agricultural Land	
3a	4.5	16.9	19.1	
3b	13.8	51.9	58.4	
4	5.3	20.0	22.5	
Non-agricultural	3.0	11.2		
TOTAL	26.6	100%	100%	(23.6 ha)

Subgrade 3a

A total of 4.5 ha of land has been graded 3a. These soils comprise well drained (Wetness Class I) stony profiles with heavy and occasionally medium clay loam topsoils. These soils experience a slight drought limitation although the overall limitation is workability.

Subgrade 3b

Across the 2 sites there is a total of 13.8 ha of moderate quality land. These soils relate to the clayey profiles described in paragraph 6.2. The heavy topsoil textures and the relatively high FC Days impose a moderately severe workability limitation.

Grade 4

There are 2 blocks of Grade 4 land at the southern site: the low lying land relates to the poorly drained soils (Wetness Class IV) on the alluvium, whilst the block at the top of the slopes comprises well drained Wetness Class I soils with clay topsoils which impose a severe workability limitation.

Non-agricultural Land

Two blocks of allotment gardens are mapped as non-agricultural.

7. TETBURY

7.1 The 2 grassland sites lie to the west of Tetbury, the northern one occupying a west facing slope falling from 115 m AOD to 105 m AOD, the southern site being on a level area of 111 m AOD. Both sites are shown as Grade 3 on the published provisional 1" to the mile ALC maps (MAFF, 1970).

7.2 Geology and Soils

The published 1:63,360 scale solid and drift geology map shows the sites to comprise Jurassic Shelly Limestone with a narrow strip of Forest Marble clay at the top of the slope of the northern site. The Soil Survey of England and Wales mapped the soils of the area at a reconnaissance scale of 1:250,000 in 1983. Both sites are mapped as Evesham 1 Association which is described as slowly permeable calcareous clayey soils associated with shallow well drained brashy calcareous soils over limestone. The recent survey found similar soils to these comprising heavy clay loam topsoils over slightly stony clay subsoils. The southern site had less stony subsoils which were gleyed and slowly permeable.

7.3 Agricultural Land Classification

All the agricultural land was found to be Subgrade 3b. The map at the end of this report showing this Grade is correct at this scale ,but any enlargement would be misleading. The northern site comprises clay topsoils over very stony clay subsoils. These soils experience a slight droughtiness limitation but a moderately severe workability limitation imposed by the topsoil. A small area also experiences a moderate slope limitation due to slopes of between 7 and 11°.

The southern site comprises clayey profiles with heavy clay loam topsoils. The subsoils are gleyed and slowly permeable from below 40 cm and are assessed as Wetness Class III, thus imposing a moderate wetness limitation.

APPENDIX 1

REFERENCES

GEOLOGICAL SURVEY OF ENGLAND AND WALES,

Sheet 235	Drift edition, 1946,Cirencester, 1:63,360 scale
Sheet 251	Solid and Drift, 1970, Malmesbury 1:63,360 scale
Sheet 200	Solid and Drift, 1974, Stratford Upon Avon, 1:50,000 scale
Sheet 217	Solid and Drift, Morton in the Marsh, 1:50,000 scale

MAFF Agricultural Land Classification Map, Provisional 1:63,360 scale

Sheet 156	1970
Sheet 144	1972
Sheet 157	1973

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.

Agricultural buildings

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, e.g. 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).

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Cirencester	Pit 1	5° S	Winter wheat	Av Rainfall: 778 mm ATO: 1407°C FC Days: 181 Climatic Grade: 1	Middle Jurassic Forest Marble
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCE
27/94	8/4/94	ASP 18	N A Done		

Horizon Number	Lowest Av Depth (cm)	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast, Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots: Abundance, Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and form
1	27	10YR53	C	3% >2cm 3% <2cm 6% SLST	-	-	-	-	-	Common fine + v fine	None	None	Clear/ smooth
2	80	10YR46	C	None	-	MDCSAB	V porous, mainly earthworm channels	M	Friable	Few fine	Non calc	None	Clear/ smooth
3	120	10YR53	C	None	Many DOM 10YR58	Weakly dev, adherent CSAB	<0.5%	P	Firm	Few fine	Non calc	Common	Clear/ smooth

Profile Gleyed From: 80

Depth to Slowly Permeable Horizon: 80

Wetness Class: I

Wetness Grade: 3b

Available Water	Wheat:	133 mm
	Potatoes:	113 mm
Moisture Deficit	Wheat:	95 mm
	Potatoes:	83 mm
Moisture Balance	Wheat:	38 mm
	Potatoes:	30 mm
Droughtiness Grade:		1

Final ALC Grade: 3b

Main Limiting Factor(s): Wetness

Remarks:

Pit dug to 90 cm.
Augered to 120 cm.

VP336-9

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Cirencester	Pit 2	0°	Set aside	Av Rainfall: 814 mm ATO: 1379°C FC Days: 187 Climatic Grade: 1	Middle Jurassic Forest Marble
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		SOIL SAMPLE REFERENCE
27/94	8/4/94	ASP 9 SP 037 024	N A Done		

Horizon Number	Lowest Av Depth (cm)	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast, Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots: Abundance, Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and form
1	20	25Y44	C	3% >2cm 2% <2cm 5% SLST						Common fine and v fine	Calc	None	Clear/ smooth
2	60	10YR46	C	23% >2cm 8% <2cm 31% SLST (Wet sieved)	-	WDCSAB	Well fissured	M	Friable	Common roots	Calc	None	Gradual/ smooth
3	120	75YR46	C	25% <2cm 50% >2cm 75% SLST									

Profile Gleyed From: -

Depth to Slowly Permeable Horizon: -

Wetness Class: 1

Wetness Grade: 3b

Available Water	Wheat:	94 mm
	Potatoes:	86 mm
Moisture Deficit	Wheat:	91 mm
	Potatoes:	78 mm
Moisture Balance	Wheat:	3 mm
	Potatoes:	8 mm
Droughtiness Grade:		3a

Final ALC Grade: 3b

Main Limiting Factor(s): Workability

Remarks:

Below 60 cm SLST rock.

VP336-9