Wotton Bassett, North and South

Agricultural Land Classification

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WOOTTON BASSETT NORTH AND SOUTH

AGRICULTURAL LAND CLASSIFICATION SURVEY

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AGRICULTURAL LAND CLASSIFICATION SURVEY

INTRODUCTION

1. This report presents the findings of a reconnaissance Agricultural Land Classification (ALC) survey of 312.8 ha of land in 2 sites at Wootton Bassett. Field survey was based on 67 auger borings and 5 soil profile pits, and was completed in May 1998.

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 the North Wiltshire Local Plan.

3. Information on climate, geology and soils, and from previous ALC surveys was considered and is presented in the relevant section. 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.

SUMMARY

4. The distribution of ALC grades is shown on the accompanying 1: 25 000 scale ALC maps. 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 tables below.

Table 1: Distribution of ALC grades: Wootton Bassett North

Grade	Area (ha)	% Surveyed Area (106.3 ha)
3b	106.3	100
Other land	5.5	-
Total site area	111.8	100

5. All of the area has been mapped as Subgrade 3b. The clay soils are poorly drained and have a moderate wetness limitation. There are better drained soils on the higher land at Baynards Ash, but their limited extent precludes them from being mapped at this scale. Several hectares of land at Ballards Ash has been landfilled and returned to agriculture. This land is assessed as being no better than Subgrade 3b at the current time and the condition of the soil may change over time as the land settles.

Table 2: Distribution of ALC grades: Wootton Bassett South

Grade	Area (ha)	% Surveyed Area (170.9ha)
3b	170.0	100
Agricultural land not surveyed	21.3	-
Other land	8.8	-
Total site area	201.0	100

6. All of the agricultural land is mapped as Subgrade 3b. These soils are poorly drained clays with heavy clay loam topsoils. An area in the south was not surveyed because ownership would not be established. This area is likely to comprise similar soils

CLIMATE

7. Estimates of climatic variables for each 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 sites are given in the relevant section.

8. 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 at tables 3 & 4 indicate that there is no overall climatic limitation.

9. Climatic variables also affect 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.

WOOTTON BASSETT NORTH

10. Apart from the published regional ALC map (MAFF, 1977), which shows the site at a reconnaissance scale as Grade 3 except for Grade 4 in the south west, the site had not been surveyed previously.

11. Land along the southern boundary was surveyed in 1986. This showed Subgrades 3b and 3c on poorly drained soils (ADAS, 1986). Under the Revised Guidelines these soils would be mapped as 3b.

Climate

12. The following data is taken to represent the site.

Table 3: Climatic Interpolations: Wootton Bassett North

Grid Reference		SU 054 830	SU 069 842
Altitude (m)		83	130
Accumulated Temperature (day °C)		1439	1385
Average Annual Rainfall (mm)		725	727
Overall Climatic Grade		1	1
Field Capacity Days		162	162
Moisture deficit (mm):	Wheat	103	98
	Potatoes	94	87

Relief and Landcover

13. Altitude ranges from 83 metres near Whitehall Stables to 130 metres at Baynards Ash with some steeper land over 7° below Baynards Ash Farm.

14. At the time of the survey the land was mainly grassland in the east and arable in the west.

Geology and Soils

15. The underlying geology of the site is shown on the published geology map (IGS, 1974) as mainly Jurassic Oxford Clay with Coral Rag (Upper Corallian) with Lower Corallian silt and sand in the North East. Near Whitehall stables in the south west is a small band of Coral Rag and Alluvium. The recent survey found extensive soils developed on Oxford Clay. No evidence of Coral Rag was found in the south west but it was found in the north east. However, no soils developed on silt and sand were found at the scale of survey.

16. Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW, 1983) as all Denchworth Association, except for a very small area of Sherborne Association in the North East by Baynards Ash Farm.

17. Denchworth Association is described as slowly permeable seasonally waterlogged clayey soils with similar fine loamy over clayey soils, also some fine loamy over clayey soils with only slight seasonal waterlogging and some slowly permeable calcareous clayey soils. Sherborne Association is described as shallow well drained brashy calcareous clayey soils over limestone. The soils found in the recent survey are typical of the mapped associations.

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18. The distribution of ALC grades found by the current survey is shown on the accompanying 1: 25 000 scale map and areas are summarised in Table No 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 3b

19. All of the agricultural land has been mapped as Subgrade 3b. The soils are developed on Oxford Clay and are poorly drained. The topsoils are heavy clay loams and clays lying over slowly permeable clays. The presence of the slowly permeable layers was confirmed in two soil profile pits. The soils are assessed as Wetness Class IV (See Appendix II). Part of the area at Ballards Ash had been landfilled and returned to agriculture. These areas have been included in the Subgrade 3b land in this reconnaissance scale survey. The soils at present are no better than Subgrade 3b. The condition of the replaced soil may change over time as the land settles and the grade of the land should be reassessed if the area is surveyed at a more detailed scale. On the higher land at Baynards Ash Farm soils have developed on Coral Rag. These soils are better drained but stony and have a droughtiness limitation. These soils may form part of a better soil unit to the east but the limited extent within the current survey area precludes a separate mapping unit at this scale.

Other Land

20. Land not surveyed includes farm buildings.

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21. Apart from the published regional ALC map (MAFF, 1977), which shows the site at a reconnaissance scale as Grade 3 north of the Wilts and Berks Canal and around Vale Farm in the south west with the rest as Grade 4. The site had not been surveyed previously.

22. Adjacent, poorly drained land, was mapped as mainly and Grade 4 in 1986 (ADAS, 1986).

23. The following data is taken to represent the site.

Table 4: Climatic Interpolations: Wootton Bassett South

Grid Reference		SU 087 829	SU 061 810
Altitude (m)		110	91
Accumulated Temperature (day °C)		1408	1431
Average Annual Rainfall (mm)		721	744
Overall Climatic Grade		1	1
Field Capacity Days		161	165
Moisture deficit (mm):	Wheat	100	102
	Potatoes	90	92

Relief and Landcover

24. Altitude ranges from 88 metres north of Lower Greenhill Farm to 110 metres in the north at Swindon Road. The slopes are all gentle and do not affect the grade of the land.

25. At the time of the survey the area was predominantly in grassland with some arable in the north and west.

Geology and Soils

26. The underlying geology of the site is shown on the published geology map (IGS, 1974) as Kimmeridge Clay with alluvium along the Brinkworth Brook. The soils found in the recent survey were all developed from clays.

27. Soils were mapped by the Soil Survey of England and Wales at a reconnaissance scale of 1:250 000 (SSEW, 1983) as mainly Denchworth Association, with an area of Wickham 2 in the south west block.

28. Denchworth Association is described as slowly permeable seasonally waterlogged clayey with similar fine loamy over clayey soils. Wickham 2 Association is described as slowly permeable seasonally waterlogged fine loamy over clayey, fine silty over clayey and clayey soils.

29. The soils found in the recent survey were slowly permeable soils typical of the mapped associations with little differentation seen around the site.

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30. The distribution of ALC grades found by the current survey is shown on the accompanying 1: 15 000 scale map and areas are summarised in Table No 2. 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 3b

31. All of the agricultural land surveyed is mapped as Subgrade 3b, moderate quality land. The clayey soils are slowly permeable in the subsoil as seen in three soil profile pits. The topsoil is generally heavy clay loam. The soils were assessed as Wetness Class IV, and experience a moderate wetness limitation.

Other Land

32. An area in the south was not surveyed because the ownership could not be established. It is expected that these soils would be similar to those described above. Other land included residential areas and farms.

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June 1998

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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.

APPENDIX III

ABBREVIATIONS AND TERMS USED IN SURVEY DATA

Soil pit and auger boring information collected during ALC survey is held on a computer database and is reproduced in this report. Terms used and abbreviations are set out below. These conform to definitions contained in the Soil Survey Field Handbook (Hodgson, 1997).

1. **Terms used on computer database, in order of occurrence.**

GRID REF: National 100 km grid square and 8 figure grid reference.

LAND USE: At the time of survey

WHT:	Wheat	**SBT:**	Sugar Beet	**HTH:**	Heathland
BAR:	Barley	**BRA:**	Brassicas	**BOG:**	Bog or Marsh
OAT:	Oats	**FCD:**	Fodder Crops	**DCW:**	Deciduous Wood
CER:	Cereals	**FRT:**	Soft and Top Fruit	**CFW:**	Coniferous Woodland
MZE:	Maize	**HRT:**	Horticultural Crops	**PLO:**	Ploughed
OSR:	Oilseed Rape	**LEY:**	Ley Grass	**FLW:**	Fallow (inc. Set aside)
POT:	Potatoes	**PGR:**	Permanent Pasture	**SAS:**	Set Aside (where known)
LIN:	Linseed	**RGR:**	Rough Grazing	**OTH:**	Other
BEN:	Field Beans	**SCR:**	Scrub		

GRDNT: Gradient as estimated or measured by hand-held optical clinometer.

GLEY, SPL: Depth in centimetres to gleying or slowly permeable layer.

AP (WHEAT/POTS): Crop-adjusted available water capacity.

MB (WHEAT/POTS): Moisture Balance. (Crop adjusted AP - crop potential MD)

DRT: Best grade according to soil droughtiness.

If any of the following factors are considered significant, 'Y' will be entered in the relevant column.

MREL:	Microrelief limitation	**FLOOD:**	Flood risk	**EROSN:**	Soil erosion risk
EXP:	Exposure limitation	**FROST:**	Frost prone	**DIST:**	Disturbed land
CHEM:	Chemical limitation				

LIMIT: The main limitation to land quality: The following abbreviations are used.

OC:	Overall Climate	**AE:**	Aspect	**EX:**	Exposure
FR:	Frost Risk	**GR:**	Gradient	**MR:**	Microrelief

FL:	Flood Risk	**TX:**	Topsoil Texture	**DP:**	Soil Depth
CH:	Chemical	**WE:**	Wetness	**WK:**	Workability
DR:	Drought	**ER:**	Erosion Risk	**WD:**	Soil Wetness/Droughtiness
ST:	Topsoil Stoniness				

TEXTURE: Soil texture classes are denoted by the following abbreviations:-

S:	Sand	**LS:**	Loamy Sand	**SL:**	Sandy Loam
SZL:	Sandy Silt Loam	**CL:**	Clay Loam	**ZCL**	Silty Clay Loam
ZL:	Silt Loam	**SCL:**	Sandy Clay Loam	**C:**	Clay
SC:	Sandy clay	**ZC:**	Silty clay	**OL:**	Organic Loam
P:	Peat	**SP:**	Sandy Peat	**LP:**	Loamy Peat
PL:	Peaty Loam	**PS:**	Peaty Sand	**MZ:**	Marine Light Silts

For the sand, loamy sand, sandy loam and sandy silt loam classes, the predominant size of sand fraction will be indicated by the use of the following prefixes:-

F: Fine (more than 66% of the sand less than 0.2mm)
M: Medium (less than 66% fine sand and less than 33% coarse sand)
C: Coarse (more than 33% of the sand larger than 0.6mm)

The clay loam and silty clay loam classes will be sub-divided according to the clay content: **M:** Medium (< 27% clay) **H:** heavy (27 - 35% clay)

MOTTLE COL: Mottle colour using Munsell notation.

MOTTLE ABUN: Mottle abundance, expressed as a percentage of the matrix or surface described.

F: few <2% **C:** common 2 - 20% **M:** many 20 - 40% **VM:** very many 40%+

MOTTLE CONT: *Mottle contrast*

F: faint - indistinct mottles, evident only on close inspection
D: distinct - mottles are readily seen
P: Prominent - mottling is conspicuous and one of the outstanding features of the horizon.

PED. COL: Ped face colour using Munsell notation.

GLEY: If the soil horizon is gleyed a 'Y' will appear in this column. If slightly gleyed, an 'S' will appear.

STONE LITH: Stone Lithology - One of the following is used.

HR:	All hard rocks and stones	**SLST:**	Soft oolitic or dolimitic limestone

CH:	Chalk	**FSST:**	Soft, fine grained sandstone
ZR:	Soft, argillaceous, or silty rocks	**GH:**	Gravel with non-porous (hard) stones
MSST:	Soft, medium grained sandstone	**GS:**	Gravel with porous (soft) stones
SI:	Soft weathered igneous or metamorphic rock		

Stone contents are given in % by volume for sizes >2cm, >6cm and total stone >2mm.

STRUCT: The degree of development, size and shape of soil peds are described using the following notation

Degree of development	**WA:** Weakly developed Adherent		**WK:**	Weakly developed
	MD: Moderately developed		**ST:**	Strongly developed
Ped size	**F:**	Fine	**M:**	Medium
	C:	Coarse	**VC:**	Very coarse
Ped Shape	**S:**	Single grain	**M:**	Massive
	GR:	Granular	**AB:**	Angular blocky
	SAB:	Sub-angular blocky	**PR:**	Prismatic
	PL:	Platy		

CONSIST: *Soil consistence is described using the following notation:*

L:	Loose	**VF:**	Very Friable	**FR:**	Friable	**FM:**	Firm
VM:	Very firm	**EM:**	Extremely firm			**EH:**	Extremely Hard

SUBS STR: Subsoil structural condition recorded for the purpose of calculating profile droughtiness: **G:** Good **M:** Moderate **P:** Poor

POR: Soil porosity. If a soil horizon has poor porosity with less than 0.5% biopores >0.5mm, a 'Y' will appear in this column.

IMP: If the profile is impenetrable to rooting a 'Y' will appear in this column at the appropriate horizon.

SPL: Slowly permeable layer. If the soil horizon is slowly permeable a 'Y' will appear in this column.

CALC: If the soil horizon is calcareous with naturally occurring calcium carbonate exceeding 1% a 'Y' will appear this column.

2. Additional terms and abbreviations used mainly in soil pit descriptions.

STONE ASSESSMENT:

VIS:	Visual	**S:**	Sieve	**D:**	Displacement

MOTTLE SIZE:

EF:	Extremely fine <1mm	**M:**	Medium 5-15mm
VF:	Very fine 1-2mm>	**C:**	Coarse >15mm
F:	Fine 2-5mm		

MOTTLE COLOUR: May be described by Munsell notation or as ochreous (OM) or grey (GM).

ROOT CHANNELS: In topsoil the presence of 'rusty root channels' should also be noted.

MANGANESE CONCRETIONS: Assessed by volume

N:	None		**M:**	Many	20-40%
F:	Few	<2%	**VM:**	Very Many	>40%
C:	Common	2-20%			

POROSITY:

P: Poor - less than 0.5% biopores at least 0.5mm in diameter
G: Good - more than 0.5% biopores at least 0.5mm in diameter

ROOT ABUNDANCE:

The number of roots per $100cm^2$:		Very Fine and Fine	Medium and Coarse
F:	Few	1-10	1 or 2
C:	Common	10.25	2 - 5
M:	Many	25-200	>5
A:	Abundant	>200	

ROOT SIZE

VF:	Very fine	<1mm	**M:**	Medium	2 - 5mm
F:	Fine	1-2mm	**C:**	Coarse	>5mm

HORIZON BOUNDARY DISTINCTNESS:

Sharp:	<0.5cm	**Gradual:**	6 - 13cm
Abrupt:	0.5 - 2.5cm	**Diffuse:**	>13cm
Clear:	2.5 - 6cm		

HORIZON BOUNDARY FORM: Smooth, wavy, irregular or broken.*
* See Soil Survey Field Handbook (Hodgson, 1997) for details.