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West Oxfordshire Local Plan
Site 268 : Woodstock
Agricultural Land Classification
ALC Map and Report
August 1993

WEST OXFORDSHIRE LOCAL PLAN
SITE 268 : WOODSTOCK
AGRICULTURAL LAND CLASSIFICATION REPORT

1. Summary

1.1 In August 1993, a detailed Agricultural Land Classification (ALC) survey was carried out on 16.2 hectares of land at Woodstock, Oxfordshire. ADAS was commissioned by MAFF's Land Use Planning Unit to determine the quality of land at 8 sites in West Oxfordshire. The work forms part of MAFF's statutory input to the West Oxfordshire Local Plan.

1.2 The survey was conducted by members of the Resource Planning Team, Guildford Statutory Group at an observation density of approximately one boring per hectare. A total of 16 borings and two soil inspection pits were described in accordance with MAFF's revised guidelines and criteria for grading the quality of agricultural land (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 its use for agriculture.

At the time of survey, the land was under winter wheat.

1.3 The distribution of the grades and subgrades is shown on the attached ALC map and the area and extent are given in the table below. The map has been drawn at a scale of 1:5000. It is accurate at this scale, but any enlargement may be misleading. This map supersedes any previous information for the site.

Table 1 : Distribution of Grades and Subgrades

	Area (ha)	% of Site	% of agricultural land
Grade 3b	16.0	98.8	100%
Urban	0.2	1.2	
Total area of site	16.2 ha	100%	

1.4 A general description of the grades and land-use categories identified in this survey is provided as an appendix. The grades are described in terms of the type of limitation that can occur, the typical cropping range and the expected level and consistency of yield.

1.5 The site has been graded 3b mainly on the basis of soil droughtiness although small areas are limited by soil wetness or topsoil stoniness. Most of the soils on the site rest over brashy limestone at shallow depth which restricts the water available for plant growth such that crops are likely to suffer significant drought stress. Occasional deeper profiles were encountered which were found to be gleyed and slowly permeable at shallow depth and thereby limited by soil wetness. Locally volumes of limestone brash in the topsoil were such as to give rise to a limitation to agricultural land quality.

2. Climate

2.1 The climatic criteria are considered first when classifying land as climate can be overriding in the sense that severe limitations will restrict land to low grades irrespective of favourable site or soil conditions.

2.2 The main parameters used in the assessment of an overall climatic limitation are average annual rainfall, as a measure of overall wetness, and accumulated temperature, as a measure of the relative warmth of a locality.

2.3 A detailed assessment of the prevailing climate was made by interpolation from a 5km gridpoint dataset (Met. Office 1989). The details are given in the table below and these show that there is no overall climatic limitation affecting the site.

2.4 No local climatic factors such as exposure or frost risk affect the site. However, climatic and soil factors interact to influence soil wetness and droughtiness limitations.

Table 2 : Climatic Interpolations

Grid Reference:	SP454161	SP454166
Altitude (m) :	90	95
Accumulated Temperature (days):	1408	1402
Average Annual Rainfall (mm):	685	688
Field Capacity (days):	148	149
Moisture Deficit, Wheat (mm):	103	102
Moisture Deficit, Potatoes (mm):	94	93
Overall Climatic Grade:	1	1

3. Relief

3.1 The land lies between approximately 90 and 95m AOD, the lowest land being towards the south, rising gently towards the north west of the site. Slopes are very gentle and in common with microrelief do not affect the agricultural land quality.

4. Geology and Soil

4.1 The British Geological Survey published map, Sheet 236, Witney (1:50,000, 1982), shows the area to be predominately underlain by Jurassic Cornbrash deposits. A small area to the south of the site is shown as Jurassic Forest Marble Clays.

4.2 The Soil Survey of England and Wales published map, Sheet 6, Soils of South East England, (1:250,000, 1983) shows the site to be underlain by soils of the Elmton 1 Association. The accompanying legend, (SSEW, 1983) describes these as 'shallow well drained brashy calcareous fine loamy soils over limestone. Some similar deeper and some non-calcareous and calcareous clayey soils'. In broad terms soils of this nature were found across the site.

5. Agricultural Land Classification

5.1 Table 1 provides the details of the area measurements for each grade and the distribution of each grade is shown on the attached ALC map.

5.2 The location of the soil observation points are shown on the attached sample point map.

Subgrade 3b

5.3 All the agricultural land at this site has been classified as moderate quality, Subgrade 3b. There are a variety of limitations across the site including soil droughtiness, soil wetness and on occasion topsoil stone content. Soil droughtiness affects the majority of the site. Land thus affected comprises soils which consist of a slightly to moderately stony (up to 30% limestone fragments, up to 17%>2cm) calcareous clay or heavy clay loam topsoil, passing to a moderately or very stony (c.20% to 60% limestone fragments) calcareous clay subsoil, becoming impenetrable to the soil auger between 25 and 50 cm over brashy limestone. Water availability to crops is limited due to the high profile stone content and relatively shallow soil depth reducing the volume of water retained in the soil matrix. Hence drought stress may be induced in some crops during part of or all the growing season in most years. Within this soil unit, land may occasionally be limited by the quantity of stones in the topsoil, (ie, 15-17% > 2 cm) which act as an impediment to cultivation, harvesting and crop growth, as well as reducing the available water capacity. A high stone content can increase production costs by causing extra wear and tear to implements and tyres. Stones can also impair crop establishment by causing reduced plant populations in drilled crops.

Across parts of the site soil wetness becomes the principal limitation. Soils commonly consist of a very slightly stony (c.2-5% total limestone fragments) calcareous heavy clay loam or clay topsoil, which commonly passes to a slightly stony (c.2-20% limestone fragments), occasionally gleyed calcareous clay horizon, overlying a poorly structured very slightly to moderately stony (c.2 to 10% limestone fragments) calcareous clay lower subsoil. This horizon is slowly permeable and therefore causes a drainage impedance such that Wetness Class IV (see Appendix II) is applied, which within the local climatic regime leads to Subgrade 3b being appropriate. Land affected by wetness can be subject to restrictions on the number of days when cultivation by machinery and/or grazing by livestock may occur, without causing structural damage to the soil. Soil wetness can also affect seed germination and development by reducing temperature and causing anaerobism due to waterlogging. These restrictions limit the range of crops that can tolerate such conditions.

Land of this quality could be expected to produce moderate yields of a narrow range of crops, principally cereal and grass. Occasional observations within this area were of a slightly better quality, but were not of a sufficient quantity or distribution to justify separate mapping.

5.4 The area shown as Urban towards the east of the site is a domestic dwelling and associated gardens.

ADAS Ref: 3305/144/93
MAFF Ref: EL 33/225

Resource Planning Team
Guildford Statutory Group
ADAS Reading

SOURCES OF REFERENCE

* British Geological Survey (1982), Sheet No. 236, Witney, 1:50,000, Solid and Drift Edition.

* MAFF (1988), Agricultural Land Classification of England and Wales : Revised guidelines and criteria for grading the quality of agricultural land.

* Meteorological Office (1989), Climatological Data for Agricultural Land Classification.

* Soil Survey of England and Wales (1983), Sheet 6, Soils of South East England. 1:250,000 map and accompanying legend.

APPENDIX I

DESCRIPTION OF THE GRADES AND SUB-GRADES

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 includes 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 or horticultural crops can usually be grown but on some land on 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. When 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.

Sub-grade 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 the 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 moist 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.

Urban

Built-up or 'hard' uses with relatively little potential for a return to agriculture : 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 parkland, 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.

Woodland

Includes commercial and non-commercial woodland.

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, eg. buildings in large grounds, and where map scale permits, the cover types may be shown separately. Otherwise, the most extensive cover type will be shown.

APPENDIX II

DEFINITION OF SOIL WETNESS CLASSES

Wetness Class I

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

Wetness Class II

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

Wetness Class III

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

Wetness Class IV

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

Wetness Class V

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

Wetness Class VI

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

(The number of days is not necessarily a continuous period. 'In most years' is defined as more than 10 out of 20 years.)

APPENDIX III

SOIL PIT AND SOIL BORING DESCRIPTIONS

Contents :

SOIL PROFILE DESCRIPTIONS : EXPLANATORY NOTE

Soil pit and auger boring information collected during ALC fieldwork is held on a database. This has commonly used notations and abbreviations as set out below.

Boring Header Information

1. GRID REF : national grid square and 8 figure grid reference.

2. USE : Land use at the time of survey. The following abbreviations are used.

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

3. GRDNT : Gradient as measured by a hand-held optical clinometer.

4. GLEY/SPL : Depth in cm to gleying or slowly permeable layers.

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

6. MB (WHEAT/POTS) : Moisture Balance.

7. DRT : Best grade according to soil droughtiness.

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

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

9. 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 : Soil Erosion Risk WD : Combined Soil Wetness/Droughtiness ST : Topsoil Stoniness

Soil Pits and Auger Borings

1. 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
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 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)

2. MOTTLE COL : Mottle colour

3. 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%+

4. 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

5. PED. COL : Ped face colour

6. STONE LITH : One of the following is used.

HR : all hard rocks and stones MSST : soft, medium or coarse grained sandstone
SI : soft weathered igneous or metamorphic SLST : soft oolitic or dolimitic limestone
FSST : soft, fine grained sandstone ZR : soft, argillaceous, or silty rocks CH : chalk
GH : gravel with non-porous (hard) stones GS :gravel with porous (soft) stones

Stone contents (> 2cm, > 6cm and total) are given in percentages (by volume).

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

- degree of development 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

8. 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

9. SUBS STR : Subsoil structural condition recorded for the purpose of calculating profile droughtiness.

G : good M : moderate P : poor

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

11. IMP : If the profile is impenetrable a 'Y' will appear in this column at the appropiate horizon.

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

13. CALC : If the soil horizon is calcareous, a 'Y' will appear in this column.

14. Other notations

APW : available water capacity (in mm) adjusted for wheat
APP : available water capacity (in mm) adjusted for potatoes
MBW : moisture balance, wheat
MBP : moisture balance, potatoes

SOIL PIT DESCRIPTION

Site Name : W OXON LP S268 WOODSTOCK Pit Number : 1P

Grid Reference: SP45451655 Average Annual Rainfall : 688 mm
Accumulated Temperature : 1402 degree days
Field Capacity Level : 149 days
Land Use : Wheat
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 27	C	10YR44 00	12	25		
27-120	C	75YR46 56	0	60		

Wetness Grade : 2 Wetness Class : I
Gleying : cm
SPL : No SPL

Drought Grade : 3B APW : 76 mm MBW : -26 mm
APP : 65 mm MBP : -28 mm

FINAL ALC GRADE : 3B
MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : W OXON LP S268 WOODSTOCK Pit Number : 2P

Grid Reference: SP45331630 Average Annual Rainfall : 688 mm
Accumulated Temperature : 1402 degree days
Field Capacity Level : 149 days
Land Use : Wheat
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 25	C	25 Y42 00	3	6		
25- 35	C	25 Y53 00	0	10		STMSAB
35- 55	C	25 Y62 00	0	10	M	WKMAB

Wetness Grade : 3B Wetness Class : IV
Gleying :035 cm
SPL :035 cm

Drought Grade : APW : mm MBW : 0 mm
APP : mm MBP : 0 mm

FINAL ALC GRADE : 3B
MAIN LIMITATION : Wetness

SAMPLE NO.	GRID REF	USE	ASPECT GRDNT	GLEY	SPL	--WETNESS-- CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	EROSN FLOOD	FROST EXP	CHEM DIST	LIMIT	ALC	COMMENTS
1	SP45401660	WHT				1	2		0		0					DR	3B	IMP LIMEST 32
1P	SP45451655	WHT				1	2	76	-26	65	-28	3B				DR	3B	IMP LIMEST 46
2	SP45501660	WHT				1	2		0		0					DR	3B	IMP LIMEST 25
2P	SP45331630	WHT		035	035	4	3B		0		0					WE	3B	SPL 35 PIT 55
3	SP45601660	WHT				1	2	73	-29	73	-20	3B				DR	3B	IMP LIMEST 50
4	SP45401650	WHT				1	2	56	-46	56	-37	3B				DR	3B	IMP LIMEST 40
5	SP45501650	WHT				1	2		0		0					DR	3B	IMP LIMEST 26
6	SP45301640	WHT				1	2		0		0					DR	3B	IMP LIMEST 25
7	SP45401640	WHT				1	2		0		0					DR	3B	IMP LIMEST 25
8	SP45501640	WHT		045	060	2	3A		0		0					WE	3A	SPL 60
9	SP45301630	WHT		029	029	4	3B		0		0					WE	3B	IMP LIMEST 65
10	SP45401630	WHT				1	2		0		0					DR	3B	IMP LIMEST 25
11	SP45501630	WHT				1	2		0		0					TS	3B	IMP LIMEST 25
12	SP45301620	WHT				1	2	55	-47	55	-38	3B				DR	3B	IMP LIMEST 32
13	SP45401620	WHT		050	050	3	3A		0		0					WE	3A	IMP LIMEST 75
14	SP45501610	WHT		025		2	3A	74	-28	74	-19	3B				DR	3B	IMP LIMEST 50
15	SP45401610	WHT				1	2	59	-43	59	-34	3B				DR	3B	IMP LIMEST 35
16	SP45501610	WHT				1	2		0		0					DR	3B	IMP LIMEST 25

AMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----- COL	ABUN	CONT	PED COL.	GLEY	----STONES---- >2	>6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC
1	0-27	c	10YR44 00						9	0	HR	25						Y
	27-32	c	75YR46 56						0	0	HR	30		M				Y
1P	0-27	c	10YR44 00						12	0	HR	25						Y
	27-120	c	75YR46 56						0	0	HR	60		M				Y
2	0-24	c	10YR43 00						13	0	HR	25						Y
	24-25	c	75YR46 56						0	0	HR	50		M				Y
2P	0-25	c	25 Y42 00						3	0	HR	6						Y
	25-35	c	25 Y53 00						0	0	HR	10	STMSAB	FM G				Y
	35-55	c	25 Y62 00	10YR68 00	M		05 Y62 00	Y	0	0	HR	10	WKMAB	FM P	Y		Y	Y
3	0-28	c	10YR44 00						3	0	HR	8						Y
	28-50	c	75YR46 56						0	0	HR	20		M				Y
4	0-25	c	10YR44 00						3	0	HR	10						Y
	25-40	c	75YR46 00						0	0	HR	30		M				Y
5	0-23	hcl	10YR44 00						12	0	HR	30						Y
	23-26	c	75YR46 00						0	0	HR	50		M				Y
6	0-22	c	10YR44 00						10	0	HR	25						Y
	22-25	c	75YR46 56						0	0	HR	50		M				Y
7	0-23	c	10YR44 00						12	0	HR	30						Y
	23-25	c	75YR46 00						0	0	HR	50		M				Y
8	0-26	c	10YR44 00						0	0	HR	5						Y
	26-45	c	10YR58 00	00MN00 00	C				0	0	HR	5		M				Y
	45-60	c	10YR56 00	75YR56 00	C		00MN00 00	Y	0	0	HR	5		M				Y
	60-120	c	25Y 51 00	10YR56 66	C		10YR72 00	Y	0	0	SLST	50		P			Y	Y
9	0-29	hcl	25 Y42 43						0	0	HR	5						Y
	29-45	c	25 Y64 00	10YR58 00	C		10YR61 00	Y	0	0	HR	20		P			Y	Y
	45-65	c	25 Y63 00	10YR58 00	C		25 Y71 00	Y	0	0	HR	5		P			Y	Y
10	0-25	hcl	25 Y53 00						8	0	HR	13						Y
11	0-25	hcl	10YR53 00						17	0	HR	25						Y
12	0-28	hcl	25 Y42 00						0	0	HR	2						Y
	28-32	c	10YR46 56						0	0	HR	20		M				Y
13	0-25	c	25 Y43 53						0	0	HR	2						Y
	25-50	c	10YR56 00	75YR58 00	F		00MN00 00		0	0	HR	2		M				Y
	50-75	c	10YR64 66	75YR58 00	C			Y	0	0	HR	2		M			Y	Y

				----MOTTLES-----			PED		----STONES----			STRUCT/	SUBS			
SAMPLE	DEPTH	TEXTURE	COLOUR	COL	ABUN	CONT	COL.	GLEY	>2	>6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC
14	0-25	c	25 Y42 43						0	0	HR	2						Y
	25-50	c	25 Y54 00	10YR58	00	C	00MN00	00 Y	0	0	HR	20		M				Y
15	0-30	hcl	25 Y42 00						0	0	HR	5						Y
	30-35	c	25 Y43 00						0	0	HR	10		M				Y
16	0-25	hcl	10YR53 00						3	0	HR	7						Y