

A1
West Oxfordshire Local Plan
Site 231: Freeland
Agricultural Land Classification
ALC Map and Report
November 1993

**WEST OXFORDSHIRE LOCAL PLAN
SITE 231: FREELAND
AGRICULTURAL LAND CLASSIFICATION REPORT**

1. SUMMARY

1.1 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality for 8 sites in West Oxfordshire. The work forms part of MAFF's statutory input to the West Oxfordshire Local Plan.

1.2 Approximately 5 hectares of land relating to site 231 at Freeland, Oxfordshire was surveyed during August 1993. The survey was undertaken at a detailed level of approximately one boring per hectare. A total of 5 soil auger borings and two soil inspection pits were assessed 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 agricultural use.

At the time of survey the land was in permanent grass most of which was being grazed by sheep.

1.3 The distribution of grades and subgrades is shown on the attached ALC map and the areas 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.

Table 1 : Distribution of Grades and Subgrades

<u>Grade</u>	<u>Area (ha)</u>	<u>% of Site</u>	<u>% of Agricultural Area</u>
2	2.7	51.9	61.4
3b	<u>1.7</u>	32.7	<u>38.6</u>
Total agricultural area	4.4		100
Urban	0.1	1.9	
Woodland	<u>0.7</u>	<u>13.5</u>	
Total site area	5.2	100	

1.4 Appendix I gives a general description of the grades, subgrades and land use categories identified in the survey.

1.5 The site has been classified as grades 2 and 3b. The area shown as grade 2 is limited by soil droughtiness caused by a moderate stone content (up to 30% total flints by volume) in both the topsoil and subsoil horizons. The area shown as subgrade 3b is limited by soil wetness as evidenced by a poorly structured clay horizon at a shallow depth in the profile.

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 5 km 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 factors do interact with soil factors to influence soil wetness and droughtiness limitations.

Table 2 : Climatic Interpolation

Grid Reference:	SP412133
Altitude (m):	105
Accumulated Temperature (days):	1393
Average Annual Rainfall (mm):	705
Field Capacity (days):	153
Moisture Deficit, Wheat (mm):	99
Moisture Deficit, Potatoes (mm):	89
Overall Climatic Grade:	1

3. RELIEF

- 3.1 The majority of the site is at approximately 105 m AOD. Towards the north however the ground falls abruptly to around 100 m AOD, approximately at the geological boundary (para 4.1) within the site. The gradient of the slope is not sufficient however to affect land quality. Microrelief also does not affect grading.

4. GEOLOGY AND SOIL

- 4.1 The British Geological Survey published map, Sheet 236, Witney, (1982) shows the site to be underlain in the south by Quaternary Glacial Sand and Gravel. In the north, where the ground falls away (para 3.1), the underlying geology becomes Jurassic Oxford Clay.
- 4.2 The Soil Survey of England and Wales published map, Sheet 6, Soils of South East England (1983) shows the site to be underlain by soils from the Sutton 1 and the Essendon Associations. Sutton 1 soils are described as 'well drained fine and coarse loamy, shallow over limestone gravel in places' (SSEW, 1984). Essendon soils are described as 'slowly permeable seasonally waterlogged coarse loamy over

clayey soils. Often found with similar fine loamy and fine silty over clayey soils' (SSEW, 1984). Soils broadly similar to these descriptions were found at this 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.

5.3 Grade 2

Land of very good quality covers the majority of this site, principally being slightly drought limited, due to the interaction between stone contents in the soil profile and local climate. The soil profile commonly consisted of a moderately stony (c. 23% total flints by volume, approximately 5% >2 cm) medium or sandy clay loam topsoil, over a slightly to moderately stony (c. 15% flints by volume) moderately structured medium clay loam upper subsoil, passing to a moderately stony (c. 25% flints by volume) gleyed heavy clay loam horizon, and a similarly stony gleyed sandy clay or clay extending to depth. These lower subsoils were considered to have moderate structural conditions.

- 5.4 The droughtiness limitation means that during all or part of the growing season water availability will not match crop demand in most years. In this unit of land the restriction, caused by stone contents decreasing the water holding capacity of the soil profile and combining with local climatic factors, is slight such that the land is considered capable of producing generally high yields of a wide range of crops.

5.5 Subgrade 3b

Land of moderate quality occurs in two units within the site, to the north and south of the very good quality land (para 5.3). The principal limitation is soil wetness as evidenced by a slowly permeable, poorly structured (from a structural observation, Pit 2, Appendix III) clay horizon in the subsoil. This is present beneath a stoneless heavy clay loam topsoil and a gleyed moderately structured heavy clay loam or clay upper subsoil. Depending on the depth to the slowly permeable horizon, Wetness Class III or IV (see Appendix II) has been assigned. The combination of soils with these drainage characteristics, topsoil texture and climatic factors give rise to a soil wetness and workability limitation such that Subgrade 3b is appropriate. Land of this quality could be expected to produce moderate yields of a narrow range of crops, principally cereals and grass.

- 5.6 Land affected by soil wetness can, dependant on the severity of the problem, be subject to restrictions on the number of days when cultivation by machinery and/or grazing by livestock may occur, and not cause structural damage to the soil. Soil wetness can also adversely affect seed germination and development.

5.7 Land mapped as Urban is a metalled track from the Wroslyn Road to the farm buildings at Cooks Corner. The area marked as woodland is a small area of deciduous woodland and scrub between housing and open farmland.

ADAS Ref: 3305/140/93
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.
- * 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 No. 6, Soils of South East England, 1:250,000.
- * Soil Survey of England and Wales (1984), Soils and their use in South East England. Bulletin No. 15.

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 Abbreviations : Explanatory Note
 - * Soil Pit Descriptions
 - * Database Printout : Boring Level Information
 - * Database Printout : Horizon Level Information

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 appropriate 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 : WOXON LP S231 FREELAND Pit Number : 1P

Grid Reference: SP41201335 Average Annual Rainfall : 705 mm
Accumulated Temperature : 1393 degree days
Field Capacity Level : 153 days
Land Use : Permanent Grass
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 20	MCL	10YR43 00	5	23		
20- 49	MCL	10YR56 00	5	15		STCSAB
49- 74	HCL	10YR52 00	2	25	M	STCSAB
74-120	SC	75YR63 00	2	27	M	STCSAB

Wetness Grade : 1 Wetness Class : I
Gleying : 049 cm
SPL : No SPL

Drought Grade : 2 APW : 122mm MBW : 22 mm
APP : 94 mm MBP : 4 mm

FINAL ALC GRADE : 2
MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : WOXON LP S231, FREELAND Pit Number : 2P

Grid Reference: SP41121343 Average Annual Rainfall : 705 mm
Accumulated Temperature : 1393 degree days
Field Capacity Level : 153 days
Land Use : Permanent Grass
Slope and Aspect : 01 degrees SW

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 24	HCL	10YR5/3 0/0	0	1		
24- 43	HCL	10YR5/2 6/1	0	0	C	MDCSAB
43- 65	C	10YR6/3 6/1	0	0	M	MDCAB
65-120	C	10YR6/3 6/1	0	0	C	

Wetness Grade : 3B Wetness Class : III
Gleying : 024 cm
SPL : 043 cm

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

FINAL ALC GRADE : 3B
MAIN LIMITATION : Wetness

SAMPLE NO.	GRID REF	ASPECT USE	GRDNT	--WETNESS--		-WHEAT-		-POTS-		M. REL		EROSN	FROST	CHEM	ALC	COMMENTS
				SPL	CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	EXP	DIST	LIMIT	
1	SP41101340	PGR SW	01	025	045	3	3B			0	0				WE 3B	SPL 45 2P
1P	SP41201335	PGR		049		1	1	122	22	94	4	2			DR 2	PIT 80 AUG 120
2	SP41201340	PGR				1	1			0	0				DR 2	IMPST 30 1P
2P	SP41121343	PGR SW	01	024	043	3	3B			0	0				WE 3B	PIT 65 AUG 120
3	SP41201330	PGR				1	1			0	0				DR 2	IMPST 20 1P
4	SP41201320	PGR		035		2	2	122	22	102	12	2			WD 2	WE & DR 1P
5	SP41301320	PGR		025	035	4	3B			0	0				WE 3B	SPL 35 2P

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED		----STONES----			STRUCT/ CONSIST	SUBS			SPL	CALC
				COL	ABUN	CONT	COL.	GLE	>2	>6	LITH		TOT	STR	POR		
1	0-25	hc1	10YR53 00						0	0	HR	2					
	25-45	c	10YR52 00	10YR58	61	C		Y	0	0		0			M		
	45-90	c	10YR63 00	10YR58	61	C		Y	0	0		0			P		Y
1P	0-20	mc1	10YR43 00						5	0	HR	23					WITH SAND
	20-49	mc1	10YR56 00						5	0	HR	15	STCSAB	FR	M		
	49-74	hc1	10YR52 00	75YR58	00	M	00MNO0	00	Y	2	0	HR	25	STCSAB	FR	M	
	74-120	sc	75YR63 00	75YR58	00	M	00MNO0	00	Y	2	0	HR	27	STCSAB	FR	M	
2	0-30	sc1	10YR44 00						0	0	HR	20					
2P	0-24	hc1	10YR53 00						0	0	HR	1					
	24-43	hc1	10YR52 61	10YR58	00	C		Y	0	0		0	MDCSAB	FR	M		
	43-65	c	10YR63 61	10YR58	00	M	00MNO0	00	Y	0	0	0	MDCAB	FM	P	Y	Y
	65-120	c	10YR63 61	10YR58	00	C	00MNO0	00	Y	0	0	0			P		Y
3	0-20	mc1	10YR43 00						0	0	HR	20					WITH SAND
4	0-25	mc1	10YR43 00						0	0	HR	15					WITH SAND
	25-35	mc1	10YR44 54						0	0	HR	10			M		
	35-65	hc1	10YR53 00	10YR56	00	C		Y	0	0	HR	10			M		
	65-120	c	75YR58 00	10YR52	00	C		Y	0	0	HR	15			M		WITH SAND
5	0-25	hc1	10YR53 00						0	0		0					
	25-35	hc1	10YR52 00	10YR58	00	C	00MNO0	00	Y	0	0	0			M		
	35-65	c	25Y 64 00	10YR58	61	C	00MNO0	00	Y	0	0	0			P		Y
	65-100	c	10YR61 62	10YR58	00	M		Y	0	0		0			P		Y