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**WEST OXFORDSHIRE LOCAL PLAN
Land at Finstock, Oxfordshire**

**Agricultural Land Classification
ALC Map and Report**

October 1998

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AGRICULTURAL LAND CLASSIFICATION REPORT

WEST OXFORDSHIRE LOCAL PLAN LAND AT FINSTOCK, OXFORDSHIRE

INTRODUCTION

1. This summary report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 11 hectares of land at Finstock, in Oxfordshire. The survey was carried out during October 1998.
2. The survey was undertaken by the Farming and Rural Conservation Agency (FRCA)¹ on behalf of the Ministry of Agriculture, Fisheries and Food (MAFF). The survey was carried out in connection with MAFF's statutory input to the West Oxfordshire Local Plan. This survey supersedes any previous ALC information for this land.
3. The work was conducted by members of the Resource Planning Team in the Eastern Region of FRCA. The land has been graded in accordance with the published MAFF ALC guidelines and criteria (MAFF, 1988). A description of the ALC grades and subgrades is given in Appendix I.
4. At the time of survey the agricultural land use on the site was a mixture of ploughed land left uncultivated and rough grassland. The areas mapped as 'Other land' include a recreation ground and an extension to a Church graveyard.

SUMMARY

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:10,000. It is accurate at this scale but any enlargement would be misleading.
6. The area and proportions of the ALC grades and subgrades on the surveyed land are summarised in Table 1.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
3b	9.1	100.0	82.7
Other land	1.9	N/A	17.3
Total surveyed area	9.1	100.0	100.0
Total site area	11.0	-	100

7. The fieldwork was conducted at an average density of 1 boring per hectare of agricultural land. In total, 8 borings and 2 soil pits were described.

¹ FRCA is an executive agency of MAFF and the Welsh Office

8. All the agricultural land on this site has been classified as Subgrade 3b (moderate quality). The main limitations to land quality are soil wetness and/or workability with gradient being limiting in a small part of the site in the south.
9. The land comprises calcareous and non-calcareous heavy clay loam and clay topsoils. These overlie clay subsoils which show signs of impeded drainage. These soil properties, in combination with the local climate, produce a soil wetness and/or workability limitation. Soil wetness and workability have the effect of restricting the number of days when the land is in a suitable condition for cultivation, trafficking by machinery or grazing by livestock and adversely affecting crop growth and development.
10. Land along the southern boundary experiences a gradient limitation. Gradient has the effect of restricting the safe and efficient use of farm machinery and land cannot be graded higher than Subgrade 3b.

Climate

11. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.
12. The key climatic variables used for grading this site are given in Table 2 and were obtained from the published 5km grid datasets using the standard interpolation procedures (Met. Office, 1989).

Table 2: Climatic and altitude data

Factor	Units	Values	
		SP 360 164	SP 357 163
Grid reference	N/A	SP 360 164	SP 357 163
Altitude	m, AOD	126	150
Accumulated Temperature	day°C (Jan-June)	1369	1342
Average Annual Rainfall	mm	722	733
Field Capacity Days	days	160	162
Moisture Deficit, Wheat	mm	94	90
Moisture Deficit, Potatoes	mm	83	78
Overall climatic grade	N/A	Grade 1	Grade 1

13. 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.
14. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR), as a measure of overall wetness, and accumulated temperature (AT0, January to June), as a measure of the relative warmth of a locality.
15. The combination of rainfall and temperature at this site mean that there is no overall climatic limitation. Local climatic factors, such as frost risk and exposure do not affect land quality at this location. The site is, therefore, climatically Grade 1.

Site

16. The site lies at altitudes in the range 126–154 m AOD. The highest land is located along the northern boundary of the site and falls through gentle and moderate gradients to the south. However, land along the southern boundary does experience a gradient limitation and is restricted to Subgrade 3b. Other site factors, such as microrelief and flooding, do not affect this site.

Geology and soils

17. The most detailed published geology information for this site (BGS, 1982) shows most of it to be underlain by Forest Marble Clays, with smaller deposits of Cornbrash in the extreme north-west corner of the site and Forest Marble Clays with Limestone on the midslopes, and finally, White Limestone on the lower southern slopes.
18. The most detailed published soils information covering the area (SSEW, 1983) shows most of the site to comprise soils of the Elmton 3 association. These soils are described as 'shallow well drained brashy calcareous fine loamy soils over limestone. Some deeper slowly permeable seasonally waterlogged, mainly calcareous, clayey soils' (SSEW, 1983). The remainder of the site, in the east, is mapped as soils of the Elmton 1 association. These soils are described as 'shallow well drained brashy calcareous fine loamy soils over limestone. Some similar deeper soils and some calcareous clayey soils' (SSEW, 1983). Soils conforming to these descriptions were observed across the site with fine loamy over slowly permeable clayey subsoils predominating. A few fine loamy over brashy limestone were also encountered.

AGRICULTURAL LAND CLASSIFICATION

19. The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1, page 1.
20. The location of the auger borings and pits is shown on the attached sample location map and the details of the soils data are presented in Appendix II.

Subgrade 3b

21. All the agricultural land is classified as Subgrade 3b (moderate quality) and is limited by soil wetness and/or workability, with some areas affected by gradient.
22. Soils are variable and are probably a reflection on the different geology found in this small area. Two soil phases occur. Over most of the site the land comprises soils which have either calcareous or non-calcareous heavy clay loam or clay topsoils. These may contain up to 10 % total flints by volume. These overlie clayey subsoils some of which are poorly structured at shallow depths, whilst others show signs of impeded drainage at moderate depths. Stone contents in these clays are in the range 2–10% total hard limestone. Pit 2 (see Appendix II) is typical of these soils and proved the existence of these slowly permeable layers (SPLs). It is the depth to these less permeable horizons combined with the topsoil texture which interacts with the local climate to determine the overall ALC grade. Where these SPLs occur at a depth of 25–30 cm, these soils are assigned to Wetness Class IV. When they occur at a depth

of 75 cm Wetness Class II is appropriate. Those shallow SPLs with a heavy clay loam topsoil result in a land classification of Subgrade 3b, whereas a clay topsoil over a deeper SPL results in a similar grade due to soil workability. The effect of a significant soil wetness and/or workability limitation may adversely affect crop growth and development, as well as limiting the flexibility of the land due to a reduction in the number of days when the soil is in a suitable condition for cultivation, trafficking by machinery or grazing by livestock.

23. A small central band, coincident with deposits of White Marble Clays with Limestone, is impenetrable to the soil auger. These soils are similar to those previously described but progress with the soil auger was impeded from 42–60 cm. Pit 1 (see Appendix II) is representative of these soils and confirmed the existence of approximately 15% total hard limestone contained in a gleyed poorly structured clay matrix. The low porosity of these clay subsoils and lack of interconnecting stone pathways results in impeded drainage. The depth to these slowly permeable clay layers ranges from 19–50 cm, which assigns these soils to Wetness Class III or IV. This, combined with the topsoil texture, interacting with the local climate, results in a Subgrade 3b classification.
24. A gradient limitation exists along the southern boundary of the site where slopes restrict land quality to Subgrade 3b. A gradient of 7.5° was recorded which will compromise the safe and efficient use of farm machinery.

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SOURCES OF REFERENCE

British Geological Survey (1982), *Sheet No:236, Witney*, 1:50,000.
BGS: London.

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

Met. Office (1989) *Climatological Data for Agricultural Land Classification*.
Met. Office: Bracknell.

Soil Survey of England and Wales (1983) *Sheet 6, Soils of South-East England*, 1:250,000.
SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in South East England*
SSEW: Harpenden

APPENDIX I

DESCRIPTIONS OF THE 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 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 of this 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 land.

Grade 3: Good to Moderate Quality Land

Land with moderate limitations which affect the choice of crops, the 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.

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 the level of yields. It is mainly suited to grass with occasional arable crops (e.g. 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 severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

APPENDIX II

SOIL DATA

Contents:

Sample location map

Soil abbreviations - explanatory note

Soil pit and soil boring descriptions (boring and horizon levels)

SOIL PROFILE DESCRIPTIONS: EXPLANATORY NOTE

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

Boring Header Information

1. **GRID REF:** national 100 km 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	FLW: Fallow
PGR: Permanent pasture	LEY: Ley grass	RGR: Rough grazing
SCR: Scrub	CFW: Coniferous woodland	OTH: Other
DCW: Deciduous woodland	BOG: Bog or marsh	SAS: Set-Aside
HTH: Heathland	HRT: Horticultural crops	PLO: Ploughed

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

4. **GLEYSPL:** Depth in centimetres (cm) to gleying and/or slowly permeable layers.

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

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

7. **DRT:** Best grade according to soil droughtiness.

8. 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		

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

OC: Overall Climate	AE: Aspect	ST: Topsoil Stoniness
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
EX: Exposure		

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
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)

2. **MOTTLE COL:** Mottle colour using Munsell notation.
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 using Munsell notation.

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

7. **STONE LITH:** Stone Lithology - one of the following is used:

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

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

8. **STRUCT:** the degree of development, size and shape of soil pedes 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	
Ped shape	S: single grain	M: massive
	GR: granular	AB: angular blocky
	SAB: sub-angular blocky	PR: prismatic
	PL: platy	

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

L: loose	FM: firm	EH: extremely hard
VF: very friable	VM: very firm	
FR: friable	EM: extremely firm	

10. **SUBS STR:** Subsoil structural condition recorded for the purpose of calculating profile droughtiness:
G: good M: moderate P: poor
11. **POR:** Soil porosity. If a soil horizon has less than 0.5% biopores >0.5 mm, a 'Y' will appear in this column.
12. **IMP:** If the profile is impenetrable to rooting a 'Y' will appear in this column at the appropriate horizon.
13. **SPL:** Slowly permeable layer. If the soil horizon is slowly permeable a 'Y' will appear in this column.
14. **CALC:** If the soil horizon is calcareous, a 'Y' will appear in this column.
15. 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

SAMPLE NO.	GRID REF	ASPECT USE	GRDNT	--WETNESS--		-WHEAT-		-POTS-		M.REL		EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS	
				GLEY	SPL	CLASS	GRADE	AP	MB	AP	MB						DRT
1	SP35801640	RGR E	2	50	25	4	3B	133	39	110	27	1			WE	3B	SEE2P
2	SP35901640	OTH E	1	25		2	3A	71	-23	71	-12	3B			WE	3B	SEE2P/IMP40
4	SP35701630	RGR SE	2	75	75	2	3B	110	16	111	28	2			WE	3B	SEE2P/IMP92
5	SP35801630	OTH	0	30	30	4	3B	126	32	103	20	1			WE	3B	SEE2P
6	SP35901630	OTH	0			1	2	89	-5	94	11	3A			WE	3B	SEE1P/IMP60
7	SP36001630	OTH E	2			1	2	52	-42	52	-31	3B			WE	3B	DISTURBED01P
8	SP35801620	RGR SE	2			1	3A	66	-28	66	-17	3B			WE	3B	SEE1P/IMP42
9	SP35901620	RGR SE	2	17		2	3A	80	-14	80	-3	3A			WE	3B	SEE1P/IMP50
1P	SP35801620	RGR SE	2		23	4	3B	78	-16	88	5	3A			WE	3B	PIT AT AB8
2P	SP35801640	RGR SE	1	46	26	4	3B	95	1	107	24	3A			WE	3B	PIT AT AB1

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED COL.	----STONES----			STRUCT/ CONSIST	SUBS			CALC			
				COL	ABUN	CONT		GLY	>2	>6		LITH	TOT	STR		POR	IMP	SPL
1	0-25	HCL	10YR42						0	0	HR	2						
	25-50	C	10YR46	10YR56	F				0	0		0		P		Y		
	50-65	C	05Y 62	10YR5658	M D			Y	0	0		0		P		Y	PLASTIC	
	65-80	C	25Y 5262	10YR58	C D			Y	0	0	SLST	5		P		Y	Y	PLASTIC
	80-120	C	05Y 5262	10YR58	M D			Y	0	0		0		P		Y		PLASTIC
2	0-25	HCL	10YR32						0	0	HR	5					N	
	25-44	C	10YR63	10YR68	M D			Y	0	0	HR	8		M			N	IMP STONE
4	0-22	C	10YR44						0	0	HR	2					Y	
	22-40	C	10YR54						0	0	HR	10		M			Y	FIRM
	40-75	C	10YR54						0	0		0		M			Y	FIRM
	75-92	C	25Y64	75YR46	C D			Y	0	0	SLST	5		P		Y	Y	PLASTIC
5	0-30	HCL	10YR43						0	0	HR	2						
	30-60	C	25Y 64	10YR56	C D			Y	0	0	SLST	5		P		Y	Y	
	60-75	C	05Y 63	10YR68	M D			Y	0	0	SLST	5		P		Y	Y	PLASTIC
	75-120	C	05Y 62	10YR58	M D			Y	0	0	SLST	2		P		Y	Y	
6	0-30	HCL	10YR43						0	0	HR	5						
	30-50	C	10YR44						0	0	HR	5		M				
	50-60	C	10YR44	75YR58	M D			S	0	0	HR	5		P				IMP FLINT
7	0-28	HCL	10YR42						0	0	HR	10					Y	
	28-33	HCL	10YR44						0	0	HR	20		M			Y	BRICKS+RUBBLE
8	0-19	C	10YR42						0	0	HR	5					Y	
	19-42	C	25Y64	75YR56	C D			S	0	0	SLST	5		M			Y	IMP HARLDMST
9	0-17	HCL	10YR43						0	0	HR	2					Y	
	17-32	C	05Y53	10YR56	M D			Y	0	0	SLST	3		M			Y	FIRM
	32-50	HCL	25Y63	10YR56	C F			Y	0	0	SLST	10		M			Y	IMP HARLDMST
1P	0-23	C	10YR42						0	0	HR	10					Y	
	23-70	C	25Y54	75YR56	C D			S	0	0	HR	15	WKCP	FM P	Y		Y	Y
2P	0-26	HCL	10YR43						0	0	HR	3						
	26-46	C	10YR54						0	0	HR	2	MDCAB	FM P	Y		Y	+CMn
	46-70	C	05Y6353	10YR56	M D			Y	0	0	SLST	5	MDCAB	FM P	Y		Y	PLASTIC