

A1
Vale of White Horse Local Plan
Land at Station Road, Shrivenham,
Oxfordshire.
Agricultural Land Classification Survey
ALC Map and Report
October 1996.

Resource Planning Team
Guildford Statutory Group
ADAS Reading

ADAS Reference: 3304/107/96
MAFF Reference: EL 33/00127
LUPU Commission: 02571

AGRICULTURAL LAND CLASSIFICATION REPORT
VALE OF WHITE HORSE LOCAL PLAN
LAND AT STATION ROAD, SHRIVENHAM, OXFORDSHIRE

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey on 5.2 hectares of land to the west of Station Road, south west of Shrivenham, Oxfordshire. The survey was carried out during July 1996.
2. The survey was commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF) from its Land Use Planning Unit, in Reading, in connection with the Vale of White Horse Local Plan. The results of this survey supersede any previous ALC information for this land.
3. The work was conducted by members of the Resource Planning Team in the Guildford Statutory Group of ADAS. 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 site was under a field bean crop and wholly in agricultural use.

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 whole site (5.2ha) has been classified as Subgrade 3a quality land.
7. The fieldwork was conducted at an average density of 1 boring per hectare. A total of 7 borings and one soil pit were described.
8. The land on this site has been classified as Subgrade 3a (good quality), the key limitation being soil wetness. The soils on the site were found to be of two separate types. To the north, profiles commonly comprised medium clay loam topsoils over deep heavy clay loam subsoils, which became slowly permeable in the lower subsoil. Towards the south of the site, the soils were commonly heavier, comprising medium clay loam topsoils over slowly permeable clay subsoils. The slowly permeable horizons cause drainage to be impeded such that land utilisation is restricted. In the local climate the depth of these slowly permeable horizons and the degree of soil wetness is sufficient to place this land in Subgrade 3a.

FACTORS INFLUENCING ALC GRADE

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 1 below and were obtained from the published 5km grid datasets using standard interpolation procedures (Met. Office, 1989).
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.

Table 1: Climatic and altitude data

Factor	Units	Values
Grid reference	N/A	SU 236 884
Altitude	m, AOD	97
Accumulated Temperature	day°C	1417
Average Annual Rainfall	mm	677
Field Capacity Days	days	150
Moisture Deficit, Wheat	mm	104
Moisture Deficit, Potatoes	mm	95

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 exposure and frost risk, are not believed to significantly affect the site. The site is climatically Grade 1.

Site

16. The site lies at an altitude of approximately 97m AOD. The land is virtually flat, rising very slightly from the south towards the north of the site. None of the slopes on the site are sufficient to affect agricultural land quality.

Geology and soils

17. The published geological information for the site (BGS, 1974) shows the site to be underlain by the Corallian Beds in a local development noted as the Red Down Sands and Clay.
18. The most detailed published soils information for the site (SSEW 1983) shows the site to comprise soils of the Kingston association. These are described as "slowly permeable seasonally waterlogged fine loamy over clayey soils and similar soils with slowly permeable

subsoils and slight seasonal waterlogging. Some well drained fine and coarse loamy soils.” (SSEW, 1983). The soils encountered at this site were found to be similar to those described above, as they include slowly permeable horizons.

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.

20. The location of the auger borings and pits is shown on the attached sample location map and details of the soils data are presented in Appendix III.

Subgrade 3a

21. Land of good quality has been mapped across the whole site. Two soil types were recorded on the site and the principal limitation in both types is soil wetness.

22. Both soil types have a virtually stone free (maximum 2% v/v total flints) medium clay loam topsoil. Towards the north of the site the topsoil passes to deep slightly gleyed and slowly permeable (see pit observation, 1P) heavy and sandy clay loam subsoils. Occasionally the upper subsoil comprises medium clay loam, which is not gleyed, passing to heavy clay loam at moderate depth. Towards the south of the site the topsoil immediately overlies a slightly gleyed and slowly permeable deep clay subsoil, which becomes gleyed at depth. The majority of the profiles were found to be stone free, but occasionally up to 5% v/v total flints were recorded in the subsoil. The depth to the slowly permeable horizons is the key limitation on this land as it restricts the soils to Wetness Class III and, subsequently, Subgrade 3a. In the local climate the medium workability of the topsoils encountered does not lead to any further restrictions on land utilisation, hence Subgrade 3a has been applied. The moderate soil wetness at this site limits land utilisation by restricting the number of days when fieldwork can occur without damaging the soil.

M Larkin
Resource Planning Team
Guildford Statutory Group
ADAS Reading

SOURCES OF REFERENCE

British Geological Survey (1974) *Sheet 252, Swindon. Solid and Drift Edition. 1:63 360. Scale.*

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.

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

Met. Office: Bracknell.

Soil Survey of England and Wales (1983) *Soils of South East England. 1:250 000 Scale.*

SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils of South East England. Bulletin No. 15.*

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 WETNESS CLASSIFICATION

Definitions of Soil Wetness Classes

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile. Six soil wetness classes are identified and are defined in the table below.

Wetness Class	Duration of waterlogging ¹
I	The soil profile is not wet within 70 cm depth for more than 30 days in most years. ²
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 only wet within 40 cm depth for 30 days in most years.
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 present within 80 cm depth, it is wet within 70 cm for more than 180 days, but only wet within 40 cm depth for between 31-90 days in most years.
IV	The soil profile is wet within 70 cm depth for more than 180 days but not wet within 40 cm depth for more than 210 days in most years or, if there is no slowly permeable layer present within 80 cm depth, it is wet within 40 cm depth for 91-210 days in most years.
V	The soil profile is wet within 40 cm depth for 211-335 days in most years.
VI	The soil profile is wet within 40 cm depth for more than 335 days in most years.

Assessment of Wetness Class

Soils have been allocated to wetness classes by the interpretation of soil profile characteristics and climatic factors using the methodology described in *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land* (MAFF, 1988).

¹ The number of days is not necessarily a continuous period.

² 'In most years' is defined as more than 10 out of 20 years.

APPENDIX III

SOIL DATA

Contents:

Sample location map

Soil abbreviations - Explanatory Note

Soil Pit Descriptions

Soil boring descriptions (boring and horizon levels)

Database Printout - Horizon Level Information

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

- GRID REF:** national 100 km grid square and 8 figure grid reference.
- 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	DCW: Deciduous Wood
HTH: Heathland	BOG: Bog or Marsh	FLW: Fallow
PLO: Ploughed	SAS: Set aside	OTH: Other
HRT: Horticultural Crops		
- GRDNT:** Gradient as estimated or measured by a hand-held optical clinometer.
- GLEYSPL:** Depth in centimetres (cm) to gleying and/or slowly permeable layers.
- AP (WHEAT/POTS):** Crop-adjusted available water capacity.
- MB (WHEAT/POTS):** Moisture Balance. (Crop adjusted AP - crop adjusted 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		

Soil Pits and Auger Borings

- 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 CH: chalk ZR: soft, argillaceous, or silty rocks MSST: soft, medium grained sandstone SI: soft weathered igneous/metamorphic rock	SLST: soft oolitic or dolimitic limestone FSST: soft, fine grained sandstone 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).
8. **STRUCT:** the degree of development, size and shape of soil peds are described using the following notation:

<u>degree of development</u>	WK: weakly developed	MD: moderately developed
	ST: strongly developed	
<u>ped size</u>	F: fine	M: medium
	C: coarse	VC: very coarse
<u>ped shape</u>	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	VF: very friable	FR: friable	FM: firm	VM: very firm
EM: extremely firm		EH: extremely hard		
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.

SOIL PIT DESCRIPTION

Site Name : VOWH LP SHRIVENHAM Pit Number : 1P

Grid Reference: SU23408840 Average Annual Rainfall : 677 mm
 Accumulated Temperature : 1419 degree days
 Field Capacity Level : 150 days
 Land Use : Field Beans
 Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 27	MCL	10YR44 54	0	1	HR					
27- 49	MCL	10YR56 00	0	0		F	MDCAB	FR	M	
49- 73	HCL	10YR54 00	0	0		C	MDCAB	FR	M	

Wetness Grade : 3A Wetness Class : III
 Gleying : S49 cm
 SPL : 49 cm

Drought Grade : 1 APW : 155mm MBW : 51 mm
 APP : 117mm MBP : 22 mm

FINAL ALC GRADE : 3A
 MAIN LIMITATION : Wetness

SAMPLE NO.	GRID REF	USE	ASPECT	--WETNESS--			-WHEAT-		-POTS-		M.REL		EROSN	FROST	CHEM	ALC	COMMENTS
				GRDNT	GLEY	SPL	CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	EXP	DIST	
1	SU23508850	BEN			28	3	3A		0	0					WE	3A	IMP60 SLGLEY28
1P	SU23408840	BEN		S49	49	3	3A	155	51	117	22	1			WE	3A	PIT73 SLGLEY49
2	SU23608850	BEN			22	3	3A		0	0					WE	3A	SL GLEY 22
3	SU23408840	BEN			45	3	3A	142	38	108	13	1			WE	3A	SL GLEY 45
4	SU23508840	BEN			55	24	3	3A		0	0				WE	3A	SL GLEY 24
5	SU23608840	BEN S		1		30	3	3A		0	0				WE	3A	IMP55 SLGLEY30
6	SU23308830	BEN S		1	55	30	3	3A	135	31	112	17	1		WE	3A	SL GLEY 30
7	SU23408830	BEN S		1	50	30	3	3A	127	23	104	9	2		WE	3A	SL GLEY 30

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----			PED COL.	----STONES----			STRUCT/ CONSIST	SUBS				CALC
				COL	ABUN	CONT		GLE	>2	>6		LITH	TOT	STR	POR	
1	0-28	mc1	10YR44 00					0	0	0						
	28-50	hc1	10YR44 00 10YR58 00 C					S	0	0		M			Y	SLIGHTLY GLEYED
	50-60	hc1	10YR44 46 10YR58 68 C					S	0	0		M			Y	SLIGHTLY GLEYED
1P	0-27	mc1	10YR44 54					0	0	HR	1					
	27-49	mc1	10YR56 00 00MN00 00 F					0	0		0	MDCAB	FR	M		
	49-73	hc1	10YR54 00 10YR56 00 C				00MN00 00 S	0	0		0	MDCAB	FR	M	Y	Y
2	0-22	mc1	10YR44 00					0	0	HR	2					
	22-35	hc1	10YR46 00 75YR58 00 C					S	0	0	0		M		Y	SLIGHTLY GLEYED
	35-90	hc1	10YR44 00 75YR46 56 C				00MN00 00 S	0	0		0		M		Y	SLIGHTLY GLEYED
	90-110	sc1	10YR46 00 10YR58 68 C				00MN00 00 S	0	0		0		M		Y	SLIGHTLY GLEYED
3	0-28	mc1	10YR44 00					0	0		0					
	28-45	mc1	10YR54 00 00FE00 00 F				00MN00 00	0	0		0		M			
	45-85	hc1	10YR54 56 10YR56 00 C				00MN00 00 S	0	0		0		M		Y	SLIGHTLY GLEYED
	85-120	sc1	10YR66 00 10YR68 00 F				00MN00 00 S	0	0		0		M		Y	SLIGHTLY GLEYED
4	0-24	mc1	10YR44 54					0	0		0					
	24-55	c	10YR54 00 10YR56 66 C				00MN00 00 S	0	0		0		P		Y	SLIGHTLY GLEYED
	55-70	c	10YR53 54 10YR66 56 M				00MN00 00 Y	0	0		0		P		Y	
5	0-30	mc1	10YR44 00					0	0	HR	2					
	30-50	c	10YR56 00 10YR58 00 C				00MN00 00 S	0	0	HR	1		P		Y	SLIGHTLY GLEYED
	50-55	c	10YR56 00 75YR44 00 C				00MN00 00 S	0	0	HR	1		P		Y	SLIGHTLY GLEYED
6	0-30	mc1	10YR44 54					0	0	HR	2					
	30-55	hc1	10YR54 00 10YR56 58 C				00MN00 00 S	0	0		0		M		Y	SLIGHTLY GLEYED
	55-100	c	05Y 52 00 10YR58 00 C					Y	0	0	HR	2		P	Y	Y
	100-120	c	05Y 53 00 75YR68 00 M				00FE00 00 Y	0	0		0		P		Y	Y
7	0-30	mc1	10YR44 54					0	0	HR	2					
	30-50	c	10YR56 00 10YR66 00 C				00MN00 00 S	0	0	HR	2		P		Y	SLIGHTLY GLEYED
	50-65	c	10YR54 56 10YR58 68 M				00MN00 00 Y	0	0	HR	5		P		Y	
	65-90	c	10YR54 64 10YR68 00 C				00MN00 00 Y	0	0		0		P		Y	
	90-120	c	10YR52 62 75YR58 00 M				00MN00 00 Y	0	0		0		P		Y	INC FE CONCS