A1

Aylesbury Vale District Local Plan
Land At Little Horwood Road
Winslow, Buckinghamshire
Agricultural Land Classification
September 1996

Resource Planning Team
Guildford Statutory Group
ADAS Reading

ADAS Reference: 0301/045/96
MAFF Reference: EL 03/01385
LUPU Commission: 02511

AGRICULTURAL LAND CLASSIFICATION REPORT

AYLESBURY VALE DISTRICT LOCAL PLAN: LAND AT LITTLE HORWOOD ROAD, WINSLOW

Introduction

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of approximately 9 hectares of land at Little Horwood Road to the south east of Winslow, Buckinghamshire. The survey was carried out during July 1996.

2. The work was commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF) from its Land Use Planning Unit in Reading, in connection with MAFF's statutory input to the Aylesbury Vale District Local Plan. This survey supersedes previous ALC surveys on this land including a detailed survey which covers the site undertaken in 1988. (ADAS Ref: 0301/23/88). The 1988 fieldwork was carried out prior to MAFF's revision of its ALC guidelines.

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 agricultural land on this site was either in permanent pasture or in ley grassland. The areas of the site shown as Other Land consist of woodland.

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 below.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% Total site area
2	8.4	94.4
Other land	0.5	5.6
Total site area	8.9	100

7. The fieldwork was conducted at an average density of 1 boring per hectare. A total of 8 borings and 1 soil pit were described at this site, in conjunction with information from another pit at an adjacent site (ADAS Ref: 0301/132/96).

8. The land at this site has been classified as Grade 2 (very good quality) on the basis of soil wetness/workability and droughtiness limitations. Soils are developed on chalky boulder clay interbedded with glacio-fluvial sand and gravels. The profiles commonly comprise medium, or occasionally, heavy clay loam topsoils over heavy clay loam upper subsoils and clay lower subsoils. In places, the soils tend to be sandier. The soils are very slightly or slightly stony and show clear evidence of wetness at moderate depths. The clays are often poorly structured when they occur. The combination of these soil properties and the prevailing climate results in minor wetness/workability and/or droughtiness limitations which mean that the land cannot be classified higher than Grade 2.

Factors Influencing ALC Grade

Climate

9. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.

10. 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
Grid reference	N/A	SP 776 277
Altitude	m, AOD	120
Accumulated Temperature	day°C	1361
Average Annual Rainfall	mm	676
Field Capacity Days	days	142
Moisture Deficit, Wheat	mm	102
Moisture Deficit, Potatoes	mm	92

11. 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.

12. 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.

13 The combination of rainfall and temperature at this site mean that there is no overall climatic limitation. Other local climatic factors such as exposure and frost risk are not believed to have a significant adverse effect on the site. The site is climatically Grade 1.

Site

14. The agricultural land at this site lies at an altitude of 110-120m AOD. The majority of the land at the site is very gently sloping with slight undulations. Nowhere does gradient or microrelief affect agricultural land quality.

Geology and soils

15. The published geological information for the site (Geological Survey G.B., 1934, Sheet 46 NW, Solid) shows the site to be underlain by a solid geology of Jurassic Oxford Clay. A Survey of the Soils of Buckinghamshire (Temple, 1929), indicates that the Oxford Clay, is overlain by superficial deposits of boulder clay and glacial gravel in the general area.

16. The most recently published soil information for the site (SSEW, 1983) shows the Ashley Association mapped across the site, with the possibility of the Hanslope Association occuring on the steeper sloping land to the southeast. The former are described as 'fine loamy over clayey soils with slowly permeable subsoils and slight seasonal waterlogging, associated with similar but wetter soils. Some calcareous and non-calcareous slowly permeable clayey soils.' (SSEW, 1983). The latter are said to be 'Slowly permeable calcareous clayey soils. Some slowly permeable non-calcareous clayey soils. Slight risk of water erosion'. (SSEW, 1983).

17. Detailed field survey broadly confirms the existence of such soils, with clay loam over clay profiles predominating at the site. Interbedded coarser textured material which may be of glacio-fluvial origin was also found at some borings, making textural classes somewhat lighter in places.

Agricultural Land Classification

18. 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.

19. 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 III.

Grade 2

20. Land of very good quality has been mapped across the survey area. The principal limitations are soil droughtiness and wetness/workability.

21. The soil profiles in the Grade 2 area can be sub-divided into two broad types:

The first comprise relatively freely draining medium clay loam topsoils overlying very slightly stony or slightly stony heavy clay loam, clay or occasionally sandy clay loam subsoils. The soils are non-calcareous. The soils are assessed as Wetness Class II. The soils are impenetrable to

the auger at variable depths but the pit indicates that this was caused by dry soil conditions and occasional fragments of flint.

The second main profile type comprises medium and heavy clay loam topsoils overlying clay subsoils with chalk fragments. The soils are calcareous throughout. The soils are slowly permeable at varying depths with slight seasonal waterlogging. The soils are assigned to wetness class II.

Given the prevailing climatic regime, soils of the types described above have minor droughtiness and wetness/workability limitations restricting the land to Grade 2. Soil droughtiness limits yield potential and consistency of yields from year to year. Where the subsoil was slowly permeable at depth (generally 50cm), drainage is slightly impeded causing slight seasonal waterlogging in the soil profile. As a result, crop germination and growth may be adversely affected. The heavier topsoil textures can also restrict the timing of grazing or cultivations as trafficking by agricultural machinery or grazing by livestock may lead to structural damage. The affect of this is partly offset by the calcareous nature of the topsoils which improves the workability and allows the land to be placed in a higher grade than would otherwise be the case.

Sharron Cauldwell,
Resource Planning Team,
Guildford Statutory Centre,
ADAS, Reading.

SOURCES OF REFERENCE

Geological Survey of Great Britain (1934) Sheet 46 NW (Solid).

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.* SSEW: Harpenden.

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

M. S. Temple, (1929) *A Survey of the Soils of Buckinghamshire.* University of Reading.

APPENDIX I

DESCRIPTION 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 that 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 severe limitations that restricts 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:

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	**DCW**:	Deciduous Wood
HTH:	Heathland	**BOG**:	Bog or Marsh	**FLW**:	Fallow
PLO:	Ploughed	**SAS**:	Set aside	**OTH**:	Other
HRT:	Horticultural Crops				

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

4. **GLEY/SPL**: 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	**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

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. **GLEY:** 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	**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/metamorphic rock		

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:

degree of development	**WK**: weakly developed **ST**: strongly developed	**MD**: moderately developed
ped size	**F**: fine **C**: coarse	**M**: medium **VC**: very coarse
ped shape	**S** : single grain **GR**: granular **SAB**: sub-angular blocky **PL**: platy	**M**: massive **AB**: angular blocky **PR**: prismatic

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 appropiate 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 : AYLESBURY LP HORWOOD RD Pit Number : 1P

Grid Reference: SP77702770 Average Annual Rainfall : 676 mm
Accumulated Temperature : 1361 degree days
Field Capacity Level : 142 days
Land Use : Permanent Grass
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 28	MCL	10YR42 43	0	2	HR					
28- 43	HCL	10YR44 54	0	3	HR		MDCSAB	FR	M	
43- 52	HCL	10YR52 53	0	10	HR	C	MDCSAB	FM	M	
52- 70	C	10YR52 53	0	1	HR	C	MWDCPR	FM	P	

Wetness Grade : 2 Wetness Class : II
Gleying :043 cm
SPL :052 cm

Drought Grade : 2 APW : 097mm MBW : -5 mm
APP : 109mm MBP : 17 mm

FINAL ALC GRADE : 2
MAIN LIMITATION : Soil Wetness/Droughtiness

SOIL PIT DESCRIPTION

Site Name : AYLESBURY VLP,NE WINSLOW Pit Number : 1P

Grid Reference: SP77702780 Average Annual Rainfall : 669 mm
Accumulated Temperature : 1377 degree days
Field Capacity Level : 141 days
Land Use : Permanent Grass
Slope and Aspect : 01 degrees E

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 23	MCL	10YR42 00	0	3	HR					Y
23- 43	HCL	25Y 52 53	0	5	HR		MDCSAB	FM	M	Y
43- 60	C	25Y 64 00	0	10	HR	F	MDCSAB	FM	M	Y
60- 80	C	25Y 52 00	0	5	CH	M	STCPR	FM	P	Y

Wetness Grade : 2 Wetness Class : II
Gleying :060 cm
SPL :060 cm

Drought Grade : 3A APW : 102mm MBW : -2 mm
APP : 108mm MBP : 14 mm

FINAL ALC GRADE : 2
MAIN LIMITATION : Wetness

SAMPLE NO.	GRID REF	USE	ASPECT	GRDNT	GLEY	SPL	--WETNESS-- CLASS	GRADE	-WHEAT- AP	MB	-POTS- AP	MB	M.REL DRT	FLOOD	EROSN EXP	FROST DIST	CHEM LIMIT		ALC	COMMENTS
1	SP77602780	PGR			035		2	2	122	20	115	23	2				WD	2		IMP 100
1P	SP77702770	PGR			043	052	2	2	097	-5	109	17	2				WD	2		
2	SP77602770	PGR					2	2	080	-22	080	-12	38				WE	2		IMP 47 PROB 2
3	SP77702770	PGR			047	060	2	2	123	21	114	22	2				WD	2		IMP 100
4	SP77502760	PGR			053	053	2	2	129	27	111	19	2				WD	2		IMP 110
5	SP77602760	LEY					2	2	093	-9	097	5	3A				WE	2		IMP 58 PROB 2
6	SP77502750	LEY			060	060	2	2	114	12	114	22	2				WD	2		
7	SP77602750	LEY	S	02	060	060	2	2	107	5	111	19	2				WD	2		
8	SP77602740	PGR			090		1	1	145	43	110	18	1					1		

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	PED GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC
1	0-30	mcl	10YR42 43						0	0	HR	1						
	30-35	mcl	10YR44 00	75YR58 00	F		00MN00 00		0	0	HR	1		M				
	35-65	hcl	10YR53 00	10YR46 58	C		00MN00 00	Y	0	0	HR	3		M				
	65-80	scl	10YR34 44	10YR58 00	M		00MN00 00	Y	0	0	HR	4		M				
	80-100	ms	25Y 56 00	10YR54 56	C		00MN00 00	Y	0	0	CH	5		M				Y
1P	0-28	mcl	10YR42 43				00MN00 00		0	0	HR	2						
	28-43	hcl	10YR44 54				00MN00 00		0	0	HR	3	MDCSAB	FR M				
	43-52	hcl	10YR52 53	75YR58 00	C		10YR62 00	Y	0	0	HR	10	MDCSAB	FM M				
	52-70	c	10YR52 53	75YR58 00	C		10YR62 00	Y	0	0	HR	1	MWDCPR	FM P	Y		Y	
2	0-29	mcl	10YR52 42						0	0	HR	1						
	29-45	hcl	10YR44 54	10YR58 00	F		00MN00 00		0	0	HR	1		M				
3	0-38	mcl	10YR43 53						0	0	HR	1						
	38-47	hcl	10YR44 54	10YR58 00	F		00MN00 00		0	0	HR	3		M				
	47-60	hcl	10YR52 53	10YR58 00	C		00FE00 00	Y	0	0	HR	5		M				
	60-100	c	10YR52 53	75YR58 00	C		00MN00 00	Y	0	0	HR	2		P			Y	
4	0-35	mcl	10YR42 00				00MN00 00		0	0	HR	3						
	35-53	hcl	10YR44 00				00MN00 00		0	0	HR	2		M				
	53-90	c	10YR52 53	10YR58 00	C		00MN00 00	Y	0	0	CH	2		P			Y	
	90-110	c	10YR52 53	10YR58 00	F		10YR56 00	S	0	0	CH	2		M			Y	
5	0-32	mcl	10YR42 43						0	0	HR	1						Y
	32-58	hcl	25Y 54 56				00MN00 00		0	0	CH	10		M				Y
6	0-28	hcl	10YR32 00				00MN00 00		0	0	HR	1						Y
	28-60	c	25Y 52 53	10YR58 00	F		00FE00 00		0	0	CH	2		M				Y
	60-90	c	25Y 52 53	10YR58 00	C		10YR51 00	Y	0	0	CH	2		P			Y	Y
7	0-28	hcl	10YR42 43						0	0	CH	2						Y
	28-60	hcl	25Y 54 56				00MN00 00		0	0	CH	5		M				Y
	60-80	c	25Y 54 56	10YR58	C		00MN00 00	Y	0	0	CH	10		P			Y	Y
8	0-30	scl	10YR43 00				00MN00 00		0	0	HR	1						
	30-60	scl	10YR44 00				00MN00 00		0	0	HR	1		M				
	60-90	msl	10YR44 54	10YR58 00	F		25Y 56 00		0	0		0		M				
	90-110	msl	10YR53 54	10YR58 00	M			Y	0	0		0		M				