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Land at Watermead, Aylesbury
Aylesbury Vale District Local Plan
Buckinghamshire

Agricultural Land Classification
ALC Map and Report

April 1997

Resource Planning Team
Eastern Region
FRCA Reading

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AGRICULTURAL LAND CLASSIFICATION REPORT

LAND AT WATERMEAD, AYLESBURY
AYLESBURY VALE DISTRICT LOCAL PLAN

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 5.2 ha of land on the northern edge of the Watermead development at Aylesbury in Buckinghamshire. The survey was carried out during April 1997.

2. The survey was undertaken by the Farming and Rural Conservation Agency (FRCA) on behalf of the Ministry of Agriculture, Fisheries and Food (MAFF), in connection with the Aylesbury Vale District 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 land use on the site was permanent grassland and cereals. The area mapped as 'Other land' is an area adjacent to the current building site, which has been given up from its agricultural use and is now being used to park site vehicles or store building materials.

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	4.0	100	76.9
Other land	1.2	N/A	23.1
Total surveyed area	4.0	100	76.9
Total site area	5.2	-	100

7. The fieldwork was conducted at an average density of 1 boring per hectare of agricultural land. A total of 4 borings and 1 soil pit was described.

8. All of the agricultural land on the site (4 hectares) has been placed in Subgrade 3b (moderate quality agricultural land), with soil wetness as the main limitation. Medium clay loam topsoils overlie clay subsoils; the subsoils are poorly structured and impede drainage, causing shallow wetness. This degree of wetness will limit the range of crops that can tolerate such conditions and restrict the number of days when the soil is in a suitable condition for cultivation or grazing by livestock.

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	SP822161	SP822163
Altitude	m, AOD	75	78
Accumulated Temperature	day°C (Jan-June)	1416	1413
Average Annual Rainfall	mm	642	645
Field Capacity Days	days	136	136
Moisture Deficit, Wheat	mm	110	110
Moisture Deficit, Potatoes	mm	103	102
Overall climatic grade	N/A	Grade 1	Grade 1

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; the site is climatically Grade 1.

Site

14. The site is flat, lying between 75 and 78 metres. Gradient and microrelief are not significant at the site. There may be a degree of flooding related to the River Thame just north of the site, but no detailed information was available at the time of survey; this will not significantly affect the grading as the site is already Subgrade 3b on the basis of other factors.

Geology and soils

15. The most detailed published soils information for the site (BGS, 1946) shows the whole area to be underlain by Kimmeridge Clay.

16. The most detailed published soils information for the site (SSEW, 1983 and 1984) shows the area to comprise soils of the Denchworth association, described as 'slowly permeable, seasonally waterlogged, clayey soils with similar fine loamy over clayey soils'. Soils similar to these were found during fieldwork.

AGRICULTURAL LAND CLASSIFICATION

17. 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.

18. 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

19. The whole of the agricultural area of the site has been placed in this grade. Soil wetness is the key limitation on the site. Pit 1 is typical of the soils that occur, and describes a medium clay loam topsoil overlying a clay upper and lower subsoil. There is clear evidence of gleying from the surface caused by the clays being slowly permeable; the structures described were coarse prismatic from 24-35 cm and coarse angular blocky beneath. These characteristics place the land in Wetness Class IV; this degree of wetness, in combination with the topsoil textures and the prevailing field capacity day level (136 days), restricts this land to Subgrade 3b. It will adversely affect seed germination and survival and will therefore restrict the range of crops that can tolerate such conditions. In addition, it will significantly restrict the number of days when the soil is in a suitable condition for cultivation, trafficking by machinery or grazing by livestock.

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SOURCES OF REFERENCE

British Geological Survey (1946) *Sheet No.238, Aylesbury.*
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.*
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:

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. **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	**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. **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	**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 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		
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

SOIL PIT DESCRIPTION

Site Name : LAND AT WATERMEAD, AYLES Pit Number : 1P

Grid Reference: SP82201610 Average Annual Rainfall : 642 mm
Accumulated Temperature : 1416 degree days
Field Capacity Level : 136 days
Land Use : Cereals
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 24	MCL	10YR41 00	0	0		C				
24- 35	C	25Y 51 00	0	0		M	MCP	FM	P	
35- 60	C	10YR51 00	0	0		M	MCAB	FM	P	

Wetness Grade : 3B Wetness Class : IV
Gleying :000 cm
SPL :035 cm

Drought Grade : 3B APW : 084mm MBW : -26 mm
APP : 090mm MBP : -13 mm

FINAL ALC GRADE : 3B
MAIN LIMITATION : Wetness

SAMPLE NO.	GRID REF	ASPECT USE	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	SP82301630	PGR	000	035	4	3B		089	-21	095	-8	3B				WE	3B	
1P	SP82201610	CER	000	035	4	3B		084	-26	090	-13	3B				WE	3B	
2	SP82201620	PGR	000	055	3	3B		101	-9	114	11	3A				WE	3B	
3	SP82301620	CER	028	045	3	3A		133	23	110	7	2				WE	3A	
4	SP82201610	CER	000	024	4	3B		126	16	103	0	2				WE	3B	

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----- COL	ABUN	CONT	PED COL.	GLEY	>2	>6	STONES---- LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC
1	0-30	mcl	10YR42 00	000C00	00	C		Y	0	0		0						
	30-35	c	10YR53 00	000C00	00	M		Y	0	0		0		M				
	35-60	c	10YR53 00	000C00	00	M		Y	0	0		0		P	Y		Y	
1P	0-24	mcl	10YR41 00	10YR48	00	C		Y	0	0		0						
	24-35	c	25Y 51 00	10YR68	00	M	25Y 52 00	Y	0	0		0	MCP	FM P	Y			
	35-60	c	10YR51 00	10YR56	00	M	25Y 51 00	Y	0	0		0	MCAB	FM P	Y		Y	
2	0-30	hcl	10YR42 00	000C00	00	M		Y	0	0		0						
	30-55	c	10YR62 00	000C00	00	M		Y	0	0		0		M				
	55-70	c	10YR62 00	000C00	00	M		Y	0	0		0		P	Y		Y	
3	0-28	mcl	10YR33 00						0	0		0						
	28-45	c	25 Y52 00	10YR58	00	M		Y	0	0		0		M				
	45-120	c	25 Y61 62	10YR68	00	M		Y	0	0		0		P			Y	
4	0-24	mcl	10YR53 51	10YR48	00	C		Y	0	0		0						
	24-55	c	05 Y51 00	10YR58	00	M	00MN00 00	Y	0	0		0		P			Y	
	55-120	c	05 Y62 00	75YR58	00	M	00MN00 00	Y	0	0		0		P			Y	