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Aylesbury Vale District Local Plan
Land at Wing

Agricultural Land Classification
ALC Map and Report

September 1997

Resource Planning Team
Eastern Region
FRCA Reading

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AGRICULTURAL LAND CLASSIFICATION REPORT

AYLESBURY VALE DISTRICT LOCAL PLAN
LAND AT WING

INTRODUCTION

1. This summary report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 8.0 ha of land at Wing, in the Aylesbury Vale District of Buckinghamshire. The survey was carried out during September 1997.

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), in connection with its statutory input to 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 agricultural land to the west of this site was under permanent grassland, partly grazed by beef cattle and horses. Whilst to the east is an area of abandoned allotment gardens. On the steeper sloping land between these two areas, land mapped as 'Other land' comprises an area of woodland, farm buildings and associated infrastructure and a pond. Adjacent to the woodland, to the east, is an area of 'Agricultural land not surveyed' which included overgrown areas too impenetrable to survey.

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
3a	3.1	47.0	38.8
3b	3.5	53.0	43.8
Agricultural land not surveyed	0.5	N/A	6.2
Other land	0.9	N/A	11.2
Total surveyed area	6.6	100	100
Total site area	8.0	-	100

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

7. The fieldwork was conducted at an average density of 1 boring per hectare of agricultural land. A total of 9 borings and 2 soil pits was described.

8. The land on this site has been classified as Subgrade 3a (good quality) and Subgrade 3b (moderate quality). The higher land on the site (formerly allotment gardens) comprises well drained coarse and medium loamy soils with flinty subsoils. These are included in Subgrade 3a due to soil droughtiness and localised micro-relief limitations. Heavy textured, poorly drained soils on lower lying ground to the west of the site are mapped as Subgrade 3b, due to wetness limitations.

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 879 231	SP 881 231
Altitude	m, AOD	105	120
Accumulated Temperature	day°C (Jan-June)	1377	1360
Average Annual Rainfall	mm	667	671
Field Capacity Days	days	143	144
Moisture Deficit, Wheat	mm	103	102
Moisture Deficit, Potatoes	mm	94	91
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 (ATO, 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. Local climatic factors, such as exposure and frost risk do not have a significant adverse affect on land quality at this location. The site is climatically Grade 1. However, climatic factors do interact with soil properties to influence soil wetness and droughtiness. At this locality the climate is comparatively cool with average rainfall, in regional terms.

Site

14. The site lies at altitudes in the range 105-120 m AOD. The highest land occurs to the east of the site on deposits of glacial sands and gravels. In the west is the lowest area of land associated with head deposits. On the higher land there is a minor microrelief limitation associated with former allotment plots. In addition, inert material, such as concrete and hard-core, was found in places and may act to hinder the use of agricultural machinery. Consequently, in assessing land quality on the higher ground account is taken of these factors and land quality has been down graded accordingly. Between the higher and lower lying land there is a strip of ground where moderate gradients of up to 6° were recorded using an optical reading clinometer.

Geology and soils

15. The most detailed published geological information for the site (BGS, 1992) shows the site to be underlain by glacial sand and gravel in the higher areas to the east and head deposits on the lower land to the west. In addition, there are two small incursions of till and Kimmeridge Clay mapped to the south west.

16. The most detailed published soils information covering the area (SSEW, 1983) maps the site as the Sutton 1 soil association. These soils are described as 'well drained fine and coarse loamy soils locally calcareous and in places shallow over limestone gravel' (SSEW, 1983). Soils consistent with this description were observed to the east of the site; deep, fine loamy soils overlie a stony horizon in the subsoil at variable depth. Elsewhere soils were distinctly wet; fine loamy or fine silty over clays in the subsoil.

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 3a

19. Land of good quality has been mapped on the highest land coincident with deposits of glacial sand and gravel.

20. All of the land classified as Subgrade 3a is affected by a soil droughtiness limitation. Soils are typically, non-calcareous comprising medium clay loam topsoils which may contain up to 10 % total flints by volume (1-5 % > 2 cm). Topsoils overlie sandy clay loam or heavy clay loam upper subsoils. These upper subsoils are impenetrable to the soil auger (40-65cm). Pit 2 (see Appendix II) was dug to determine the nature of these impenetrable subsoils and is considered typical of these soils. Pit 2 contains up to 27 % total flints by volume in the upper subsoil. Lower Subsoils are lighter, but less flinty medium sandy loam with up to 2% by volume total flints. The slight to moderate top and upper subsoil stone contents reduce the amount of available water in the profiles, and moisture balance calculations indicate that the

amount of water available to a growing crop may not be sufficient to meet its needs throughout the growing season. The resulting drought stress may cause the level and consistency of yields to be depressed. A cautious approach to grading has been applied as it is uncertain how subsoil stone contents vary across the mapping unit.

21. In addition, there are localised problems of uneven microtopography caused by the past management of the land for allotments. Most of the unevenness would be removed by normal cultivation techniques. However, some deeper depressions would remain as a more long term limitation and cause a localised hindrance to some mechanical operations.

Subgrade 3b

22. Land of moderate quality is located on the slopes and lower land in the west of the site principally associated with geological Head deposits.

23. All of the Subgrade 3b agricultural land suffers from a moderate to severe wetness limitation. Soils are non-calcareous and comprise gleyed medium clay loam topsoils, with up to 2% flints, by volume. These overlie a thin, gleyed heavy clay loam or clay upper subsoil with similar stone contents. Lower subsoils are poorly structured clays. Pit 1 (see Appendix II) confirmed the nature of these slowly permeable soils. These profiles are all gleyed within 40 cm, evidence of severely impeded drainage arising from the presence of slowly permeable horizons between 20 and 39 cm. Such drainage characteristics equate to wetness class IV which, when considered alongside topsoil textures and the prevailing climatic conditions, results in a land classification of Subgrade 3b.

24. The result of a severe soil wetness problem adversely effects seed germination and survival, partly by a reduction in soil temperature and partly because of anaerobism. This also inhibits the development of a good root system and can effect crop growth. In addition, the topsoil restricts 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 (1992) *Sheet No.220, Leighton Buzzard.* 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:

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 WING Pit Number : 1P

Grid Reference: SP88002320 Average Annual Rainfall : 667 mm
Accumulated Temperature : 1377 degree days
Field Capacity Level : 143 days
Land Use : Permanent Grass
Slope and Aspect : 02 degrees SW

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 20	MCL	10YR41 00	0	2	HR	C				
20- 38	HCL	10YR52 00	0	0		M	MDCSAB	FR	M	
38- 60	C	05PB71 00	0	0		M	MDCPR	FM	P	

Wetness Grade : 3B Wetness Class : IV
Gleying :0 cm
SPL :038 cm

Drought Grade : 3A APW : 87 mm MBW : -16 mm
APP : 93 mm MBP : -1 mm

FINAL ALC GRADE : 3B
MAIN LIMITATION : Wetness

SOIL PIT DESCRIPTION

Site Name : LAND AT WING Pit Number : 2P

Grid Reference: SP88102310 Average Annual Rainfall : 667 mm
Accumulated Temperature : 1377 degree days
Field Capacity Level : 143 days
Land Use :
Slope and Aspect : 01 degrees W

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 21	MCL	10YR31 00	5	17	HR					
21- 41	SCL	10YR43 00	0	27	HR		MDCSAB	FR	M	
41- 65	MSL	10YR44 00	0	2	HR		MDCAB	FR	M	
65-120	MSL	10YR44 00	0	2	HR		WKCAB	FR	G	

Wetness Grade : 1 Wetness Class : I
Gleying : cm
SPL : cm

Drought Grade : 2 APW : 154mm MBW : 51 mm
APP : 98 mm MBP : 4 mm

FINAL ALC GRADE : 2
MAIN LIMITATION : Droughtiness

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	SP88002320	PGR	SW	02	0	039	4	3B	92	-11	104	10	3A				WE	3B	SPL39CM
1P	SP88002320	PGR	SW	02	0	038	4	3B	87	-16	93	-1	3A				WE	3B	SPL38CM
2	SP87902310	PGR			033	033	4	3B	111	8	113	19	2				WE	3B	SPL33CM
2P	SP88102310	OTH	W	01			1	1	154	51	98	4	2				DR	2	AT BORING 4
3	SP88002310	PGR	W	03	0	028	4	3B	71	-32	71	-23	3B				WE	3B	SPL28CM
4	SP88102310	OTH	W	01			1	1	60	-43	60	-34	3B				DR	2	SEE 2P
5	SP87902300	PGR			0	020	4	3B	76	-27	80	-14	3B				WE	3B	SPL20CM
6	SP88002300	PGR	W	03	0	030	4	3B	109	6	115	21	2				WE	3B	SPL30CM
7	SP88102300	OTH	W	01			1	1	82	-21	82	-12	3B				DR	3A	IMP50CM QG2
8	SP88102290	OTH	W	01			1	1	94	-9	101	7	3A				DR	3A	IMP65CM QG2
9	SP88162292	OTH					1	1	92	-11	98	4	3A				DR	3A	IMP60CM QG2

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES COL	MOTTLES ABUN	MOTTLES CONT	PED COL.	GLEY	STONES >2	STONES >6	STONES LITH	STONES TOT	STRUCT/ CONSIST	SUBS STR	SUBS POR	SUBS IMP	SUBS SPL	SUBS CALC
1	0-16	mcl	10YR32 00	75YR46-00	C			Y	0	0	HR	2						
	16-39	hcl	10YR52 00	10YR56 00	C			Y	0	0	HR	2		M				
	39-70	c	05PB61 00	10YR56 00	M			Y	0	0	HR	2		P			Y	
1P	0-20	mcl	10YR41 00	75YR46 00	C			Y	0	0	HR	2						
	20-38	hcl	10YR52 00	75YR46 00	M			Y	0	0		0	MDCSAB	FR M				
	38-60	c	05PB71 00	10YR56 00	M			Y	0	0		0	MDCPR	FM P			Y	
2	0-33	mcl	10YR43 00						0	0	HR	2						
	33-60	c	10YR53 00	10YR56 00	C			Y	0	0	HR	2		P			Y	
	60-87	c	10YR51 53	10YR56 00	C			Y	0	0	HR	2		P			Y	
2P	0-21	mcl	10YR31 00						5	0	HR	17						
	21-41	scl	10YR43 00				10YR43 00		0	0	HR	27	MDCSAB	FR M				
	41-65	msl	10YR44 00				10YR43 00		0	0	HR	2	MDCAB	FR M				
	65-120	msl	10YR44 00						0	0	HR	2	WKCAB	FR G				
3	0-28	mcl	10YR41 00	75YR46 00	C			Y	0	0	HR	2						
	28-70	hcl	05PB51 00	10YR56 00	C			Y	0	0	HR	2		P			Y	
4	0-19	mcl	10YR32 00						5	0	HR	10						
	19-40	scl	10YR44 00						0	0	HR	10		M				
5	0-20	c	10YR51 52	10YR46 00	C			Y	0	0	HR	2						
	20-60	zc	10YR41 00	75YR46 00	M		00MN00 00	Y	0	0	HR	2		P			Y	
6	0-30	hzcl	10YR41 00	10YR46 00	C			Y	2	0	HR	2						
	30-58	c	10YR42 00	10YR46 00	M			Y	0	0	HR	2		P			Y	
	58-65	c	10YR51 00	10YR58 00	M			Y	0	0	HR	5		P			Y	
	65-80	c	05PB51 00	10YR56 00	C			Y	0	0		0		P			Y	
7	0-28	mcl	10YR32 00						1	0	HR	5						
	28-50	hcl	10YR43 00						0	0	HR	5		M				
8	0-35	mcl	10YR32 00						1	0	HR	5						
	35-65	scl	10YR43 00						0	0	HR	10		M				
9	0-30	mcl	10YR32 00						1	0	HR	4						
	30-60	hcl	10YR33 00						0	0	HR	4		M				