A1

Maidstone Borough Local Plan
Objector Site 134,
Land at Howland Road, Marden

Agricultural Land Classification
ALC Map and Report

November 1996

Resource Planning Team
Eastern Region
FRCA Reading

RPT Job Number: 2007/165/96
MAFF Reference: EL 20/00862
LURET Job Number: 02637

AGRICULTURAL LAND CLASSIFICATION REPORT

MAIDSTONE BOROUGH LOCAL PLAN
OBJECTOR SITE 134,
LAND AT HOWLAND ROAD, MARDEN

Introduction

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of approximately 6 hectares of land off Howland Road, to the east of Marden, Kent. The survey was carried out during November 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 Maidstone Borough Local Plan. The results of this survey supersede any previous ALC information for this land.

3. Prior to the 1st April 1997 the work was conducted by members of the Resource Planning Team in the Guildford Statutory Group of ADAS. After this date, the work was completed by the same team as part of the Farming and Rural Conservation Agency (FRCA), Reading. 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 in grassland.

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)	% Agricultural area	% Total site area
2	3.0	51.7	50.8
3a	2.8	48.3	47.5
Other land	0.1	-	1.7
Total agricultural land	5.8	100.0	-
Total site area	5.9	-	100.0

7. The fieldwork was conducted at an average density of 1 boring per hectare. A total of 6 borings and 1 soil pit were described.

8. The land at this site has been classified as Grade 2 (very good quality) and Subgrade 3a (good quality). Land assigned to Grade 2 is affected by minor soil droughtiness restrictions, whilst that classified as Subgrade 3a is influenced by soil wetness.

9. Soils within the Grade 2 mapping unit generally comprise medium silty clay loam topsoils which overlie medium or heavy clay loam subsoils. There is evidence of a fluctuating watertable, but overall these soils are moderately well drained. The land is affected by slight restrictions on profile available water resulting from the interaction of soil properties and the prevailing climatic conditions. This minor soil droughtiness limitation may influence the level and consistency of crop yields.

10. Across the eastern part of the site the land is affected by soil wetness arising from the imperfect drainage of the associated soils. Profiles were found to be similar to those described above, but clay horizons in the lower subsoil impede soil drainage and cause seasonal waterlogging in the profile. This will affect plant growth and development, as well as restricting the opportunities for cultivations and/or grazing, to the extent that Subgrade 3a is appropriate.

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 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	TQ 754 446
Altitude	m, AOD	25
Accumulated Temperature	day°C (Jan-June)	1483
Average Annual Rainfall	mm	660
Field Capacity Days	days	136
Moisture Deficit, Wheat	mm	125
Moisture Deficit, Potatoes	mm	122

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 (Climatic Grade 1). However, climatic factors do interact with soil properties

to influence soil wetness and droughtiness. At this locality the climate is relatively warm and dry in a regional context. This will have the effect of enhancing the likelihood of soil droughtiness restrictions.

16. Local climatic factors such as frost risk and exposure are not thought to adversely affect agricultural land use on this site.

Site

17. The land on this site ranges from 23-30m AOD. The highest land is found along the western site boundary, with the land falling gently through gradients of 1-2° towards the east of the site. Micro-relief and gradient do not affect agricultural land quality across the site.

18. Flooding does not appear to be limiting on this site.

Geology and soils

19. The published geological sheet for the area (BGS, 1976) shows all of the site to be underlain by river gravel deposits.

20. The most recently published soils information for this area (SSEW, 1983) maps the Waterstock soil association across the site. These soils are described as 'Fine loamy gleyic brown earths with ochreous mottling in the subsoil.' (SSEW, 1983).

21. Detailed field examination of the soils on the site found them to be broadly in accordance with those described by the Soil Survey, being clay loam soils variably affected by impeded drainage.

Agricultural Land Classification

22. 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.

23. 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

24. An area of very good quality agricultural land has been mapped across the western part of the site. Soils typically comprise non-calcareous, medium silty clay loam topsoils, containing up to 2% . These overlie heavy clay loam upper subsoils of similar stone content, which are mottled and gleyed. Lower subsoils have similar or slightly lighter textures, are also mottled and gleyed, and become impenetrable due to isolated flints at 65-110cm depth. These soils are moderately well drained, despite being gleyed from 20-48cm. Wetness class I or II (see Appendix II) is therefore assigned. The interaction between soil properties and the prevailing climate, which is relatively dry at this locality, results in slightly reduced reserves of available water. Soil moisture balance calculations indicate that available water may not be sufficient to meet the demands of a growing crop throughout the season. Grade 2 is therefore appropriate

meet the demands of a growing crop throughout the season. Grade 2 is therefore appropriate on the basis of a minor soil droughtiness restriction, which may affect the level and consistency of yield.

Subgrade 3a

25. Good quality agricultural land is across the eastern part of the site. This land is principally affected by soil wetness restrictions. Non-calcareous, medium clay loam or silty clay loam topsoils occur, which are stone free and occasionally gleyed. These overlie heavy clay loam upper subsoils and pass to poorly structured clay below 45-50cm depth. These clayey lower subsoils are defined as slowly permeable and as such impede soil drainage to the extent that wetness class III is appropriate. Soil pit 1 (see Appendix III) is representative of these soils and the Subgrade 3a mapping unit. The combination of soil drainage status and climatic conditions, along with topsoil textures, results in a land classification of Subgrade 3a. The soil wetness limitation which affects this land will influence crop development and growth, and the timing of cultivations and/or grazing.

Michelle Leek
Resource Planning Team
FRCA Reading

SOURCES OF REFERENCE

British Geological Survey (1976) *Sheet No. 288, Maidstone,* 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.* Meteorological 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, 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:

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 : MAIDSTONE LP, MARDEN Pit Number : 1P

Grid Reference: TQ75404450
Average Annual Rainfall : 660 mm
Accumulated Temperature : 1483 degree days
Field Capacity Level : 136 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- 24	MCL	10YR42 52	0	0						
24- 50	HCL	25 Y52 53	0	0		C	MDCSAB	FM	M	
50- 62	C	25 Y63 00	0	0		M	MDCOPR	FM	P	
62- 80	C	25 Y62 00	0	0		M	STCOAB	FM	P	

Wetness Grade : 3A
Wetness Class : III
Gleying :024 cm
SPL :050 cm

Drought Grade :
APW : 000mm MBW : 0 mm
APP : 000mm MBP : 0 mm

FINAL ALC GRADE : 3A
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	TQ75404460	PGR	E	01	030	030	4	3B	115	-10	106	-16	3A				WE	3B	
1P	TQ75404450	PGR	E	01	024	050	3	3A	000	0	000	0					WE	3A	
2	TQ75504460	PGR	E	01	0	045	3	3A	109	-16	114	-8	3A				WE	3A	
3	TQ75204450	RGR			048		1	1	104	-21	112	-10	3B				DR	2	IMP 65
4	TQ75304450	RGR	E	02	020		2	2	145	20	117	-5	2				WD	2	
5	TQ75404450	PGR	E	01	030	045	3	3A	113	-12	111	-11	3A				WE	3A	
6	TQ75124455	RGR			020		2	2	120	-5	117	-5	3A				WD	2	IMP 85

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	hcl	10YR42 52						0	0		0						Y	
	30-100	c	25 Y53 00	10YR58 00	C		00MN00 00	Y	0	0		0		P			Y	Y	PLASTIC
1P	0-24	mcl	10YR42 52						0	0		0							
	24-50	hcl	25 Y52 53	75YR58 00	C			Y	0	0		0	MDCSAB FM	M					
	50-62	c	25 Y63 00	75YR56 00	M		00MN00 00	Y	0	0		0	MDCOPR FM	P			Y		2NDRY MDCAB
	62-80	c	25 Y62 00	75YR68 00	M		00MN00 00	Y	0	0		0	STCOAB FM	P	Y		Y		
2	0-30	mzcl	10YR52 00	75YR56 00	C			Y	0	0		0							
	30-45	hcl	10YR53 00	75YR58 00	C		00MN00 00	Y	0	0		0		M					
	45-80	c	10YR53 00	75YR58 00	C		00MN00 00	Y	0	0		0		P			Y		
3	0-30	mzcl	10YR43 00				00MN00 00		0	0		0							
	30-48	hcl	10YR43 53	10YR58 00	F		00MN00 00		0	0		0		M					
	48-65	hcl	25Y 72 73	75YR58 00	C		00MN00 00	Y	0	0	HR	2		M					IMP 65
4	0-20	mzcl	10YR42 43						0	0	HR	2							
	20-70	hcl	25Y 64 74	10YR56 58	M		00MN00 00	Y	0	0	HR	1		M					
	70-110	mcl	25Y 73 00	75YR44 58	M		00MN00 00	Y	0	0		0		M					
5	0-30	mcl	10YR42 52	75YR56 00	F				0	0		0							
	30-45	hcl	25 Y63 00	75YR56 00	C		00MN00 00	Y	0	0		0		M					
	45-60	c	25 Y63 00	75YR56 00	C			Y	0	0		0		P			Y		
	60-90	c	25 Y62 00	75YR68 00	M			Y	0	0		0		P			Y		
6	0-20	mzcl	10YR43 00	10YR56 00	F		00MN00 00		0	0	HR	2							
	20-60	hcl	10YR52 53	75YR58 00	C		00MN00 00	Y	0	0		0		M					
	60-85	mcl	25Y 73 00	75YR58 00	M		00MN00 00	Y	0	0		0		M					IMP 85