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Maidstone Borough Local Plan
Site 29 Land at River Farm,
Hollingbourne
Agricultural Land Classification
ALC Map and Report
October 1994

AGRICULTURAL LAND CLASSIFICATION REPORT

MAIDSTONE BOROUGH LOCAL PLAN SITE 29 LAND AT RIVER FARM, HOLLINGBOURNE

1 Summary

- 1.1 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality for a number of sites in the Maidstone Borough of Kent. The work forms part of MAFF's statutory input to the preparation of the Maidstone Borough Local Plan.
- 1.2 Site 29 comprises 8.3 hectares of land north of Eyhorne Street in the village of Hollingbourne. An Agricultural Land Classification (ALC) survey was carried out during August 1994. The survey was undertaken at a detailed level of approximately one boring per hectare. A total of 12 borings and one soil inspection pit were described in accordance with MAFF's revised guidelines and criteria for grading the quality of agricultural land (MAFF 1988). These guidelines provide a framework for classifying land according to the extent to which its physical or chemical characteristics impose a long term limitation on its use for agriculture.
- 1.3 The survey work was carried out by the Resource Planning Team of the Guildford Statutory Group of ADAS.
- 1.4 At the time of survey the land use on the site was permanent pasture.
- 1.5 The distribution of grades and subgrades is shown on the attached ALC map and the areas are given in the table below. The map has been drawn at a scale of 1:10,000. It is accurate at this scale but any enlargement would be misleading.

Table 1 Distribution of Grades and Subgrades

Grade	Area (ha)	% of Agricultural Land
2	0.6	7.2
3b	7.7	92.8
Total area of site	8.3	100.0

- 1.6 Appendix I gives a general description of the grades, subgrades and land use categories identified in the survey. The main classes are described in terms of the type of limitation that can occur, the typical cropping range and the expected level and consistency of yield.
- 1.7 The majority of the agricultural land surveyed has been classified as Subgrade 3b moderate quality, because of significant soil wetness and workability limitations. Profiles typically comprise heavy silty clay loam topsoils which become calcareous downslope. These overlie clay and silty clay upper and lower subsoils. These

subsoils are poorly structured and their slowly permeable characteristics act to significantly impair drainage resulting in gleying below and within the topsoils. The lowest lying land has been classed as Grade 2 very good quality because of a possible chemical limitation caused by extremely calcareous upper subsoils comprising algal marl deposits.

2 Climate

- 2.1 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.
- 2.2 The main parameters used in the assessment of an overall climatic limitation are average annual rainfall as a measure of overall wetness and accumulated temperature (degree days Jan-June) as a measure of the relative warmth of a locality.
- 2.3 A detailed assessment of the prevailing climate was made by interpolation from a 5km gridpoint dataset (Met Office 1989). The details are given in the table below and these show that there is no overall climatic limitation affecting the site. The crop adjusted soil moisture deficits at this locality are slightly higher than the regional average. High soil moisture deficits increase the likelihood of soil droughtiness limitations and decrease that of soil wetness limitations.
- 2.4 No local climatic factors such as exposure or frost risk are believed to affect the site.

Table 2 Climatic Interpolation

Grid Reference	TQ833549
Altitude (m)	65
Accumulated Temperature (degree days Jan-June)	1432
Average Annual Rainfall (mm)	724
Field Capacity (days)	152
Moisture Deficit, Wheat (mm)	111
Moisture Deficit Potatoes (mm)	105
Overall Climatic Grade	1

3 Relief

- 3.1 The highest land occurs in the north west of the site lying level at approximately 75m AOD. The land then falls through slopes of 1.5° to lie at approximately 65m AOD in the south-east of the site where land becomes level. Neither gradient or relief impose any limitation to agricultural land quality.

4 Geology and Soil

- 4 1 British Geological Survey (1971) Sheet 288 shows the entire site to be underlain by Gault Clay
- 4 2 Soil Survey of England and Wales (1983) Sheet 6 shows the entire site to comprise soils of the Denchworth Association. These soils are described as slowly permeable seasonally waterlogged clayey soils with similar fine loamy over clayey soils. Some fine loamy over clayey soils with only slight seasonal waterlogging and some slowly permeable calcareous clayey soils. Landslips and associated irregular terrain locally (SSEW 1983)
- 4 3 Detailed field examination of the soils on the site found them to be consistent with the published geological information across most of the site. Soils comprise both calcareous and non calcareous slowly permeable seasonally waterlogged soils. The flatter lowest lying land consists of well drained soils with upper subsoils comprising algal marl deposits

5 Agricultural Land Classification

- 5 1 Table 1 provides the details of the area measurements for each grade and the distribution of each grade is shown on the attached ALC map
- 5 2 The location of the soil observation points are shown on the attached sample point map

Grade 2

- 5 3 The flatter lower-lying land on the site has been classed as very good quality because of a possible chemical limitation caused by very high levels of calcium carbonate within the soil profile. Topsoils typically comprise silt loams or medium silty clay loams which overlie heavy silty clay loam upper subsoils. At approximately 45 cm depth these profiles pass into a deep horizon of algal marl which overlies poorly structured clay at approximately 95 cm. This clay acts to slightly impede drainage causing gleying within the algal marl horizon. However because the clay is only present at depth then such profiles are still eligible to be assigned to Wetness Class I. These soils having developed from calcareous algal marl deposits have very high levels of calcium carbonate which acts to restrict micro nutrient availability to plants. It is therefore judged that these soils have sufficiently high carbonate levels to impose a slight chemical limitation on plant growth thereby restricting the agricultural land quality. The range of crops which can tolerate such high levels of calcium carbonate will be limited

Subgrade 3b

- 5 4 The majority of land on the site has been classified as moderate quality because of significant soil wetness and workability limitations. Topsoils comprise heavy silty clay loams though on the highest flatter land in the north of the site silty clays occur. Topsoils are very slightly stony containing approximately 2-5% total flints

and/or chalk fragments by volume and tend to be non calcareous along the western boundary of the site but calcareous elsewhere. These overlie calcareous and non calcareous clay and silty clay upper and lower subsoils which are similarly stony to that of the topsoils. These subsoils are poorly structured directly below the topsoil and their slowly permeable characteristics act to significantly impede drainage. This causes seasonal waterlogging as evidenced by gleying below and often within the topsoil. Consequently Wetness Class IV is appropriate. Pit 1 typifies such soils. The interaction between the heavy topsoil textures and the drainage status with the climatic regime prevailing at this site means that this land is subject to significant restrictions on its use in terms of workability opportunities for cultivations and grazing by livestock. Crop growth and yield will also be adversely affected by such soil wetness.

ADAS Ref 2007/198/94
MAFF Ref EL 20/328

Resource Planning Team
Guildford Statutory Group
ADAS Reading

SOURCES OF REFERENCE

British Geological Survey (1976) Sheet No 288 Maidstone 1 50 000 Series (solid and drift edition)

MAFF (1988) Agricultural Land Classification of England and Wales Revised guidelines and criteria for grading the quality of agricultural land

Meteorological Office (1989) Climatological Data for Agricultural Land Classification

Soil Survey of England and Wales (1983) Sheet 6 Soils of South East England 1 250 000 and accompanying legend

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 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 (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 which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

Urban

Built-up or 'hard' uses with relatively little potential for a return to agriculture including housing industry commerce education transport religious buildings cemeteries Also hard-surfaced sports facilities, permanent caravan sites and vacant land all types of derelict land including mineral workings which are only likely to be reclaimed using derelict land grants

Non-agricultural

'Soft' uses where most of the land could be returned relatively easily to agriculture including private parkland public open spaces sports fields allotments and soft surfaced areas on airports Also active mineral workings and refuse tips where restoration conditions to 'soft' after uses may apply

Woodland

Includes commercial and non-commercial woodland A distinction may be made as necessary between farm and non-farm woodland

Agricultural Buildings

Includes the normal range of agricultural buildings as well as other relatively permanent structures such as glasshouses Temporary structures (eg polythene tunnels erected for lambing) may be ignored

Open Water

Includes lakes ponds and rivers as map scale permits

Land Not Surveyed

Agricultural land which has not been surveyed

Where the land use includes more than one of the above, eg buildings in large grounds and where map scale permits the cover types may be shown separately Otherwise the most extensive cover type will be shown

APPENDIX II

FIELD ASSESSMENT OF SOIL WETNESS CLASS

SOIL WETNESS CLASSIFICATION

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.

Definition of Soil Wetness Classes

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

Soils can be allocated to a wetness class on the basis of quantitative data recorded over a period of many years or by the interpretation of soil profile characteristics, site and climatic factors. Adequate quantitative data will rarely be available for ALC surveys and therefore the interpretative method of field assessment is used to identify soil wetness class in the field. The method adopted here is common to ADAS and the SSLRC.

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

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

APPENDIX III
SOIL PIT AND SOIL BORING DESCRIPTIONS

Contents

Soil Abbreviations - Explanatory Note

Soil Pit Descriptions

Database Printout - Boring Level Information

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

- 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 **GLEYSPL** 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 **MD** moderately developed
 ST strongly developed

ped size **F** fine **M** medium
 C coarse **VC** very 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 **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 MAIDSTONE LP SITE 29 Pit Number 1P

Grid Reference TQ83365491 Average Annual Rainfall 724 mm
 Accumulated Temperature 1432 degree days
 Field Capacity Level 152 days
 Land Use Permanent Grass
 Slope and Aspect 02 degrees SE

HORIZON	TEXTURE	COLOUR	STONES >2	TOT STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 25	HZCL	25ZY42 00	0	5	HR					Y
25- 42	C	10YR53 00	0	10	HR	C	STCOAB	VF	P	Y
42- 50	C	10YR53 00	0	0		M	STVCPR	VF	P	
50- 70	ZC	05 Y61 00	0	0		M	MDCOPR	VF	P	

Wetness Grade 3B Wetness Class IV
 Gleying 025 cm
 SPL 025 cm

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

FINAL ALC GRADE 3B
 MAIN LIMITATION Wetness

SAMPLE NO	GRID REF	ASPECT USE	--WETNESS		WHEAT-		-POTS-		M REL		EROSN EXP	FROST DIST	CHEM LIMIT	ALC	COMMENTS
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB					
1	TQ83305500	PGR		0 018	4	3B		0	0				WE	3B	
1P	TQ83365491	PGR SE	02	025 025	4	3B		0	0				WE	3B	Pit dug to 70
2	TQ83405500	PGR SE	04	020 020	4	3B		0	0				WE	3B	
3	TQ83205490	PGR E	01	0 020	4	3B		0	0				WE	3B	
4	TQ83305490	PGR SE	04	025 025	4	3B		0	0				WE	3B	
5	TQ83365491	PGR SE	04	025 025	4	3B		0	0				WE	3B	
6	TQ83505490	PGR E	01	028 028	4	3B		0	0				WE	3B	
7	TQ83205480	PGR SE	05	0 025	4	3B		0	0				WE	3B	
8	TQ83305483	PGR SE	02	022 022	4	3B		0	0				WE	3B	
9	TQ83405480	PGR E	01	0 028	4	3B		0	0				WE	3B	
10	TQ83505480	PGR E	01	078 078	2	3A	136	25	114	9	2		WE	3A	
11	TQ83585480	PGR E	01	045 095	1	1	157	46	122	0	1		CH	2	Algal Mar1 45
12	TQ83475483	PGR E	01	0 030	4	3B		0	0				WE	3B	

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES-----			PED COL	----STONES-----			STRUCT/ CONSIST	SUBS							
				COL	ABUN	CONT		GLE	>2	>6		LITH	TOT	STR	POR	IMP	SPL	CALC	
1	0-18	zc	25Y 52 00	75YR46	00	C		Y	0	0	HR	4							
	18-40	zc	25Y 61 63	10YR56	00	C		Y	0	0	HR	5		P				Y	
	40-60	zc	25Y 61 63	10YR56	00	M		Y	0	0		0		P				Y	
1P	0-25	hzc1	25Z42	00					0	0	HR	5						Y	
	25-42	c	10YR53	00	10YR56	00	C	Y	0	0	HR	10	STCOAB	VF	P	Y		Y	Y
	42-50	c	10YR53	00	75YR58	00	M	Y	0	0		0	STVCPR	VF	P	Y		Y	
	50-70	zc	05 Y61	00	75YR58	00	M	Y	0	0		0	MDCOPR	VF	P	Y		Y	
2	0-20	hzc1	25Y 42 00						0	0	CH	3						Y	
	20-35	zc	25Y 53 00	10YR56	00	C		Y	0	0	CH	3		P				Y	Y
	35-60	zc	05Y 61 00	10YR56	00	M		Y	0	0		0		P				Y	
3	0-20	hzc1	25Y 42 00	75YR46	00	C		Y	0	0	HR	3							
	20-35	zc	05Y 61 62	10YR56	00	M		Y	0	0	HR	8		P				Y	
	35-60	zc	05Y 61 62	10YR56	00	M		Y	0	0		0		P				Y	
4	0-25	hzc1	25Y 42 00						0	0	HR	2						Y	
	25-38	c	10YR53	00	10YR58	00	M	Y	0	0	HR	5		P				Y	Y
	38-55	c	25Y 53 00	75YR58	00	M		Y	0	0	HR	2		P				Y	Y
5	0-25	hzc1	25Y 42 00						0	0	CH	2						Y	
	25-40	c	10YR53	00	10YR56	00	C	00MN00	00	Y	0	0	HR	8		P		Y	Y
	40-50	c	10YR53	00	10YR56	51	M		Y	0	0	HR	3		P			Y	
	50-70	zc	05Y 61 62	10YR56	00	M		Y	0	0		0		P				Y	
6	0-28	hzc1	25Y 42 00	10YR56	00	F			0	0	CH	2						Y	
	28-55	c	25Y 52 00	10YR56	00	C		Y	0	0	CH	2		P				Y	Y
7	0-25	hzc1	25Y 41 00	10YR68	00	C		Y	0	0	HR	2							
	25-40	c	25Y 52 61	75YR68	00	M		Y	0	0	HR	2		P				Y	
	40-60	zc	05Y 61 00	75YR68	00	M		Y	0	0		0		P				Y	
8	0-22	hzc1	25Y 42 00						0	0	HR	2							
	22-32	c	25Y 53 00	10YR58	00	M		00MN00	00	Y	0	0	HR	5		P		Y	
	32-60	zc	05Y 62 00	75YR68	00	M		Y	0	0	HR	2		P				Y	
9	0-28	hzc1	25Y 32 00	10YR56	00	C		Y	0	0	CH	2						Y	
	28-60	c	05Y 51 00	10YR56	00	C		Y	0	0	CH	2		P				Y	Y
10	0-25	hzc1	25Y 42 00						0	0	CH	3						Y	
	25-65	zc	25Y 42 00						0	0	CH	3		M				Y	
	65-78	zc	25Y 31 00	10YR56	00	F			0	0	CH	3		M				Y	
	78-120	zc	05Y 61 00	10YR56	00	C		Y	0	0		0		P				Y	Y
11	0-30	mzc1	10YR42	00					0	0	CH	2						Y	
	30-45	hzc1	25Y 52 53						0	0	CH	3		M				Y	
	45-95	cs1	10YR82	00	10YR56	00	C		Y	0	0	0		M				Y	
	95-120	c	25Y 42 00	75YR46	00	C		Y	0	0		0		P				Y	Y

SAMPLE	DEPTH	TEXTURE	COLOUR	- --MOTTLES-----			PED	----STONES			-- STRUCT/		SUBS				
				COL	ABUN	CONT		COL	GLEY >2	>6	LITH	TOT	CONSIST	STR	POR	IMP	SPL
12	0-30	hzc1	25Y 42 00	10YR56	00	C		Y	0	0	HR	2					Y
	30-55	c	05Y 42 52	10YR58	00	C		Y	0	0		0	P				Y