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HAVANT BOROUGH LOCAL PLAN
Sites 22, 23 & 24 Land at Hampshire Farm, Havant, Hampshire

Agricultural Land Classification
ALC Map and Report

September 1997

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Eastern Region
FRCA Reading

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AGRICULTURAL LAND CLASSIFICATION REPORT

HAVANT BOROUGH LOCAL PLAN
SITES 22, 23 & 24 LAND AT HAMPSHIRE FARM, HAVANT, HAMPSHIRE

INTRODUCTION

1 This summary report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 12 9 ha of land at Hampshire Farm east of Havant in Hampshire 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 Havant Borough 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 majority of the land was under cereal production Whilst land adjacent to the River Ems was under permanent grassland and grazed by dairy cattle

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 All of the site 12 9ha is in agricultural use and has been classified as Subgrade 3b

7 The fieldwork was conducted at an average density of 1 boring per hectare of agricultural land A total of 13 borings and 2 soil pits was described

8 The entire site has been mapped as Subgrade 3b (moderate quality agricultural) land equally limited by a moderate soil wetness and moderate soil droughtiness restriction The majority of the site suffers from a moderate soil wetness limitation Soil profiles are typically deep very slightly stony and non calcareous Topsoil textures are medium silty clay loams These overlie gleyed heavy clay loam or heavy silty clay loam upper subsoils with a moderate structural condition Lower subsoils are clayey and poorly structured which acts to impede drainage and it is the depth to this slowly permeable layer which determines the overall ALC grade and restricts the land to no higher than Subgrade 3b quality

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

9 The agricultural impact of a moderate soil wetness limitation is felt in an adverse effect upon seed germination partly by a reduction in soil temperature and partly because of anaerobism This also inhibits the development of a good root system and can affect crop growth In addition the light topsoils are prone to structural damage and this restricts the number of days when the soil is in a suitable condition for cultivation trafficking by machinery or grazing by livestock

10 Land adjacent to the River Ems suffers from a moderate soil droughtiness limitation Soil profiles are typically non calcareous and slightly stony overlying gravelly horizons at moderate depth Topsoil textures are medium silty clay loams These overlie gleyed heavy silty clay loam or heavy clay loam or clay upper subsoils which exhibit moderate structural conditions Lower subsoils are very stony clays which could not be described to depth The texture depth and stone content determines the overall ALC grade by significantly reducing the amount of available water in the soil profile and limiting this land to Subgrade 3b

11 The agricultural impact of a moderate soil droughtiness limitation is to affect crop growth and reduce the level and constancy of yield because sufficient moisture is not readily available throughout critical growing times of the year

FACTORS INFLUENCING ALC GRADE

Climate

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

13 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	SU 753 075	SU 755 074
Altitude	m AOD	12	12
Accumulated Temperature	day C (Jan June)	1537	1537
Average Annual Rainfall	mm	812	810
Field Capacity Days	days	170	169
Moisture Deficit Wheat	mm	112	112
Moisture Deficit Potatoes	mm	108	108
Overall climatic grade	N/A	Grade 1	Grade 1

14 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

15 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

16 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 affect land quality at this location The land is climatically Grade 1 However climatic factors do interact with soil properties to influence soil wetness and soil droughtiness At this locality the climate is relatively warm and moist in national terms The likelihood of soil wetness problems may therefore be enhanced

Site

17 The site is relatively flat and low lying in the range 12 20 m AOD The highest land occurs along the north western boundary of the site and falls gently away to the south and east The survey area is not affected by any site limitations (i e gradient micro relief or flooding)

Geology and soils

18 The most detailed published geological information for the site (BGS 1958) shows the majority of the survey area to be underlain by Coombe deposits with smaller areas of alluvium London Clay and Brickearth deposits found along the eastern north western and southern boundaries respectively

19 The most detailed published soils information covering the site (SSEW 1983) shows most of it to be mapped as soils of the Wickham 3 association These soils are described as slowly permeable seasonally waterlogged fine loamy over clayey soils and similar more permeable soils with slight waterlogging Some deep coarse loamy soils affected by groundwater (SSEW 1983) Soils consistent with this description were observed across the site fine loamy over shallow slowly permeable clayey soils Along the eastern boundary of the site soils of the Hamble 2 association are recorded These soils are described as deep stoneless well drained silty soils affected by groundwater over gravel locally (SSEW 1983) Soils conforming to this description were detected in this area fine silty passing to stony shallow clayey subsoils over gravelly layers

AGRICULTURAL LAND CLASSIFICATION

20 The details of the classification of the site are shown on the attached ALC map

21 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

22 All of the agricultural land is mapped entirely as moderate quality Its principal limitations are soil wetness and soil droughtiness

23 The majority of the site is affected by the occurrence of a significant soil wetness limitation concurrent with soils mapped as the Wickham 3 association Soils typically comprise non calcareous medium silty clay loam topsoils which may contain up to 2 % flints by volume These overlie heavy silty clay loam or heavy clay loam upper subsoils with up to 5 % flints by volume Upper subsoils pass into poorly structured clayey subsoils with similar stone contents Pit 1 (see Appendix II) is typical of these soils and confirmed the existence of these poorly structured clay horizons which are slowly permeable It is the depth to these slowly permeable clay horizons (between 35 and 54 cm) which determines the ALC grade Consequently soils are assigned to Wetness Class IV or occasionally Wetness Class III Poor drainage in combination with topsoil texture and the local climate results in a land classification of Subgrade 3b Occasional borings that are slightly better drained do occur in this map unit but have not been mapped separately

24 The effect of prolonged soil wetness is to impede drainage which adversely affects 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 affect crop growth In addition the heavy topsoils restrict the number of days when the soil is in a suitable condition for cultivation trafficking by machinery or grazing by livestock

25 The remainder of the survey area is limited by soil droughtiness and is coincident with soils of the Hamble 2 association adjacent to the River Ems

26 All the soil profiles across this area proved impenetrable to the soil auger at relatively shallow depths due to high stone contents Soil pit 2 (see appendix II) confirmed the extent of the high stone contents of the subsoils Soils typically comprise non calcareous medium silty clay loam topsoils which may contain up to 5 % flints by volume Topsoils overlie heavy clay loam or heavy silty clay loam or clay lower subsoils with up to 10 % flints by volume These pass into clay lower subsoils which proved to be impenetrable to the auger From Pit 2 stone volumes were measured using a 2 cm sieve and stones less than 2 cm were wet sieved In total 55 % flints by volume was recorded (from 39 cm) Stone contents increased to 65 % flints by volume further down the profile (from 65 cm) Given these high stone contents the pit could not be examined beyond 65cm It has been assumed that roots can penetrate beyond this depth but the stone contents and the degree of penetration beyond 65cm are unknown and the pit has therefore been left in Subgrade 3b Elsewhere in this droughty section shallower borings occur which may indicate higher stone contents in places These stony subsoils severely restrict the amount of available water in the profile and the interaction between these properties and the local climatic parameters results in significant soil droughtiness Moisture balance calculations indicate that there is insufficient water to meet the needs of a growing plant at critical times of the growing season Subgrade 3b is therefore the appropriate classification for this land Here the impact of soil droughtiness will be seen in the reduction of the level and consistency of yields

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SOURCES OF REFERENCE

British Geological Survey (1958) *Sheet No 316 Fareham* 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

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	SU75300770	CER		27	45	4	3B		96	-16	108	0	3A				WE	3B	SEE 1P
2	SU75300760	CER		35	54	3	3A		104	-8	112	4	3A				WE	3A	
3	SU75400760	CER		29	29	4	3B		102	-10	107	-1	3A				WE	3B	SEE 1P
4	SU75500760	PGR		18		2	2		73	-39	73	-35	3B				DR	3B	SEE 2P
5	SU75200750	CER		30	54	3	3A		105	-7	111	3	3A				WE	3A	
6	SU75300750	CER		28	44	4	3B		96	-16	108	0	3A				WE	3B	AB AT 1P
7	SU75400750	CER		39	39	4	3B		103	-9	107	-1	3A				WE	3B	SEE 1P
8	SU75500750	PGR		28		2	2		84	-28	84	-24	3B				DR	3B	AB AT 2P
9	SU75200740	CER		30	35	4	3B		94	-18	105	-3	3A				WE	3B	SEE 1P
10	SU75300740	CER		42	54	3	3A		107	-5	112	4	3A				WE	3A	
11	SU75400740	PGR		15		2	2		86	-26	86	-22	3B				DR	3B	SEE 2P
12	SU75500740	PGR		17		2	2		66	-46	66	-42	3B				DR	3B	SEE 2P
13	SU75300730	CER		25	44	4	3B		95	-17	107	-1	3A				WE	3B	SEE 1P
P1	SU75300750	CER		30	43	4	3B		108	-4	118	10	3A				WE	3B	PIT1 AT AB6
P2	SU75500750	PGR		17		2	2		79	-33	84	-24	3B				DR	3B	PIT2 AT AB8

				----MOTTLES-----			PED		----STONES----				STRUCT/	SUBS			
SAMPLE	DEPTH	TEXTURE	COLOUR	COL	ABUN	CONT	COL	GLEY	>2	>6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC
13	0-25	MZCL	10YR42						0	0	HR	2						
	25-44	HCL	10YR61	10YR56	C			Y	0	0	HR	2			M			
	44-70	C	10YR72	10YR56	M			Y	0	0	HR	2			P		Y	
P1	0-30	MZCL	10YR42						0	0	HR	2						
	30-43	HCL	10YR63	10YR56	C			Y	0	0	HR	2	MDCSAB	FR	M			
	43-78	C	25Y 62	10YR56	M			Y	0	0	HR	5	STCAB	FR	M		Y	
P2	0-17	MZCL	10YR42						1	0	HR	4						
	17-39	HZCL	10YR53	10YR56	C			Y	0	0	HR	6	MCSAB	FR	M			
	39-47	C	10YR53	10YR56	C			Y	0	0	HR	45			M			
	47-65	C	25Y 63	10YR56	M			Y	0	0	HR	55			M			