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EAST HAMPSHIRE DISTRICT LOCAL PLAN
Land at Chawton Park Farm, Alton, Hampshire

Agricultural Land Classification
ALC Map and Report

July 1998

Resource Planning Team
Eastern Region
FRCA Reading

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AGRICULTURAL LAND CLASSIFICATION REPORT

EAST HAMPSHIRE DISTRICT LOCAL PLAN
LAND AT CHAWTON PARK FARM, ALTON, HAMPSHIRE

INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of approximately 17 hectares of land at Chawton Park Farm, on the south-western edge of Alton in Hampshire. The survey was carried out during July 1998.

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 MAFF's statutory input to the second review of the East Hampshire 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 use on the site comprised permanent grassland and wheat. The areas mapped as 'Other land' include recently planted woodland and an agricultural building.

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
2	2.5	20.0	14.9
3a	4.7	37.6	28.0
3b	5.3	42.4	31.5
Other land	4.3	N/A	25.6
Total surveyed area	12.5	100.0	74.4
Total site area	16.8	-	100.0

[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. In total, 13 borings and 2 soil pits were described.

8. The agricultural land on this site has been classified as Grade 2 (very good quality), Subgrade 3a (good quality) and Subgrade 3b (moderate quality). The principal limitations include soil wetness, soil workability, soil droughtiness and topsoil stoniness.

9. Grade 2 land is located along the valley bottom. Soils comprise non-calcareous, moderately stony medium clay loam topsoils. Subsoils are similarly textured but with increasing stone contents. These soil properties interact with the local climate and result in a minor soil droughtiness and soil workability limitation which may adversely affect crop yield, consistency of yield and crop quality and restrict the number of days when the land is in a suitable condition to work. Topsoil stoniness is also a limiting factor.

10. Subgrade 3a land is found on the mid-slopes of the site. Soils comprise non-calcareous medium clay loam topsoils. These overlie poorly structured clay subsoils which impede drainage and cause a slight soil wetness limitation. The Subgrade 3b agricultural land is mapped on the higher ground of the survey area. Here, similar soils but with heavy clay loam topsoils combine with the local climate and result in a significant soil workability limitation. The effect of both limitations is to restrict the range of crops that are suitable for this land and to limit the number of days when the land is in a suitable condition for cultivations, grazing by livestock or trafficking by machinery.

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	SU 700 378	SU 699 379
Altitude	m, AOD	135	155
Accumulated Temperature	day°C (Jan-June)	1385	1362
Average Annual Rainfall	mm	894	905
Field Capacity Days	days	195	197
Moisture Deficit, Wheat	mm	89	87
Moisture Deficit, Potatoes	mm	77	73
Overall climatic grade	N/A	Grade 1	Grade 2

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 (ATO, January to June), as a measure of the relative warmth of a locality.

15. The combination of rainfall and temperature at this site means that there is no overall climatic limitation for land below approximately 150 m AOD (it is climatically Grade 1), but land above this height is limited to Grade 2 at best. Local climatic factors, such as exposure and frost risk do not affect land quality across the site. The climate here is relatively cool and moist, in regional terms, and will interact with soil properties to influence soil wetness and soil droughtiness and the detailed grading across the site.

Site

16. The site lies at altitudes in the range 125–160 m AOD. The highest land occurs at the junction of the northern and western boundaries. Here, the land falls through moderate to gentle gradients towards Chawton Park Road along the southern boundary, where there is the bottom of a dry valley. The site is not affected by site restrictions (i.e., gradient, microrelief or flooding).

Geology and soils

17. The most detailed published geological information for the site (BGS, 1973) shows four lithologies. On the highest ground clay-with-flints is shown. This quickly gives way to Upper Chalk on the upper and mid-slopes and to Middle Chalk on the lower slopes and the valley bottom. Fingering through the Middle Chalk, along the valley bottom, is a sinuous deposit of river and valley gravel.

18. The most detailed published soils information covering the area (SSEW, 1983) shows the majority of it to comprise soils of the Carstens association. These soils are described as 'well drained fine silty over clayey, clayey and fine silty soils, often very flinty' (SSEW, 1983). Along the valley bottom, soils of the Coombe 1 association are mapped. These are described as 'well drained calcareous fine silty soils, deep in valley bottoms, shallow to chalk on valley sides in places. Slight risk of water erosion' (SSEW, 1983).

AGRICULTURAL LAND CLASSIFICATION

19. 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.

20. 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.

Grade 2

21. Land of very good quality is mapped in the valley bottom, coincident with river and valley gravel deposits.

22. This land is affected by a number of limitations which include soil droughtiness, soil wetness/workability and topsoil stoniness. Soils generally comprise non-calcareous medium clay loam topsoils. These may contain up to 16% total flints by volume (8% > 2 cm in size). Topsoils overlie similar or heavy clay loam upper subsoils. These may contain up to 34% total flints by volume. From 58–100 cm, high stone contents in this area proved impenetrable to the soil auger. Pit 2 (see Appendix II) is typical of these soils and proved the existence of stonier lower subsoils. From 55 cm a medium clay loam lower subsoil with up to 53% total flints by volume is recorded. These stony subsoils restrict the amount of available water in the soil profile and the combination of soil properties interacting with the local climate results in a minor soil droughtiness limitation. The resulting drought stress may cause the level and consistency of yields to be depressed. Of equal significance is the topsoil stoniness, as this may have the effect of increasing production costs by enhancing the wear and tear to farm machinery, and impairing the establishment, growth and quality of crops.

23. Soil wetness/workability is also a limiting factor on this site. The field capacity level for this locality is 195 days, and this, combined with the topsoil texture, results in land restricted to Grade 2. This affects the flexibility of the land due to the reduction in the number of days when the soil is in a suitable condition for cultivation, trafficking by machinery or grazing by livestock.

Subgrade 3a

24. Land of good quality is found on the lower and mid-slopes. It is restricted by a soil wetness limitation.

25. Soils typically comprise non-calcareous medium clay loam topsoils. These may contain up to 10% total flints by volume (6% > 2 cm in size). These overlie poorly structured clay or pass through a shallow heavy clay loam upper subsoil to the clay subsoils beneath. The depth to these slowly permeable layers varies from 26–55 cm and they show evidence of only slight gleying. This combination of soil properties results in these soils being assigned to Wetness Class III. The interaction of imperfect soil drainage, topsoil texture and climatic factors, gives rise to a land classification of Subgrade 3a. Excessive soil wetness may adversely affect crop growth and development, and restrict the time when the land can be worked without causing damage to the soil.

Subgrade 3b

26. Land of moderate quality is mapped on the mid-slopes and higher ground. It is limited by soil workability.

27. Soils of the Subgrade 3b area are similar to those described for the Subgrade 3a unit above. The only difference between the two is the heavy clay loam topsoil texture of the Subgrade 3b land. Soils comprise non-calcareous heavy clay loam topsoils, with up to 20%

total flints by volume (4-11% > 2 cm in size). These overlie poorly structured clay subsoils. Soil pit 1P (see Appendix II) is typical of these soils and confirms the existence of these slowly permeable layers. The clay horizons impede soil drainage and it is the depth to gleying and the slowly permeable layers (SPLs) which determines the final ALC grade. The SPLs generally occur in the range 25–35 cm, and this results in these soils being assigned to Wetness Class III. This combination of imperfect soil drainage, heavy clay loam topsoil texture and the prevailing field capacity level, gives rise to a land classification of Subgrade 3b. A significant soil workability limitation such as this affects the flexibility of the land due to the reduction in 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 (1975) *Sheet No. 300, Alresford.*
BGS: London.

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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	SU69803800	WHT	E	1	22	22	4	3B	77	-12	83	6	3A				WE	3B	STANDING H2O
2	SU69903800	WHT	E	2		22	3	3B	76	-13	79	2	3A				WE	3B	FCD195HCLTS=3B
3	SU70003800	WHT	SE	4		35	3	3B	92	3	103	26	3A				WE	3B	FCD195HCLTS=3B
6	SU69903790	WHT	E	5		28	3	3A	87	-2	95	18	3A				WE	3A	FCD195MCLTS=3A
7	SU70003790	WHT	E	3		26	3	3A	97	8	94	17	2				WE	3A	FCD195MCLTS=3A
8	SU70103790	PGR	SE	4		27	3	3B	73	-16	75	-2	3A				WE	3B	FCD195HCLTS=3B
11	SU69903780	WHT	SE	5		28	3	3A	89	0	95	18	3A				WE	3A	FCD195MCLTS=3A
12	SU70003780	PGR	E	4		55	3	3A	107	18	104	27	2				WE	3A	FCD195MCLTS=3A
13	SU70103780	PGR	SE	4			1	2	84	-5	89	12	3A				WE	3A	SEE/1P
14	SU70203780	PGR	NE	1			1	2	85	-4	89	12	3A				DR	2	WORKABILITY 2
15	SU69903770	PGR	E	5		25	3	3B	92	3	87	10	3A				WE	3B	FCD195HCLTS=3B
16	SU70003770	PGR	E	6		85	1	2	119	30	106	29	1				DR	2	WORKABILITY 2
17	SU70103770	PGR	W	1			1	2	57	-32	57	-20	3B				DR	3A	BORDER3A/2 2P
P	SU70003800	WHT	SE	4		39	3	3B	86	-3	97	20	3A				WE	3B	NO GLEY
2P	SU70203780	PGR	NE	1			1	2	95	6	85	8	2				WD	2	PIT80AUG105+TS

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	0-22	MCL	10YR41	10YR46	C	D		Y	4	0	HR	10							
	22-60	C	10YR64	05YR46	M			Y	0	0	HR	5			P		Y		SL.SANDY
2	0-25	HCL	10YR43						0	0	HR	5							
	25-55	C	10YR44	75YR56	C	D		S	0	0	HR	5			P		Y		CMn+IMP FLINT
3	0-35	HCL	10YR43						0	0	HR	5							
	35-70	C	75YR46	75YR56	C	D		S	0	0	HR	5			P		Y		
6	0-28	MCL	10YR43	10YR56	F	D		N	6	0	HR	10							
	28-54	C	10YR44	10YR56	C	D		S	0	0	HR	10			P		Y		
	54-75	C	75YR46	75YR56	C	D		S	0	0	HR	10			P		Y		IMP FLINT
7	0-26	MCL	10YR43	10YR46	F			N	0	0	HR	10							
	26-75	C	10YR54	75YR56	C	D		S	0	0	HR	10			P		Y		FMn
	75-90	ZC	10YR44	75YR56	C			S	0	0	CH	30			P		Y	Y	IMP CHALK
8	0-27	HCL	10YR43						4	0	HR	10							
	27-55	C	75YR46	75YR56	C			S	0	0	HR	15			P		Y		IMP FLINT
11	0-28	MCL	10YR43						6	0	HR	10							
	28-78	C	10YR54	10YR58	C	D		S	0	0	HR	10			P		Y		FMn+IMP FLINT
12	0-35	MCL	10YR43						0	0	HR	10							
	35-55	HCL	10YR44						0	0	HR	10			M				
	55-92	C	75YR46	75YR56	C	F		S	0	0	HR	10			P		Y		IMP FLINT
13	0-28	MCL	10YR43						0	0	HR	10							
	28-53	MCL	10YR44						0	0	HR	10			M				
	53-58	C	10YR46						0	0	HR	10			M				IMP FLINT
14	0-28	MCL	10YR43						0	0	HR	10							
	28-58	HCL	10YR44						0	0	HR	10			M				GRAVELLY
15	0-25	HCL	10YR43	10YR56	C	F		S	11	3	HR	20							SIEVED ST
	25-50	C	75YR46	75YR56	C	F		S	0	0	HR	20			P		Y		FMn
	50-95	C	75YR46	75YR76	C	F		S	0	0	HR	10			P		Y		IMP FLINT
16	0-27	MCL	10YR43						0	0	HR	10							
	27-85	MCL	10YR54						0	0	HR	10			M				
	85-100	C	75YR46	75YR56	C	F		S	0	0	HR	10			P		Y		IMP FLINT
17	0-35	MCL	10YR43						0	0	HR	10							GRAVELLY
1P	0-26	HCL	10YR42						7	0	HR	15							
	26-39	HCL	10YR43						0	0	HR	10	MDCSAB	FR	M	N		N	
	39-65	C	75YR56				75YR54		0	0	HR	10	MDCAB	FM	M	Y		Y	CMn AUG95CM

				----MOTTLES-----			PED	----STONES----				STRUCT/	SUBS				
SAMPLE	DEPTH	TEXTURE	COLOUR	COL	ABUN	CONT	COL.	GLEY	>2	>6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC	
2P	0-29	MCL	10YR43						8	0	HR	16							GRADE2 TS
	29-55	MCL	10YR44						0	0	HR	34	MDCSAB	FR	M	N			WETSIEVED
	55-105	MCL	10YR44						0	0	HR	53			M				WETSIEVED