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Winchester District Local Plan
Site 191: Inhams Lane,
Denmead
Agricultural Land Classification Report
July 1994

AGRICULTURAL LAND CLASSIFICATION REPORT

WINCHESTER DISTRICT LOCAL PLAN SITE 191 : INHAMS LANE, DENMEAD

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 Winchester District of Hampshire. The work forms part of MAFF's statutory input to the preparation of the Winchester District Local Plan.
- 1.2 Site 191 comprises approximately 11 hectares of land north-west of Denmead in Hampshire. An Agricultural Land Classification, (ALC), survey was carried out during July 1994. The survey was undertaken at a detailed level of approximately one boring per hectare of agricultural land surveyed. A total of 11 borings and two soil inspection pits 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 At the time of the survey the land use across most of the site was permanent pasture. Towards the south of the site the land had recently been cleared of scrub. Urban areas comprise houses, gardens and a pub along with a track just south of Inhams Farm. Non-Agricultural land comprises a disturbed area.
- 1.4 The distribution of grades and subgrades is shown on the attached ALC map and the areas and extent 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 Site	% of Agricultural Land
3a	8.0	69.0	73.4
4	2.9	25.0	<u>26.6</u>
Urban	0.6	5.2	100.0 (10.9 ha)
Non-Agricultural	<u>0.1</u>	<u>0.8</u>	
Total area of site	11.6	100.0	

- 1.5 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.

1.6 Land quality on the site is primarily determined by soil droughtiness where Subgrade 3a has been mapped, and soil wetness/workability where Grade 4 is assigned. Subgrade 3a land comprises medium textured soils containing high volumes of flints, increasing with depth. These act to restrict rooting and reduce profile available water, such that a droughtiness restriction applies. Towards the south of the site poorly drained clayey soils are affected by severe soil wetness and workability limitations which are exacerbated by the relatively moist climate, in regional terms, which prevails.

2. Climate

2.1 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 Estimates of climatic variables relevant to the assessment of agricultural land quality were obtained by interpolation from a 5 km grid point dataset (Met. Office, 1989) for a representative location in the survey area.

Table 2 : Climatic Interpolation

Grid Reference	⁵⁰ TQ 650122
Altitude (m, AOD)	45
Accumulated Temperature (degree days, Jan-June)	1500
Average Annual Rainfall (mm)	826
Field Capacity (days)	179
Moisture Deficit, Wheat (mm)	107
Moisture Deficit, Potatoes (mm)	100

2.3 The details given in the table above show that there is no overall climatic limitation affecting the site. In addition, no local climatic factors such as exposure or frost risk affect land quality at this locality.

2.4 Climatic factors do, however, interact with soil properties to influence soil wetness and droughtiness limitations. The climate at this locality is relatively warm and moist in regional terms, with regionally high annual rainfall and field capacity days. The likelihood of soil wetness restrictions will thereby be enhanced.

3. Relief

3.1 The site lies at an altitude of 43-47 m AOD falling gently from south to north. A small valley dissects the southern part of the site along an old watercourse. The land to the south of this is raised at a slightly higher elevation than the rest of the site.

4. Geology and Soil

- 4.1 British Geological Survey (1971), Sheet 316, Fareham shows two distinct geological deposits to underlie the site. To the north of the small valley Reading Beds are shown, whilst London Clay underlies the southern part of the site.
- 4.2 Soil Survey of England and Wales (1983), Sheet 6, shows the entire site to comprise soils of the Windsor Association. These are described as being 'slowly permeable seasonally waterlogged clayey soils' (SSEW, 1984).
- 4.3 Detailed field examination of the soils on the site found them to be consistent with the published geological information, there being two discrete soil types related to the underlying geology. Medium textured stony soils were observed in association with Reading Beds whilst poorly drained clayey soils were found to correspond with London Clay 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.

Subgrade 3a

- 5.3 Land of this quality has been mapped across the majority of the agricultural land surveyed. The principal limitation to its agricultural use is that of soil droughtiness and/or topsoil stoniness, although the land also experiences a minor workability limitation. Due to the dry, stony nature of the soils, most of the sample points proved to be impenetrable (to soil auger) at shallow depths between 10 and 50 cm. However, a soil inspection pit in this mapping unit revealed that, although stony, soil resources did extend to a least 120 cm. Profiles typically comprise non-calcareous, silt loam, medium clay loam or medium silty clay loam topsoils. These contain 11% flints by volume > 2 cm, approximately 25% flints in total. Upper subsoils of similar texture and stone content extend to about 40-45 cm and pass to very stony (ie, 50% total flints) medium textured lower subsoils. There was no evidence of impeded drainage and profiles were thus assigned to Wetness Class I. The relatively high profile stone contents act to restrict profile available water and impede effective rooting by plants. As a result a droughtiness restriction applies. Crop growth and yield may be adversely affected. In addition, topsoil stone contents in the range 10-15% flints > 2 cm cause land quality to be limited to Subgrade 3a through the effects on seed germination, crop growth and quality, along with increased production costs arising from the wear and tear to farm machinery.

Grade 4

- 5.4 Poor quality land corresponds with poorly drained clayey soils derived from deposits of London Clay. Typically non-calcareous heavy clay loam topsoils which are gleyed directly overlie gleyed and slowly permeable clay subsoils. The poorly structured clay severely impedes drainage causing soils to be seasonally waterlogged. Wetness Class IV is appropriate. Given the heavy topsoil textures and the moist climatic regime at this locality, such a drainage status results in land which has severe 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 excessive and prolonged soil wetness.

In the small valley referred to in para 3.1, the soils appear to be permanently waterlogged being anaerobic and saturated at the time of survey. Organic loam topsoils and upper subsoils overlie organic clay below about 40 cm which passes to impenetrable gravel at about 50 cm depth. These soils were assessed as Wetness Class V, Grade 4.

ADAS Ref: 1513/141/94
MAFF Ref: EL15/594

Resource Planning Team
Guildford Statutory Group
ADAS Reading

SOURCES OF REFERENCE

British Geological Survey (1971) Sheet 316, Fareham.

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

Meteorological Office (1989), Climatic datasets for Agricultural Land Classification.

Soil Survey of England and Wales (1983), Sheet 6, Soils of South-East England.

Soil Survey of England and Wales (1984), Bulletin 15, Soils and their use in South-East England.

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.

²'In 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. **GLEYS** : 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).

SOIL PIT DESCRIPTION

Site Name : WINCHESTER LP, SITE 191 Pit Number : 1P

Grid Reference: SU65001210 Average Annual Rainfall : 826 mm
 Accumulated Temperature : 1500 degree days
 Field Capacity Level : 179 days
 Land Use : Permanent Grass
 Slope and Aspect : degrees N

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 20	MZCL	10YR43 00	11	25	HR					
20- 43	MZCL	10YR44 54	0	25	HR				M	
43-120	MCL	10YR44 54	0	50	HR				M	

Wetness Grade : 2 Wetness Class : I
 Gleying : cm
 SPL : No SPL

Drought Grade : 3A APW : 102mm MBW : -5 mm
 APP : 082mm MBP : -19 mm

FINAL ALC GRADE : 3A
 MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : WINCHESTER LP, SITE 191 Pit Number : 2P

Grid Reference: SU65051179 Average Annual Rainfall : 826 mm
 Accumulated Temperature : 1500 degree days
 Field Capacity Level : 179 days
 Land Use : Permanent Grass
 Slope and Aspect : 02 degrees N

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 9	HCL	10YR61 00	0	0		C				
9- 17	C	10YR61 00	0	0		M	MDCSAB	FR	M	
17- 50	C	10YR71 00	0	0		M	MDCOPR	FM	P	

Wetness Grade : 4 Wetness Class : IV
 Gleying : 0 cm
 SPL : 017 cm

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

FINAL ALC GRADE : 4
 MAIN LIMITATION : Wetness

SAMPLE NO.	GRID REF	ASPECT USE	--WETNESS--		-WHEAT-		-POTS-		M.REL		EROSN	FROST	CHEM	ALC	COMMENTS
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	EXP	DIST	
1	SU65001220	PGR			1	2	027	-80	027	-74	4			DR 3A	IMP 15, SEE 1P
1P	SU65001210	PGR N			1	2	102	-5	082	-19	3A			DR 3A	
2	SU64901210	PGR			1	2	000	0	000	0				DR 3A	IMP 10, SEE 1P
2A	SU64881210	PGR			1	2	000	0	000	0				DR 3A	IMP 10, SEE 1P
2P	SU65051179	PGR N	02	0	017	4	4	000	0	000	0			WE 4	
3	SU65001210	PGR			1	2	000	0	000	0				DR 3A	IMP 15, SEE 1P
4	SU64901200	PGR			1	2	000	0	000	0				DR 3A	IMP 20, SEE 1P
5	SU65001200	PGR			1	2	152	45	114	13	1			WK 2	NOT IMP
6	SU64821190	PGR		020	5	4	000	0	000	0				WE 4	ANAEROBIC
7	SU64901190	PGR			1	2	000	0	000	0				DR 3A	IMP 20, SEE 1P
8	SU65001190	PGR			1	2	081	-26	081	-20	3B			DR 3A	IMP 50, SEE 1P
9	SU65051179	PGR N	02	0	010	4	4	000	0	000	0			WE 4	LONDON CLAY
10	SU65191213	PGR			1	2	000	0	000	0				DR 3A	IMP 12, SEE 1P

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----			PED COL.	----STONES----			STRUCT/ CONSIST	SUBS STR POR IMP SPL CALC				
				COL	ABUN	CONT		GLEY	>2	>6		LITH	TOT			
1	0-15	mc1	10YR43 00					0	0	0						IMP, FLINTS
1P	0-20	mzc1	10YR43 00					11	0	HR	25					
	20-43	mzc1	10YR44 54					0	0	HR	25		M			
	43-120	mc1	10YR44 54					0	0	HR	50		M			
2	0-10	z1	10YR53 00					0	0	HR	10					IMP, FLINTS
2A	0-10	mc1	10YR43 00					0	0	HR	10					IMP, FLINTS
2P	0-9	hc1	10YR61 00	75YR46 00	C			Y	0	0	0					
	9-17	c	10YR61 00	75YR56 00	M			Y	0	0	0	MDCSAB	FR	M	Y	
	17-50	c	10YR71 00	75YR58 00	M			Y	0	0	0	MDCOPR	FM	P	Y	Y
3	0-15	mzc1	10YR43 00					0	0		0					IMP, FLINTS
4	0-20	z1	10YR43 00					0	0	HR	5					IMP, FLINTS
5	0-20	mzc1	10YR43 00					0	0	HR	5					
	20-30	hc1	10YR54 00					0	0	HR	5		M			Y
	30-70	hc1	10YR64 00					0	0	HR	2		M			Y
	70-100	hzc1	10YR54 00					0	0		0		M			Y
	100-120	mzc1	10YR74 00					0	0	HR	5		M			Y
6	0-20	o1	10YR31 00					0	0		0					
	20-40	o1	05 Y41 00	75YR58 00	C			Y	0	0	0			P		
	40-50	oc	05 Y41 00	75YR58 00	F			Y	0	0	0			P		IMP, GRAVEL
7	0-20	z1	10YR43 00					0	0	HR	5					IMP, FLINTS
8	0-20	mzc1	10YR43 00					0	0	HR	2					
	20-45	hc1	10YR54 00					0	0	HR	10		M			
	45-50	c	10YR54 00			F	00MNO0 00	0	0	HR	10		M			IMP, FLINTS
9	0-10	hc1	10YR42 00	75YR58 00	C		10YR61 00	Y	0	0	0					
	10-35	c	10YR61 00	75YR58 00	M			Y	0	0	0			P		Y
	35-75	c	10YR71 00	75YR68 00	M			Y	0	0	0			P		Y
10	0-12	mzc1	10YR43 00					0	0		0					IMP, FLINTS