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Bracknell Forest Local Plan,
Site SAN/10 - Sandhurst
Agricultural Land Classification
ALC Map and Report
November 1994

AGRICULTURAL LAND CLASSIFICATION REPORT

BRACKNELL FOREST LOCAL PLAN
SITE SAN/10 - SANDHURST.

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 Bracknell district of Berkshire. The work forms part of MAFF's statutory input to the preparation of the Bracknell Forest Local Plan.

1.2 Site San/10 comprises 15 hectares of land to the north of the Yateley Lakes on the southern edge of the village of Sandhurst. An Agricultural Land Classification (ALC) survey was carried out during November 1994. The survey was undertaken at a detailed level of approximately one boring per hectare of agricultural land. A total 7 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 members of the Resource Planning Team in the Guildford Statutory Group of ADAS.

1.4 At the time of the survey the agricultural land on the site comprised permanent grazing for sheep and pigs. Areas of woodland have been mapped in the west and on the southern boundaries of the site. Areas marked as non-agricultural include scrub-land. Workshops, private dwellings and a hardcore track have been marked as urban, with animal housing marked as farm buildings.

1.5 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
3b	7.2	48.0	86.7
4	1.1	7.3	13.3
Non-agricultural	0.4	2.7	100% (8.3 ha.)
Woodland	5.9	39.3	
Urban	0.3	2.0	
Farm buildings	0.1	0.7	
Total area of Site	15.0	100%	

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 on the site has been classified as Subgrade 3b, moderate quality land, with soil wetness as the main limitation. Soil profiles typically comprise a slightly sandy medium clay loam topsoil overlying a clay subsoil interbedded with sand in places. Profiles show evidence of a wetness problem in the form of gleying, and the clay subsoil is poorly structured and slowly permeable. Such drainage characteristics equate these soils to Wetness Class IV, with a consequent classification of Subgrade 3b. Further evidence of poor drainage on the site is the prevalence of hydrophilic plant species such as Juncus spp. Poorly drained wet soils can inhibit plant growth, and increase the likelihood of trafficking by machinery or poaching by grazing livestock. In the north-eastern corner of the site land has been classified as Grade 4, this is due to the fact that soils are judged to be disturbed. Evidence suggests that this area of the site has been subject to historical filling with subsoil material originating from elsewhere.

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.

2.4 However, soils factors and climatic factors do interact to influence soil wetness and droughtiness limitations. The field capacity days for the site are relatively low in a regional context, and therefore the likelihood of any soil wetness problems may be decreased. Furthermore, the moisture deficits for the site are relatively high, and therefore the likelihood of any soil droughtiness problems may be increased.

2.5 No local climatic factors such as exposure or frost risk are believed to affect the site.

Table 2 : Climatic Interpolation

Grid Reference	SU 830 614
Altitude (m)	57
Accumulated Temperature (degree days, Jan-June)	1461
Average Annual Rainfall (mm)	673
Field Capacity (days)	141
Moisture Deficit, Wheat (mm)	114
Moisture Deficit, Potatoes (mm)	107
Overall Climatic Grade	1

3. Relief

3.1 The site is flat, lying at an altitude of approximately 57m AOD..

4. Geology and Soils

4.1 The relevant geological sheet (BGS, 1971) shows the entire site to be mapped as alluvium.

4.2 The published Soil Survey map (SSEW, 1983) shows the soils on the site to comprise those of the Swanwick association. These are described as 'deep permeable coarse loamy and sandy soils, some with peaty surface horizons, affected by groundwater' (SSEW, 1983).

4.3 Detailed field examination found the soils on the site to be loamy, suffering from poor drainage and high groundwater levels. Upper subsoils occasionally comprised organic horizons.

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 3b

5.3 The majority of the agricultural land on the site has been classified as Subgrade 3b, moderate quality land, with soil wetness as the main limitation. Soil profiles within this mapping unit tend to be stoneless, typically comprising a medium clay loam topsoil over heavy clay loam upper subsoil and a clay lower subsoil. An organic loam upper subsoil was noted at some of the soil observation points. Profiles tend to show evidence of a drainage imperfection in the form of gleying from either the topsoil or upper subsoil Furthermore, high groundwater levels were also evident at some of the soil observation points. A soil inspection pit (Pit 1) in this mapping unit found both the heavy clay loam

and clay subsoils to be gleyed and poorly structured with low porosity, and therefore may be classified as slowly permeable. Such drainage characteristics equate these soils to Wetness Class IV, with a resultant classification of Subgrade 3b when considering prevailing local climatic factors. Poorly drained wet soils may restrict plant and root development, and may be more susceptible to structural damage through trafficking by agricultural machinery or poaching by grazing livestock.

Grade 4

5.4 Towards the north-east of the site, an area of land has been mapped as poor quality Grade 4. In this area of the site soils are judged to be disturbed, since historical filling with foreign subsoil material has occurred. The precise nature of the fill material is unknown, although it is evident that soil profiles are sufficiently disturbed to significantly reduce the agricultural potential of this land.

SOURCES OF REFERENCE

British Geological Survey (1981), Sheet No. 269, Windsor, 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.

[1]The 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 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. **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	**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 **ST** : strongly developed	**MD** : moderately developed
ped size	**F** : fine **C** : coarse	**M** : medium **VC** : very coarse
ped shape	**S** : single grain **GR** : granular **SAB** : sub-angular blocky **PL** : platy	**M** : massive **AB** : angular blocky **PR** : prismatic

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 appropiate 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 : BRACKNELL LP SITE SAN/10 Pit Number : 1P

Grid Reference: SU83176130 Average Annual Rainfall : 673 mm
Accumulated Temperature : 1461 degree days
Field Capacity Level : 141 days
Land Use : Permanent Grass
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 27	MCL	10YR42 00	0	0						
27- 35	HCL	10YR52 00	0	0		C	MDCPR	FR	P	
35- 65	C	10YR52 62	0	0		C	WKCSAB	FM	P	

Wetness Grade : 3B Wetness Class : IV
Gleying :027 cm
SPL :027 cm

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

FINAL ALC GRADE : 3B
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
1P	SU83176130	PGR			027	027	4	3B		0		0					WE		3B	
6	SU83006160	PGR			0	032	4	3B		0		0					WE		3B	WT 40
8	SU83006150	PGR			0	023	4	3B		0		0					WE		3B	WT 50
9	SU83106137	PGR			024	024	4	3B		0		0					WE		3B	WT 45
12	SU86306130	PGR			027	027	4	3B		0		0					WE		3B	
13	SU83106130	PGR			024	024	4	3B		0		0					WE		3B	
14	SU83206130	PGR			0	035	4	3B		0		0					WE		3B	
15	SU83306130	PGR			023	042	3	3A		0		0					WE		3A	

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	
1P	0-27	mcl	10YR42 00						0	0		0							
	27-35	hcl	10YR52 00	10YR66	72	C		Y	0	0		0	MDCPR	FR	P	Y		Y	
	35-65	c	10YR52 62	10YR78	61	C		Y	0	0		0	WKCSAB	FM	P	Y		Y	
6	0-25	mcl	10YR42 00	10YR68	00	C		Y	0	0		0							
	25-32	ol	10YR41 00	10YR68	00	C		Y	0	0		0			M				
	32-60	c	10YR52 00	10YR68	72	M		Y	0	0		0			P			Y	WATER TABLE 40
8	0-23	mcl	10YR53 00	10YR68	00	C		Y	0	0		0							
	23-60	c	10YR52 51	05YR58	00	C		Y	0	0		0			P			Y	WATER TABLE 50
9	0-24	mcl	10YR43 00	10YR58	00	C		S	0	0		0							
	24-70	c	10YR52 00	10YR68	72	C		Y	0	0		0			P			Y	WATER TABLE 45
12	0-27	mcl	10YR42 00						0	0		0							
	27-70	c	10YR52 00	05YR58	00	C		Y	0	0		0			P			Y	
13	0-24	mcl	10YR53 00						0	0	HR	2							
	24-70	c	10YR52 00	10YR78	62	C		Y	0	0	HR	3			P			Y	
14	0-27	mcl	10YR53 00	10YR58	00	C		Y	0	0		0							
	27-35	sc	10YR52 00	10YR58	00	C		Y	0	0		0			M				
	35-90	c	10YR52 00	10YR78	62	C		Y	0	0		0			P			Y	
15	0-23	mcl	10YR42 00						0	0	HR	2							
	23-42	ol	10YR41 00	10YR58	00	C		Y	0	0		0			M				
	42-80	c	10YR52 00	10YR58	62	C		Y	0	0		0			P			Y	