A1 Arun District Local Plan Site 21 Land East of Horsham Road Findon, West Sussex Agricultural Land Classification ALC Map and Report April 1994

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# AGRICULTURAL LAND CLASSIFICATION REPORT

#### ARUN DISTRICT LOCAL PLAN SITE 21 LAND EAST OF HORSHAM ROAD, FINDON, W SUSSEX

#### 1 Summary

- 11 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality for a number of sites in the Arun District of West Sussex The work forms part of MAFF's statutory input to the preparation of the Arun District Local Plan
- 12 Approximately 7 hectares of land relating to Site 21 east of Horsham Road Findon was surveyed in April 1994 The survey was undertaken at a detailed level of approximately one boring per hectare A total of 9 soil auger borings and one soil inspection pit were assessed 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
- 13 The work was conducted by members of the Resource Planning Team in the Guildford Statutory Group of ADAS
- 14 At the time of the survey the agricultural land use on the site was permanent grassland
- 15 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 5 000. 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
1	03	41	4 2
2	32	43 8	45 1
3a	29	39 7	40 8
3b	07	96	<u>99</u>
Woodland	<u>02</u>	<u>28</u>	100% (7 1 ha)
Total area of site	e <u>73</u>	100%	

15 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

The majority of the site has been classified as Grades 2 3a and 3b according to a 17 droughtiness limitation These profiles comprise chalky medium silty clay loam topsoils over increasingly chalky medium or heavy silty clay loam subsoils The chalk bedrock is encountered at varying depths according to the topography The amount of profile available water for crops is significantly affected by the depth to chalk and shallow rooting which imposes a droughtiness limitation of varying severity across the site On the higher slopes the chalk is encountered at shallow depths and thus creates a droughtiness limitation consistent with Subgrade 3b On the gentler slopes and mid-slope plateau the profiles are progressively deeper thus less droughty This land has therefore been assessed as Subgrade 3a and Grade 2 respectively In the valley bottom an area of land was found where the chalk was not encountered The entire profile comprises a slightly stony non-calcareous medium silty clay loam, which becomes less stony with depth There are no signs of soil wetness and the stone content is not sufficient to cause any droughtiness problems This area is therefore classified as Grade 1

#### 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 prevaiing 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 However climatic factors do interact with soil properties to influence soil wetness and droughtiness limitations. At this locality the field capacity days are relatively high and thus reduce the likelihood of soil droughtiness and correspondingly increase the likelihood of soil wetness
- 2.4 No local climatic factors such as exposure or frost risk affect the site

#### Table 2Climatic Interpolation

Grid Reference	FQ127079	TQ126076
Altitude (m)	61	40
Accumulated Temperature (days	) 1473	1497
Average Annual Rainfall (mm)	848	833
Field Capacity (days)	175	173
Moisture Deficit Wheat (mm)	108	111
Moisture Deficit Potatoes (mm)	101	105
Overall Climatic Grade	1	1

#### 3 Relief

3 1 The site occupies a gently sloping southwest facing slope between 40 m and 61 m AOD The gradient is never greater than 4° with a small plateau midway down and flatter ground in the valley bottom Nowhere on the site do gradient or relief affect land quality

### 4 Geology and Soil

- 4 1 British Geological Survey (1984) Sheet 318/333 Brighton and Worthing shows the majority of the site to be underlain by head with a smaller area of Upper and Middle Chalk on the higher ground
- 4 2 The Soil Survey map of Great Britain (1967) Sheet TQ10 Worthing shows that the soils on this site chiefly comprise the Coombe series in the northeast and Icknield series in the centre with a small area of Charity on the valley floor The Coombe series are described as well drained calcareous fine silty soils over chalk or chalk rubble Shallow in places especially on brows and steep slopes and the Icknield as shallow mostly humose well drained calcareous soils over chalk on steep slopes and hilltops Deeper flinty calcareous silty soils in small coombes and valleys The Charity series is also similar being described as 'well drained flinty fine silty soils in valley bottoms Calcareous fine silty soils over chalk or chalk rubble on valley sides sometimes shallow (SSEW 1983)

#### 5 Agricultural Land Classification

- 51 Table 1 provided 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

## 53 Grade 1

A small area of low lying land in the southwest corner of the site was found to correspond to the Charity soil series These deep free draining profiles comprise medium silty clay loam topsoils with 5% flint < 2 cm diameter The subsoils remain similar in texture but contain 2% flint < 2 cm to depth There are no signs of soil wetness and insufficient stone to cause a soil droughtiness limitation Therefore this area has been classified as excellent quality, Grade 1 agricultural land

#### 54 Grade 2

On a midslope plateau and the more gentle slopes either side an area of very good quality Grade 2 land was identified within the Coombe series These profiles covering the majority of the site comprise medium silty clay loam topsoils with 1-10% chalk over similar but increasingly chalky (5-50%) upper subsoils At 58 cm depth and occasionally higher up the profile the subsoils become heavier with

between 50-70% chalk By 70 85 cm depth the chalk bedrock with 10% flint is encountered Rooting information extrapolated from an adjacent site shows that water for crops can only be effectively extracted for 30 cm into the chalk The combination of profile stone contents shallow soil depth over chalk and shallow rooting into the chalk cause profile available water to be slightly reduced such that Grade 2 is appropriate on the basis of soil droughtiness

#### 5.5 Subgrade 3a

On the slightly steeper slopes the land was assessed as good quality Subgrade 3a, agricultural land As before the profiles comprise slightly chalky (2-5%) medium silty clay loam topsoils which become increasingly chalky (2-10%) in the upper subsoil Between 40-50 cm from the surface the chalk content in some borings is significantly increased (50 70%) before all reach the chalk bedrock (which contains 10% flint) at 50-70 cm depth Again rooting information extrapolated from an adjacent site shows that water is available to crops up to 30 cm into the chalk The chalk here however occurs at shallower depth resulting in a more severe soil droughtiness limitation which equates to Subgrade 3a given the prevailing climate

### 56 Subgrade 3b

A small area on the crest of the hill was found to coincide with the Icknield soil series and identified as moderate quality Subgrade 3b Here the chalky (25%) medium silty clay loam topsoil overlies an extremely chalky (80%) upper subsoil rapidly becoming solid chalk (with 10% flint) at 35 cm depth Soil Inspection pit 1 revealed a harder more blocky chalk which only allows roots to penetrate for a further 20 cm A combination of the shallow depth to chalk and its blocky structure significantly reduces the amount of profile available water for crops by causing shallow rooting As a result this area has been classified as Subgrade 3b on soil droughtiness

ADAS Ref 4202/84/94 MAFF Ref EL42/460 Resource Planning Team Guildford Statutory Group ADAS Reading

## SOURCES OF REFERENCE

British Geological Survey (1984) Sheet No 318/333 Brighton and Worthing, 1 50 000

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 Great Britain (1967) Sheet TQ10 Soils of The West Sussex Coastal Plain 1 25 000 and accompanying legend

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 religous buildings cemetries. Also hardsurfaced 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

Wetness Class	Duration of Waterlogging <sup>1</sup>
I	The soil profile is not wet within 70 cm depth for more than 30 days in most years $^{2}$
п	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
Ш	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

#### **Definition of Soil Wetness Classes**

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

<sup>&</sup>lt;sup>1</sup>The number of days specified is not necessarily a continuous period

<sup>&</sup>lt;sup>2</sup> 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
РОТ	Potatoes	SBT	Sugar Beet	FCD	Fodder Crops
LIN	Linseed	FRT	Soft and Top Fruit	FLW	Fallow
PGR	Permanent Pasture	eLEY	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	ОТН	Other
HRT	Horticultural Crop	os			

- 3 GRDNT Gradient as estimated or measured by a hand-held optical chnometer
- 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

MRELMicrorelief limitationFLOODFlood riskEROSNSoil erosion riskEXPExposure limitationFROSTFrost proneDISTDisturbed landCHEMChemical limitation

9 LIMIT The main limitation to land quality The following abbreviations are used

<b>O</b> C	<b>Overall Climate</b>	AE	Aspect	EX	Exposure
FR	Frost Risk	GR	Gradient	MR	Microrelief
FL	Flood Risk	ТХ	Topsoil Texture	DP	Soil Depth
СН	Chemical	WE	Wetness	WK	Workabılıty
DR	Drought	ER	Erosion Risk	WD	Soil Wetness/Droughtiness
ST	Topsoil Stonines	SS			

#### 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	С	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
СН	chalk	FSST	soft fine grained sandstone
ZR	soft argillaceous or silty rocks	GH	gravel with non-porous (hard) stones
MSST	soft medium grained sandstone	eGS	gravel with porous (soft) stones
SI	soft weathered igneous/metamo	orphic ro	ck

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
<u>ped shape</u>	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 fnable FR fnable 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

#### program ALCO12 LIST OF BORINGS HEADERS 13/05/94 SITE 21 ARUN LP -----

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page 1

program ALCO11

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page 1

#### SOIL PIT DESCRIPTION

Site Name SITE 21 ARUN LF	P Pit Number 1P
Grid Reference TQ12800780	Average Annual Rainfall848 mmAccumulated Temperature1473 degree daysField Capacity Level175 daysLand UsePermanent GrassSlope and Aspect02 degrees SW
HORIZON TEXTURE COLOUR 0- 25 MZCL 10YR52 ( 25- 35 MZCL 10YR54 ( 35- 55 CH 10YR81 (	00 0 25 00 0 80
Wetness Grade 1	Wetness Class I Gleying cm SPL cm
Drought Grade 38	APW 069mm MBW39mm APP 070mm MBP31mm
FINAL ALC GRADE 3B	

MAIN LIMITATION Droughtiness