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ARUN DISTRICT LOCAL PLAN
SITE 11 : LAND WEST OF
YAPTON ROAD, MIDDLETON-ON-SEA
AGRICULTURAL LAND CLASSIFICATION
ALC MAP AND REPORT
APRIL 1994

ARUN DISTRICT LOCAL PLAN
SITE 31 : LAND WEST OF YAPTON ROAD, MIDDLETON-ON-SEA
AGRICULTURAL LAND CLASSIFICATION REPORT

1.0 Summary

1.1 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality on 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.

1.2 Site 11 comprises approximately 4 hectares of land west of Yapton Road at Middleton-on-Sea in West Sussex. An Agricultural Land Classification, (ALC), survey was carried out during April 1994. The survey was undertaken at a detailed level of approximately one boring per hectare. A total of four soil auger 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 long-term limitations on its use for agriculture.

1.3 Work was conducted by members of the Resource Planning Team in the Guildford Statutory Group.

1.4 At the time of the survey the land on the site was in set-aside.

1.5 The distribution of grades and subgrades is shown on the ALC map and the areas 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. This map supersedes any previous information for this site.

Table 1 : Distribution of Grades and Subgrades

Grade	Area (ha)	% of Agricultural Area
3a	1.4	36.8
3b	2.4	63.2
Total area of site	3.8	100.0

1.6 Appendix 1 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 agricultural land on the site has been classified as Subgrades 3a and 3b, with soil wetness as the main limitation. Soil profiles typically comprise medium silty clay loam topsoils which become heavier with depth. The lower subsoil comprises a poorly structured slowly permeable clay horizon, causing a drainage impedance. The depth to this horizon varies, this being reflected in the presence of both good and moderate quality land on the site. Poorly drained soils restrict plant growth , and are more susceptible to damage from grazing livestock and agricultural machinery.

2.0 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 No local climatic factors such as exposure or frost risk affect the site. However, climatic factors do interact with soil factors to influence soil wetness and droughtiness limitations. The Field Capacity Days are relatively low in a regional context, with correspondingly high crop-adjusted moisture deficits. This will have the effect of increasing the likelihood of soil droughtiness restrictions.

Table 2 : Climatic Interpolation

Grid Reference :	SU 972 007
Altitude (m) :	5
Accumulated Temperature (days) :	1543
Average Annual Rainfall (mm) :	738
Field Capacity (days) :	150
Moisture Deficit, Wheat (mm) :	121
Moisture Deficit, Potatoes (mm) :	118

3.0 Relief

3.1 The site is flat and lies at an altitude of 5 metres. On no part of the site do altitude or relief pose any limitation to agricultural use.

4.0 Geology and Soil

4.1 The published geology map for the site area (BGS 1975 Sheet 332 (Drift): Bognor) shows the underlying geology to be brickearth over Upper Chalk.

4.2 The published soils information for the site area (SSGB 1967 Sheet SU 90: Bognor Regis) shows the soils mapped as two distinct series. The majority of the site comprises soils of the Park Gate series. These are described 'deep, stoneless silty soils affected by seasonally high groundwater' (SSEW, 1983). The remainder of the soils are mapped as the Hook series, these are described as 'deep brown earths with gleying' (SSEW, 1983). Detailed field examination broadly confirms that although similar texturally, the soil water regime differs from that described by the published soils information.

5.0 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.

5.3 Subgrade 3a: An area of land on the site (1.4 ha.) has been classified as Subgrade 3a, good quality land, with soil wetness as the main limitation. Soil profiles typically comprise medium silty clay loam topsoils which overlie a heavy silty clay loam upper subsoil, resting upon a clay lower subsoil. Profiles are gleyed throughout, suggesting the existence of a soil wetness imperfection. A soil inspection pit dug in this mapping unit revealed that the clay lower subsoil has a poor substructural condition (a medium angular blocky structure), low porosity and is heavily gleyed. Accordingly, it satisfies the criteria for classification as a slowly permeable layer. These drainage characteristics equate these soils to Wetness Class III. In combination with the local climatic regime and the easily worked topsoil texture, this results in a classification of Subgrade 3a. These soils show a moderate drainage imperfection which may contribute to soil wetness problems.

5.4 Subgrade 3b: The remainder of the land on the site has been classified as Subgrade 3b, moderate quality land, with soil wetness as the main limitation. Soil profiles show similar textures and gley characteristics to those elsewhere on the site. However, the depth at which the slowly permeable clay horizon commences is comparatively shallower. Therefore these soils are assigned to Wetness Class IV due to the more significant drainage limitation caused by the clay horizon. This gives a resultant classification of Subgrade 3b, as soil wetness problems are likely to be increased by such drainage characteristics.

ADAS Ref : 4202/075/94
MAFF Ref : EL 42/460

Resource Planning Team
Guildford Statutory Group
ADAS Reading

REFERENCES

* British Geological Survey (1975), Sheet No.332 (Drift), Bognor, 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 SU90, Bognor Regis, 1:25,000, and accompanying 'Soils of the West Sussex Coastal Plain' 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, 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).

SOIL PIT DESCRIPTION

Site Name : SITE 11, ARUN LP Pit Number : 1P

Grid Reference: SU97100080 Average Annual Rainfall : 734 mm
Accumulated Temperature : 1543 degree days
Field Capacity Level : 150 days
Land Use :
Slope and Aspect : degrees

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 29	MZCL	10YR52 00	0	0	C	
29- 60	HZCL	10YR63 00	0	0	M	MDCSAB
60- 80	C	10YR62 00	0	0	M	MDMAB

Wetness Grade : 3A Wetness Class : III
Gleying :0 cm
SPL :060 cm

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

FINAL ALC GRADE : 3A
MAIN LIMITATION : Wetness

SAMPLE NO.	GRID REF	ASPECT USE	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	SU97000080	SAS	0	035	4	3B		0		0						WE	3B	
1P	SU97100080	SAS	0	060	3	3A		0		0						WE	3A	
2	SU97100080	SAS	0	060	3	3A		0		0						WE	3A	
3	SU97200080	SAS	0	035	4	3B		0		0						WE	3B	
4	SU97200070	SAS	0	065	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
1	0-25	mzcl	10YR53 00	10YR58 00	C			Y	0	0		0						
	25-35	hzcl	10YR53 00	10YR58 00	C			Y	0	0		0		M				
	35-70	c	10YR63 00	75YR58 00	M		00MN00 00	Y	0	0		0		P			Y	
1P	0-29	mzcl	10YR52 00	10YR58 00	C		00MN00 00	Y	0	0		0						
	29-60	hzcl	10YR63 00	75YR58 00	M		00MN00 00	Y	0	0		0	MDCSAB	FR M				
	60-80	c	10YR62 00	75YR58 00	M		00MN00 00	Y	0	0		0	MDMAB	FM P			Y	
2	0-35	mzcl	10YR53 00	10YR58 00	C			Y	0	0		0						
	35-60	hzcl	10YR64 00	10YR58 00	C			Y	0	0		0		M				
	60-80	c	10YR63 00	75YR58 00	M		00MN00 00	Y	0	0		0		P			Y	
3	0-30	mzcl	10YR53 00	10YR58 00	C			Y	0	0		0						
	30-35	hzcl	10YR62 00	10YR58 00	C			Y	0	0		0		M				
	35-70	c	10YR63 00	75YR58 51	M		00MN00 00	Y	0	0		0		P			Y	
4	0-30	mzcl	10YR42 00	10YR58 00	C			Y	0	0		0						
	30-65	hzcl	10YR64 00	10YR58 00	C		00MN00 00	Y	0	0		0		M				
	65-90	c	10YR63 00	10YR58 61	M		00MN00 00	Y	0	0		0		P			Y	