A1

Land adjacent to Wingham Bird Park, Kent Agricultural Land Classification ALC Map and Report October 1994

AGRICULTURAL LAND CLASSIFICATION REPORT

LAND ADJACENT TO WINGHAM BIRD PARK, KENT.

1. Summary

1.1 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality for an area of land south of the Wingham Bird Park, east of the village of Wingham in Kent. The work forms part of MAFF's statutory input to the planning application for an extension to the existing bird park.

1.2 5 hectares of land relating to the aforementioned site was surveyed in October 1994. The survey was undertaken at a detailed level of approximately one boring per hectare of agricultural land. A total 6 borings 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 landuse on the site was a mixture of set-aside and soft fruit. The area marked as urban includes a car park for the existing bird park enterprise.

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
2	1.2	24.0	26.7
3a	2.7	54.0	60.0
3b	0.6	12.0	13.3
Urban	0.5	10.0	100% (4.5 ha.)
Total area of Site	5.0	100%	

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 The agricultural land on the site has been classified as Grade 2 and Subgrades 3a and 3b, with soil droughtiness and wetness as the main limitations. Towards the west of the site very good quality land has been mapped. Soil profiles typically comprise sandy silt loam topsoils which become heavier with depth. These profiles show a slight limitation on profile available water which may affect crop yields, such that a classification of grade 2 is appropriate due to droughtiness. The remainder of the land classified as Subgrades 3a and 3b show signs of a drainage imperfection in the form of gleying below the topsoil.

This can be attributed to the presence of a slowly permeable clay subsoil which restricts both soil drainage and plant rooting. The depth to this slowly permeable layer varies, this being reflected in the presence of good quality Subgrade 3a (Wetness Class III) land in the centre of the site. Where the slowly permeable layer occurs directly below the topsoil in the east of the site, the drainage restriction is more severe (Wetness Class IV) and a resultant classification of Subgrade 3b is appropriate.

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. However, the field capacity days for the site are relatively low in a national context, and therefore the likelihood of any soil wetness problems may be decreased. The moisture deficits are alkso comparably high, indicating an increased risk of drought.

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

Table 2 : Climatic Interpolation

Grid Reference	TR 254 583
Altitude (m)	13
Accumulated Temperature (degree days, Jan-June)	1479
Average Annual Rainfall (mm)	674
Field Capacity (days)	138
Moisture Deficit, Wheat (mm)	125
Moisture Deficit, Potatoes (mm)	122
Overall Climatic Grade	1

3. Relief

3.1 The site is gently sloping, lying at an altitude of approximately 12-20m AOD.

4. Geology and Soils

4.1 The relevant geological sheet (BGS, 1982) shows the majority of the site to be underlain by head brickearth. Thanet Beds (grey and brown sands with local clayey intercalations) are mapped around the edges of the site.

4.2 The published Soil Survey map (SSEW, 1980) shows the soils on the site to comprise Argillic Brown Earths. These are described as 'silty soils in brickearth associated with loamy soils in Thanet and Woolwich beds; free drainage; locally with slight impedance' (SSEW, 1980).

4.3 Detailed field examination found the soils on the site to be of a silty and loamy texture becoming heavier with depth. Soils tend to be free draining in the west of the site, and show a drainage impedance on the lower ground towards the east of the site.

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.

Grade 2

5.3 Very good quality land is found on the higher ground towards the west of the site. Soil profiles typically comprise a very slightly stony sandy silt loam topsoil over a heavy clay loam or sandy clay loam upper subsoil, which in turn rests upon a heavy clay loam or clay lower subsoil. Droughtiness tends to be the overall limitation within this mapping unit, as soils show a slight restriction on the amount of profile available water for plant growth. This will have an affect upon the level and consistency of crop yields such that a classification of Grade 2 is appropriate. In the east of the Grade 2 mapping unit, soils show signs of a wetness imperfection in the form of gleying, and the clay lower subsoil is slowly permeable. Therefore they are assigned to Wetness Class II, yet in combination with the light topsoil texture this does not pose any significant limitation.

Subgrade 3a

5.4 Towards the west of the site on the lower ground the composition of soil profiles changes. Profiles were found to comprise medium silty clay loam topsoils overlying heavy silty clay loam upper subsoils which in turn rest upon clay or silty clay lower subsoils commencing at 42-45cm. The profiles show signs of a wetness imperfection in the form of gleying from below the topsoil, and the clay subsoils are slowly permeable. Such drainage characteristics equate these profiles to Wetness Class III, with a resultant classification of Subgrade 3a due to the moderate wetness imperfection exhibited by these soils.

Subgrade 3b

5.5 On the lowest land on the site, soils were found to comprise a medium silty clay loam topsoil resting directly upon a slowly permeable clay subsoil. The shallow depth to the clay means that these soils are assigned to Wetness Class IV, with a resultant classification of Subgrade 3b due to this significant wetness limitation. Poorly drained wet soils can inhibit plant and root development, and may be more susceptible to structural damage through trafficking by agricultural machinery or poaching by grazing livestock.

SOURCES OF REFERENCE

British Geological Survey (1982), Sheet No. 289, Canterbury, 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 (1980), Bulletin No.9, Soils of Kent, and accompanying map at 1:250,000.

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).

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

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	TR25115815	SAS			000		1	1	130	5	123	1	2				DR	2		IMPEN 90
2	TR25405830	FRT	E	02	030	045	3	3A		0		0					WE	3A		
3	TR25105810	FRT	E	02	026	052	2	1	144	19	121	-1	2				DR	2		WE ALSO
4	TR25325825	FRT			026	042	3	3A		0		0					WE	3A		
5	TR25405810	FRT	E	02	028	045	3	3A		0		0					WE	3A		
6	TR25505824	FRT	E	02	030	030	4	3B		0		0					WE	3B		

				----MOTTLES-----			PED		----STONES----			STRUCT/	SUBS			
SAMPLE	DEPTH	TEXTURE	COLOUR	COL	ABUN	CONT	COL.	GLEY	>2	>6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC
1	0-28	fszl	10YR52 00						2	0	HR	2						
	28-45	scl	10YR53 00	10YR58 00	F				0	0	HR	5		M				
	45-90	hcl	10YR56 00						0	0	HR	5		M				
2	0-30	mzcl	10YR42 00						0	0		0						
	30-45	hzcl	10YR53 00	10YR56 00	C			Y	0	0		0		M				
	45-70	zc	10YR62 00	10YR78 71	M			Y	0	0		0		P			Y	
3	0-26	fszl	10YR52 00						0	0		0						
	26-52	hcl	10YR56 00	10YR64 00	C			S	0	0	HR	2		M				
	52-120	c	10YR63 73	10YR58 00	C	00MN00	00	Y	0	0	HR	2		P			Y	
4	0-26	mzcl	10YR42 52						0	0		0						
	26-42	hzcl	10YR63 00	10YR58 00	C			Y	0	0		0		M				
	42-70	zc	10YR62 00	10YR68 72	M			Y	0	0		0		P			Y	
5	0-28	mzcl	10YR42 00						0	0		0						
	28-45	hzcl	10YR52 72	10YR58 00	M			Y	0	0		0		M				
	45-60	c	10YR72 00	10YR68 00	M			Y	0	0		0		P			Y	
	60-75	c	10YR53 63	10YR68 00	M	00MN00	00	Y	0	0		0		P			Y	
6	0-30	mcl	10YR42 00	10YR58 00	F				0	0		0						
	30-65	c	10YR62 42	10YR58 00	M			Y	0	0		0		P			Y	