4104/236/93

A1
Hove Borough Local Plan
Site 1: Land North of Mile Oak
Agricultural Land Classification
ALC Map & Report
December 1993

HOVE BOROUGH LOCAL PLAN
SITE 1: LAND NORTH OF MILE OAK, EAST SUSSEX
AGRICULTURAL LAND CLASSIFICATION, REPORT

1. Summary

1.1 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality on four sites in Hove. The work forms part of MAFF's statutory input to the preparation of the Hove Borough Local Plan.

1.2 Approximately 12 hectares of land relating to Site 1, to the north of Mile Oak, a district of Hove, in East Sussex was surveyed during November 1993. The survey was undertaken at a detailed level of approximately one boring per hectare. A total of 11 soil auger borings and 1 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 long-term limitations on its use for agriculture.

1.3 The survey work was conducted by members of the Resource Planning Team in the Guildford Statutory Group.

1.4 At the time of the survey, much of the agricultural land appeared to be in set-aside, with one field to the west being grazed by horses.

1.5 The distribution of grades and subgrades is shown on the attached 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 Site	% of Agricultural Area
3a	1.6	12.9	15.2
3b	7.0	56.5	66.7
4	1.9	15.3	18.1
			100%(10.5ha)
Non-Agricultural	1.2	9.7	
Urban	0.5	4.0	
Not Surveyed	0.2	1.6	
Total area of site	12.4	100	

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 majority of agricultural land on the site has been classified as Subgrade 3b, moderate quality land, with soil droughtiness as the principal limitation. Medium silty clay loam topsoils are directly underlain by chalk, which restricts rooting, giving rise to restricted profile available water for crop growth. Occasionally soil resources were deeper, being sufficient to allow good quality, Subgrade 3a land to be mapped. Towards the east and west of the site, land can be classified as no better than Subgrade 3b and Grade 4 respectively due to significant slope limitations, where gradients between 7.5 and 14 degrees were recorded with an optical reading clinometer.

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 the overall climatic limitation are average annual rainfall, as a measure of overall wetness, and accumulated temperature, 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 and soil factors interact to influence soil wetness and droughtiness limitations.

Table 2: Climatic Interpolations

Grid Reference:	TQ 244078	TQ246077	TQ 246078
Altitude (m):	45	60	75
Accumulated Temperature (days):	1488	1471	1454
Average Annual Rainfall (mm):	804	810	821
Field Capacity (days):	168	169	171
Moisture Deficit, Wheat (mm):	112	111	108
Moisture Deficit, Potatoes (mm):	106	104	101
Overall Climatic Grade:	1	1	1

3. Relief

3.1 The land at this site lies between approximately 45m AOD and 75m AOD, in the form of a ridge between two dry valley features. Some of the slopes are of sufficient gradient to affect land quality (greater than 7°). The maximum recorded using an optical reading clinometer was 14° towards the west of the site.

4. Geology and Soil

4.1 The British Geological Survey Sheet 318/333, Brighton and Worthing (1:50000, 1984) shows the majority of the site to be underlain with Cretaceous Upper and Middle Chalk. The slopes to the east and west of the dominant ridge are shown as Quaternary Head deposits. This is described as a soliflucted, glaciofluvial deposit, commonly a brown silty loam with variable stone content.

4.2 The Soil Survey of England and Wales, Sheet 6, Soils of South East England (1:250000, 1983) shows the area to be underlain by soils of the Andover 1 Association. These are described as 'shallow well drained calcareous silty soils over chalk on slopes and crests'. (SSEW, 1983).

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.

5.3 Subgrade 3a

Land of this quality occurs in two discrete areas. One towards the south east of the site, the other towards the west at the base of a steep slope. Soils in these areas were found to be essentially similar. They consist of a slightly to moderately chalky (c.15 to 20% chalk fragments) calcareous medium clay loam topsoil extending to between 30 and 45 cm. Occasionally a subsoil horizon occurs which consists of a moderately chalky (up to 35% chalk fragments) calcareous medium silty clay loam. This overlies pure chalk at between 35 and 45 cm.

From the pit observation (1P, Appendix III), it was seen that roots were able to penetrate approximately 50 cm into the soft chalk. Due to this restricted rooting depth, droughtiness is the principal limitation (see para 5.6), caused by the plants not being able to exploit total profile available water. Land of this quality would be expected to produce moderate yields of a wide range of crops such as cereals, grass, oilseed rape, sugar beet and the less demanding horticultural crops.

5.4 Subgrade 3b

Land of this quality covers the majority of the site and is graded for two reasons, soil droughtiness and slope. Towards the centre of the site the soils were found to comprise a moderately chalky (c.15 to 20% chalk fragments) calcareous medium silty clay loam topsoil. This directly overlies pure chalk into which roots were observed to extend approximately 50 cm (1P, Appendix III). This root restriction combined with shallow soil depth causes a droughtiness limitation within the soil as total water availability is limited to crops. (See para 5.6).

Slope gradient restricts areas to the east and west of the site to this subgrade. These areas were found to have gradients between 7 and 11° using an optical reading clinometer. This restricts the efficient and safe use of certain types of agricultural machinery, to an extent whereby this subgrade is appropriate. Land of this quality could be expected to produce moderate yields of crops such as cereals and grass.

5.5 Grade 4

Land with severe limitations is mapped towards the east of the site. The principal limitation here is slope, measured at around 14° across the face of the valley side, using an optical reading clinometer. This severely restricts the safe and efficient use of many types of farm machinery such that this grade is appropriate. Land of this quality could be expected to produce moderate to high grass yields in most years, but only occasionally would arable crops be successful.

5.6 Drought affected land is subject to restrictions, in terms of the type of crop that may successfully be grown, because at some point during, or throughout the growing season water availability will not match demand in most years. In this case, the restriction is due to chalk restricting root penetration.

ADAS Ref: 4104/236/93
MAFF Ref: EL41/453

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, 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 No. 6, Soils of South East England, 1:250,000.

* Soil Survey of England and Wales (1984), Soils and their use in South East England. Bulletin No. 15.

APPENDIX I

DESCRIPTION OF THE GRADES AND SUB-GRADES

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 on the 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.

Grade 3 : Good To Moderate Quality Agricultural Land

Land with moderate limitations which affect the choice of crops, 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.

Sub-grade 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 very 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 : 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/airfields. Also active mineral workings and refuse tips where restoration conditions to 'soft' after-uses may apply.

Woodland

Includes commercial and non-commercial 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

DEFINITION OF SOIL WETNESS CLASSES

Wetness Class I

The soil profile is not wet within 70cm depth for more than 30 days in most years.

Wetness Class II

The soil profile is wet within 70cm depth for 31-90 days in most years **or**, if there is no slowly permeable layer within 80cm depth, it is wet within 70cm for more than 90 days, but not wet within 40cm depth for more than 30 days in most years.

Wetness Class III

The soil profile is wet within 70cm depth for 91-180 days in most years **or**, if there is no slowly permeable layer within 80cm depth, it is wet within 70cm for more than 180 days, but only wet within 40cm depth for 31-90 days in most years.

Wetness Class IV

The soil profile is wet within 70cm depth for more than 180 days but not wet within 40cm depth for more than 210 days in most years **or**, if there is no slowly permeable layer within 80cm depth, it is wet within 40cm depth for 91-210 days in most years.

Wetness Class V

The soil profile is wet within 40cm depth for 211-335 days in most years.

Wetness Class VI

The soil profile is wet within 40cm depth for more than 335 days in most years.

(The number of days is not necessarily a continuous period. '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 database. This has commonly used notations and abbreviations as set out below.

Boring Header Information

1. **GRID REF** : national 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 **HRT** : Horticultural Crops **PGR** : Permanent Pasture **LEY** : Ley Grass **RGR** : Rough Grazing
SCR : Scrub **CFW** : Coniferous Woodland **DCW** : Deciduous Woodland **HTH** : Heathland **BOG** : Bog or Marsh
FLW : Fallow **PLO** : Ploughed **SAS** : Set aside **OTH** : Other

3. **GRDNT** : Gradient as measured by a hand-held optical clinometer.

4. **GLEY/SPL** : Depth in cm to gleying or slowly permeable layers.

5. **AP (WHEAT/POTS)** : Crop-adjusted available water capacity.

6. **MB (WHEAT/POTS)** : Moisture Balance.

7. **DRT** : Best grade according to soil droughtiness.

8. If any of the following factors are considered significant, an entry of 'Y' will be entered in the relevant column.

MREL : Microrelief limitation **FLOOD** : Flood risk **EROSN** : Soil erosion risk **EXP** : Exposure limitation **FROST** : Frost
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** : Soil Erosion Risk **WD** : Combined 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
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 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

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

6. **STONE LITH** : One of the following is used.

HR : all hard rocks and stones **MSST** : soft, medium or coarse grained sandstone
SI : soft weathered igneous or metamorphic **SLST** : soft oolitic or dolimitic limestone
FSST : soft, fine grained sandstone **ZR** : soft, argillaceous, or silty rocks **CH** : chalk
GH : gravel with non-porous (hard) stones **GS** :gravel with porous (soft) stones

Stone contents (>2cm, >6cm and total) are given in percentages (by volume).

7. **STRUCT** : the degree of development, size and shape of soil peds are described using the following notation:

- degree of development **WK** : weakly developed **MD** : moderately developed **ST** : strongly developed

- ped size **F** : fine **M** : medium **C** : coarse **VC** : very coarse

- ped shape **S** : single grain **M** : massive **GR** : granular **AB** : angular blocky **SAB** : sub-angular blocky **PR** : prismatic **PL** : platy

8. **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

9. **SUBS STR** : Subsoil structural condition recorded for the purpose of calculating profile droughtiness.

G : good **M** : moderate **P** : poor

10. **POR** : Soil porosity. If a soil horizon has less than 0.5% biopores >0.5 mm, a 'Y' will appear in this column.

11. **IMP** : If the profile is impenetrable a 'Y' will appear in this column at the appropiate horizon.

12. **SPL** : Slowly permeable layer. If the soil horizon is slowly permeable a 'Y' will appear in this column.

13. **CALC** : If the soil horizon is calcareous, a 'Y' will appear in this column.

14. 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 : HOVE LP-NORTH.OF MILEOAK Pit Number : 1P

Grid Reference: TQ24670780 Average Annual Rainfall : 821 mm
Accumulated Temperature : 1454 degree days
Field Capacity Level : 171 days
Land Use :
Slope and Aspect : 02 degrees S

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 29	MZCL	10YR53 00	0	15		
29- 78	CH	00CH00 00	0	2		

Wetness Grade : 1 Wetness Class : I
Gleying : cm
SPL : No SPL

Drought Grade : 3A APW : 091mm MBW : -18 mm
APP : 091mm MBP : -11 mm

FINAL ALC GRADE : 3A
MAIN LIMITATION : Droughtiness

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
1P	TQ24670780	SAS	S	02			1	1	091	-18	091	-11	3A				DR	3A		PIT 80 ROOTS78
2	TQ24530788	SAS	W	05			1	1	086	-22	088	-13	3B				DR	3B		IMPCH 70 1P
3	TQ24600788	SAS	W	03			1	1	085	-23	088	-13	3B				DR	3B		IMPCH 40 1P
4	TQ24700790	SAS	E	05			1	1	086	-22	088	-13	3B				DR	3B		IMPCH 80 1P
10	TQ24600780	SAS	W	01			1	1	087	-22	089	-13	3B				DR	3B		IMPCH 50 1P
11	TQ24700780	SAS	E	01			1	1	095	-17	094	-14	3A				DR	3A		IMPCH 55 1P
12	TQ24800780	SAS	E	04			1	1	101	-11	977	-9	3A				DR	3A		IMPCH 60 1P
13	TQ24550767	PGR	W	05			1	1	084	-26	087	-16	3B				DR	3B		IMPCH 35 1P
14	TQ24600770	SAS	S	02			1	1	084	-26	087	-16	3B				DR	3B		IMPCH 30 1P
15	TQ24700770	SAS	S	02			1	1	086	-24	088	-15	3B				DR	3B		IMPCH 35 1P
16	TQ24420781	PGR	W	03			1	1	107	-5	106	0	3A				DR	3A		IMPCH 50
17	TQ24460767	PGR	W	02			1	1	114	2	102	-4	3A				DR	3A		IMPCH 50 1P

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	0-29	mzcl	10YR53 00						0	0	CH	15						Y
	29-78	ch	00CH00 00						0	0	HR	2		P				Y
2	0-25	mzcl	10YR52 00						0	0	CH	20						Y
	25-75	ch	00CH00 00						0	0	HR	3		P				Y
3	0-24	mzcl	25Y 53 00						0	0	CH	15						Y
	24-74	ch	00CH00 00						0	0	HR	3		P				Y
4	0-25	mzcl	10YR52 00						0	0	CH	20						Y
	25-75	ch	00CH00 00						0	0	HR	3		P				Y
10	0-25	mzcl	10YR42 00						0	0	CH	15						Y
	25-75	ch	10YR71 00						0	0		0		M				Y
11	0-30	mzcl	10YR52 00						0	0	CH	10						Y
	30-80	ch	10YR71 00						0	0		0		M				Y
12	0-30	mzcl	10YR42 00						0	0	CH	10						Y
	30-35	mzcl	10YR54 00						0	0	CH	35		M				Y
	35-85	ch	10YR71 00						0	0		0		M				Y
13	0-24	mzcl	10YR53 00						0	0	CH	20						Y
	24-74	ch	10YR81 00						0	0		0		M				Y
14	0-24	mzcl	10YR53 00						0	0	CH	20						Y
	24-74	ch	10YR81 00						0	0		0		M				Y
15	0-25	mzcl	10YR53 00						0	0	CH	20						Y
	25-75	ch	10YR81 00						0	0		0		M				Y
16	0-30	mzcl	10YR42 00						0	0	CH	15						Y
	30-45	mzcl	10YR43 00						0	0	CH	8		M				Y
	45-50	hzcl	10YR44 00						0	0	CH	4		M				Y
17	0-45	mzcl	10YR43 00						0	0	CH	20						Y
	45-75	ch	10YR81 00						0	0		0		M				Y