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WEST SUSSEX MINERALS PLAN
SITE 26: WEST HEATH EXTENSION
AGRICULTURAL LAND CLASSIFICATION
ALC MAP & REPORT
OCTOBER 1993

**WEST SUSSEX MINERALS PLAN
SITE 26: WEST HEATH EXTENSION
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 West Sussex. The work forms part of MAFF's statutory input to the preparation of the West Sussex Minerals Plan.

1.2 Approximately 7 hectares of land relating to Site 26: West Heath Extension near Petersfield was surveyed in October 1993. The survey was undertaken at a detailed level of approximately one boring per hectare. A total of 7 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 longterm limitations on its use for agriculture.

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

1.4 At the time of the survey the land use on the site was permanent grassland with a significant area of non agricultural land comprising bracken and scattered trees.

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 survey information for the site.

Table 1 : Distribution of Grades and Subgrades

<u>Grade</u>	<u>Area (ha)</u>	<u>% of Site</u>
3a	4.6	62.2
Non agricultural land	2.8	37.8
Total area of site	7.4	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 site has been classified as Subgrade 3a with soil droughtiness as the key limitation. The area shown as this grade experiences a moderate limitation arising from the interaction of sandy textured soils with the local climatic regime which limits available water for plant growth.

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 the overall climatic limitation are annual average 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. It should be noted that the field capacity days are high and the moisture deficits are low making the local climate quite wet in a regional context. Climatic factors and soil properties interact to affect soil droughtiness and wetness limitations with the likelihood of soil wetness offsetting soil droughtiness due to the 'wet' climate.

Table 2 : Climatic Interpolation

Grid Reference :	SU 788 227
Altitude (m) :	55
Accumulated Temperature (days) :	1481
Average Annual Rainfall (mm) :	924
Field Capacity (days) :	203
Moisture Deficit, Wheat (mm) :	97
Moisture Deficit, Potatoes (mm) :	88
Overall Climatic Grade :	1

3.0 Relief

3.1 The site lies at an altitude of 45-65 metres with land sloping eastwards to the point of lowest altitude. Nowhere on the site does relief or gradient affect agricultural land quality.

4.0 Geology and Soil

4.1 The relevant geological sheets for the site, Sheet 316 (BGS, 1971) and Sheet 300 (BGS, 1975) show the underlying geology to be mapped as Cretaceous Folkestone Beds.

4.2 The published soils information for the area, Sheet 6 (SSEW, 1983) shows the soils on the site to be mapped as the Frilford association - "Deep well drained sandy and coarse loamy soils. Some ferruginous sandy and some coarse loamy soils affected by groundwater" (SSEW, 1983). A detailed inspection of soils on the site confirmed the presence of soils similar to those described above.

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.

Subgrade 3a

5.3 All of the agricultural land on the site has been classified as subgrade 3a. Soil profiles typically comprise topsoils of loamy medium sand containing 1% total flints by volume over upper subsoils of similar texture containing 0-1% total flints. Lower subsoils consist of medium sand containing 0-1% total flints. Profiles are well drained and do not suffer a wetness limitation; being assigned to a wetness class of I. However, soils do suffer a moderate droughtiness limitation. The combination of sandy free draining soil textures, structures and the local climate (see paragraph 2.4) reduces profile available water and results in a moderate risk of drought stress. A classification of subgrade 3a is therefore appropriate.

5.4 Land classified as non agricultural comprises heathland vegetation.

ADAS REFERENCE : 4203/210/93
MAFF REFERENCE : EL 42/00228

Resource Planning Team
Guildford Statutory Group
ADAS Reading

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.

Sub-grade 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 re-claimed 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

REFERENCES

- * BRITISH GEOLOGICAL SURVEY (1971), Sheet No.316, Fareham, 1:63,360 scale
(1975), Sheet No.300, Arlesford, 1:50,000 scale.

- * 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 scale and accompanying legend.

APPENDIX III

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 IV

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 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 appropriate 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 : W.SSX SITE 26 WEST HEATH Pit Number : 1P

Grid Reference: SU78742264 Average Annual Rainfall : 924 mm
 Accumulated Temperature : 1481 degree days
 Field Capacity Level : 203 days
 Land Use : Permanent Grass
 Slope and Aspect : 02 degrees SE

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 25	LMS	10YR41 00	0	1		WKMSAB
25- 46	LMS	10YR31 00	0	0		MDCSAB
46- 85	MS	10YR62 00	0	1		WKCSAB
85-120	MS	10YR72 00	0	1		WKCSAB

Wetness Grade : 2 Wetness Class : I
 Gleying : cm
 SPL : cm

Drought Grade : 3A APW : 082mm MBW : -15 mm
 APP : 066mm MBP : -22 mm

FINAL ALC GRADE : 3A
 MAIN LIMITATION : Droughtiness

SAMPLE NO.	GRID REF	USE	ASPECT	GRDNT	SPL	--WETNESS--		-WHEAT-		-POTS-		M.REL		EROSN	FROST	CHEM	ALC	COMMENTS
						CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	EXP	DIST	LIMIT		
1P	SU78742264	PGR	SE	02		1	2	082	-15	066	-22	3A					DR 3A	PIT TO 110
3	SU78702270	PGR	SE	02		1	2	091	-6	067	-21	3A					DR 3A	
4	SU78802270	PGR	E	02		1	2	078	-19	061	-27	3A					DR 3A	
5	SU78902270	PGR	SE	02		1	2	083	-14	066	-22	3A					DR 3A	
6	SU78702260	PGR	SE	03		1	2	089	-8	065	-23	3A					DR 3A	
7	SU78812263	PGR	SE	02		1	2	093	-4	077	-11	3A					DR 3A	
8	SU78682255	PGR	SE	02		1	2	078	-19	063	-25	3A					DR 3A	
9	SU78852260	PGR	SE	02		1	2	081	-16	065	-23	3A					DR 3A	

-----MOTTLES----- PED -----STONES----- STRUCT/ SUBS

SAMPLE	DEPTH	TEXTURE	COLOUR	COL	ABUN	CONT	COL.	GLE	>2	>6	LITH	TOT	CONSIST	STR	POR	IMP	SPL	CALC
1P	0-25	1ms	10YR41 00					0	0	HR	1		WKMSAB	VF				
	25-46	1ms	10YR31 00					0	0		0		MDCSAB	VF	G			
	46-85	ms	10YR62 00					0	0	HR	1		WKCSAB	VF	M			
	85-120	ms	10YR72 00					0	0	HR	1		WKCSAB	VF	M			
3	0-25	1ms	10YR21 00					0	0	HR	1							
	25-48	1ms	10YR21 00					0	0		0				G			
	48-95	ms	10YR71 00					0	0		0				M			
	95-120	1ms	10YR22 00					0	0		0				G			
4	0-20	1ms	10YR31 00					0	0	HR	1							
	20-38	1ms	10YR21 00					0	0	HR	1				G			
	38-80	ms	10YR66 00					0	0		0				M			
	80-120	ms	10YR66 00					0	0		0				M			
5	0-25	1ms	10YR32 00					0	0		0							
	25-45	1ms	10YR32 00					0	0		0				G			
	45-120	ms	10YR52 00					0	0		0				M			
6	0-25	1ms	10YR21 00					0	0	HR	1							
	25-35	1ms	10YR21 00					0	0	HR	1				G			
	35-45	1ms	10YR31 00					0	0		0				G			
	45-80	ms	10YR52 00					0	0		0				M			
	80-100	1ms	10YR21 00					0	0		0				G			
	100-120	ms	10YR52 00					0	0		0				M			
7	0-25	1ms	10YR32 00					0	0		0							
	25-45	1ms	10YR32 00					0	0		0				G			
	45-55	ms1	10YR21 00					0	0		0				G			
	55-120	ms	10YR62 00					0	0		0				M			
8	0-20	1ms	10YR32 00					0	0	HR	1							
	20-45	ms	10YR52 00					0	0		0				M			
	45-68	1ms	10YR21 00					0	0		0				G			
	68-120	ms	10YR72 00					0	0		0				M			
9	0-35	1ms	10YR31 00					0	0	HR	1							
	35-120	ms	10YR72 00					0	0		0				M			