A1

West Sussex Minerals Plan
Site E: South Minsted

Agricultural Land Classification
Revised February 1996

Resource Planning Team
Guildford Statutory Group
ADAS Reading

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AGRICULTURAL LAND CLASSIFICATION, SUMMARY REPORT

WEST SUSSEX MINERALS PLAN
SITE E: SOUTH MINSTED (REVISED FEBRUARY 1996)

Introduction

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey on 10.3 ha of land to the west of Midhurst in West Sussex. The grading of this site has been re-evaluated, since the original fieldwork in March 1995, to take into account new information on irrigation which was not available at the time of the original survey work.

2. The survey was commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF) from its Land Use Planning Unit in Reading, in connection with the West Sussex Minerals Plan. All of this site was surveyed in March 1995 in connection with the Plan. However, due to the availability of irrigation water, the 1995 data was reviewed and a new map and report produced in 1996; this supersedes the 1995 ALC information for this land.

3. The work was conducted by members of the Resource Planning Team in the Guildford Statutory Group of ADAS. The land has been graded in accordance with the published MAFF ALC guidelines and criteria (MAFF, 1988). A description of the ALC grades and subgrades is given in Appendix I.

4. At the time of survey the agricultural land at this site was in a variety of uses. The southern-most field was in grass whilst the remainder of the site was under maize stubble or recently sown cereals.

Summary

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:10,000 it is accurate at this scale but any enlargement would be misleading. This map supersedes the 1995 ALC map.

6. The area and proportions of the ALC grades and subgrades on the surveyed land are summarised in Table 1 overleaf.

7. The fieldwork was conducted at an average density of approximately one boring per hectare of agricultural land surveyed. A total of 13 borings and two soil inspection pits were described.

8. The land on this site has been classified as Grade 2 (very good quality) and Subgrade 3a (good quality). The majority of the land is limited by soil droughtiness, though a discrete area has been classified as Subgrade 3a because of soil wetness limitations.

Table 1: Area of grades and other land (as revised February 1996)

Grade/Other land	Area (hectares)	% Surveyed Area
2	6.4	62.1
3a	3.9	37.9
Total surveyed area	10.3	100.0

9. Since the original 1995 fieldwork it has been established that this site is irrigated, and that an adequate water supply is available for agricultural use. As irrigation can significantly enhance the potential of agricultural land, especially in drier areas, it is taken into account in ALC grading where it is current or recent practice. Consequently, the 1995 data has been amended to include this factor.

10. Soils on the site were generally found to be loamy sand topsoils overlying loamy sand or sand subsoils. Such soils have low reserves of profile available water and despite the relatively moist climatic regime which prevails at this locality, crops are likely to suffer drought stress for part of the growing season. However, irrigation partially offsets these effects to give rise to either slight or moderate soil droughtiness limitations. Occasional profiles are affected by a soil wetness limitation where clayey subsoil horizons impede drainage.

Factors Influencing ALC Grade

Climate

11. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.

12. The key climatic variables used for grading this site are given in Table 2 and were obtained from the published 5km grid datasets using the standard interpolation procedures (Met. Office, 1989).

Table 2: Climatic and altitude data

Factor	Units	Values	Values
		SU 852 208	SU 855 212
Grid reference	N/A		
Altitude	m, AOD	45	40
Accumulated Temperature	day°C (Jan-June)	1492	1498
Average Annual Rainfall	mm	919	910
Field Capacity Days	days	201	200
Moisture Deficit, Wheat	mm	99	100
Moisture Deficit, Potatoes	mm	91	92

13. 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.

14. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR), as a measure of overall wetness, and accumulated temperature (ATO, January to June), as a measure of the relative warmth of a locality.

15. The combination of rainfall and accumulated temperature at this site mean that there is no overall climatic limitation. However, climatic factors do interact with soil properties to influence soil wetness and droughtiness limitations. At this locality the high average annual rainfall, and correspondingly high field capacity days, increase the likelihood of soil wetness. Similarly the relatively low crop adjusted soil moisture deficits reduce the likelihood of soil droughtiness. No local climatic factors, such as exposure and frost risk, are believed to adversely affect the land quality on the site. This site is climatically Grade 1.

Site

16. The site slopes gently from 45m AOD in the north west to 40m AOD in the east. The land rises again to 45m AOD, in the south, towards Starveacre Copse.

Geology and soils

17. The published geological information (BGS, 1972), shows the majority of the site to be underlain by the Folkestone Beds with some Gault Clay in the south.

18. The published soils information (SSEW, 1983), shows the site to be underlain by soils of the Shirrell Heath 1 association. The legend accompanying the map describes these soils as 'Well drained with a bleached subsurface horizon. Some similar soils with slowly permeable subsoils and slight seasonal waterlogging. Some sandy and coarse loamy soils affected by groundwater often with humose surface horizon.' (SSEW, 1983).

Agricultural Land Classification

19. The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1, page 2.

20. The location of the auger borings and pits is shown on the attached sample location map and the details of the soils data are presented in Appendix III. Details from the original ALC survey, carried out in 1995, are attached in Appendix IV.

Grade 2

21. The majority of the agricultural land on this site has been mapped as Grade 2, very good quality. The key limitation is minor soil droughtiness. The profiles commonly comprise stoneless medium sandy loam or, more usually, loamy medium sandy topsoils over similar or coarser textured (medium sand) upper subsoils. In some profiles the medium sand continues to depth. These soils are free draining and thus, despite the relatively high rainfall, contain

low water reserves. This would normally restrict potential level and consistency of crop yields to the extent that Subgrade 3a would be appropriate. However, this land benefits from an adequate supply of irrigation water. This water has the effect of partially alleviating drought risk in this area, thus allowing Grade 2 to be mapped. A thin iron pan was recorded in the some of these profiles. Though this horizon was compacted it was not considered likely to cause a significant restriction to drainage or rooting and thus does not influence ALC grading.

22. A number of borings contain sandy clay loam and clay lower subsoils which were identified as being poorly structured and slowly permeable in Pit 2. These subsoil horizons do not generally occur until below 80 cm depth thus drainage through the profile is not significantly impeded. This land would also be classified as Subgrade 3a on the basis of soil droughtiness. However, the availability of adequate irrigation water means that this land is classified as Grade 2. Individual borings of slightly poorer quality were also identified in this mapping unit but were of insufficient number and extent to map separately.

Subgrade 3a

23. Along the eastern edge of the site the land has been classified as Subgrade 3a, good quality, on the basis of soil droughtiness. Soils here are generally more sandy at shallower depths than elsewhere on the site. Profiles comprise stoneless or very slightly flinty (2% total flint) loamy medium sand topsoils over very weakly developed loamy medium sand or medium sand upper subsoils. Loose single grain medium sand lower subsoils then continue to depth. The combination of coarse textures and moderate subsoil structural conditions causes the profile available water for crops to be lowered. This would normally restrict the potential level and range of crop yields to the extent that Subgrade 3b would be appropriate. However, this land benefits from adequate irrigation water which has the effect of partially alleviating drought risk in this area. This land is thus classified as Subgrade 3a.

24. Occasionally, a moderate soil wetness limitation did occur where slowly permeable clay occurs at 40 cm depth causing drainage to be impeded (Wetness Class III is appropriate). Wet soils such as these can reduce plant growth and yields and thus restrict the number of days when cultivations and/or grazing may occur. The availability of irrigation water is not significant for such soils since soil wetness (rather than soil droughtiness) is the overriding limitation to land quality.

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SOURCES OF REFERENCE

British Geological Survey (1957) *Sheet No. 317, Chichester, 1:50,000.*
BGS: London.

Ministry of Agriculture, Fisheries and Food (1988) *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.*
MAFF: London.

Met. Office (1989) *Climatological Data for Agricultural Land Classification.*
Met. Office: Bracknell.

Soil Survey of England and Wales (1983) *Sheet 6, Soils of South East England, 1:250,000 and accompanying legend.*
SSEW: Harpenden.

APPENDIX I

DESCRIPTIONS 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 (e.g. 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.

APPENDIX II

SOIL WETNESS CLASSIFICATION

Definitions of Soil Wetness Classes

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[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.

Assessment of Wetness Class

Soils have been allocated to wetness classes by the interpretation of soil profile characteristics and climatic factors using the methodology described in *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land* (MAFF, 1988).

[1] The number of days is not necessarily a continuous period.
[2] 'In most years' is defined as more than 10 out of 20 years.

APPENDIX III

SOIL DATA

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 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

SOIL PIT DESCRIPTION

Site Name : W. SUSSEX MINS, SITE E Pit Number : 1P

Grid Reference: SU85402100 Average Annual Rainfall : 919 mm
Accumulated Temperature : 1498 degree days
Field Capacity Level : 200 days
Land Use : Fallow
Slope and Aspect : 01 degrees S

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 25	LMS	10YR31 00	0	0						
25- 40	LMS	10YR42 00	0	0			WKCSAB	VF	M	
40- 90	MS	10YR53 00	0	0			WKMSAB	VF	M	
90-120	MS	10YR72 00	0	0			SINGLE	LS	M	

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

Drought Grade : 3B APW : 077mm MBW : -23 mm
APP : 060mm MBP : -32 mm

FINAL ALC GRADE : 3A
MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : W. SUSSEX MINS, SITE E Pit Number : 2P

Grid Reference: SU85302110 Average Annual Rainfall : 919 mm
Accumulated Temperature : 1498 degree days
Field Capacity Level : 200 days
Land Use :
Slope and Aspect : 01 degrees E

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 25	LMS	10YR41 00	0	2	HR					
25- 60	LMS	10YR42 00	0	0			WKCSAB	VF	M	
60- 78	LMS	75YR68 00	0	0			STCOPL	FM	M	
78-110	SCL	10YR64 00	0	0		M	MDVCPL	FR	P	
110-120	C	25 Y72 00	0	0		M			P	

Wetness Grade : 2 Wetness Class : II
Gleying :078 cm
SPL :078 cm

Drought Grade : 3A APW : 096mm MBW : -4 mm
APP : 064mm MBP : -28 mm

FINAL ALC GRADE : 2
MAIN LIMITATION : Droughtiness

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	SU85402120	CER	E	01			1	1	098	-2	082	-10	3A				DR	2		Inc irrigation
1P	SU85402100	FLW	S	01			1	1	077	-23	060	-32	3B				DR	3A		Inc irrigation
2	SU85502120	CER					1	1	078	-22	061	-31	3B				DR	3A		Inc irrigation
2P	SU85302110	STB	E	01	078	078	2	2	096	-4	064	-28	3A				DR	2		Inc irrigation
3	SU85302110	STB	E	01	090	090	1	1	104	4	073	-19	3A				DR	2		Inc irrigation
4	SU85402110	CER	NE	01	085	105	1	1	114	14	079	-13	3A				DR	2		Inc irrigation
5	SU85502110	CER	NE	01			1	1	077	-23	060	-32	3B				DR	3A		Inc irrigation
6	SU85202100	CER	E	02			1	1	097	-3	065	-27	3A				DR	2		Inc irrigation
7	SU85302100	CER	E	01	040	040	3	3A	123	23	104	12	2				WE	3A		
8	SU85402100	FLW	S	01			1	1	077	-23	060	-32	3B				DR	3A		Inc irrigation
9	SU85202090	FLW	SW	01	078		1	1	086	-14	067	-25	3A				DR	2		Inc irrigation
10	SU85302090	FLW	NE	01			1	1	077	-23	060	-32	3B				DR	3A		Inc irrigation
11	SU85102080	PGR	W	03	0		3	3B	134	34	118	26	1				WE	3B		201 FCD
12	SU85202080	PGR	N	01	110		1	1	087	-13	063	-29	3A				DR	2		Inc irrigation
13	SU85302080	PGR	SE	01			1	1	075	-25	058	-34	3B				DR	3A		Inc irrigation

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	olms	10YR31 00						0	0		0							
	25-45	ms	10YR41 00						0	0		0		M					
	45-120	ms	10YR52 00						0	0	HR	5		M					
1P	0-25	lms	10YR31 00						0	0		0							
	25-40	lms	10YR42 00						0	0		0	WKCSAB VF	M					very weakly dev
	40-90	ms	10YR53 00						0	0		0	WKMSAB VF	M					tending to loose
	90-120	ms	10YR72 00						0	0		0	SINGLE LS	M					
2	0-30	lms	10YR41 00						0	0		0							
	30-70	ms	10YR42 00						0	0		0		M					
	70-120	ms	10YR34 00						0	0		0		M					
2P	0-25	lms	10YR41 00						0	0	HR	2							
	25-60	lms	10YR42 00						0	0		0	WKCSAB VF	M					enriched with OM
	60-78	lms	75YR68 00						0	0		0	STCOPL FM	M					Fe pan, poss SPL
	78-110	scl	10YR64 00	10YR68 00	M			Y	0	0		0	MDVCPL FR	P			Y		
	110-120	c	25 Y72 00	75YR58 00	M			Y	0	0		0		P			Y		
3	0-40	lms	10YR41 00						0	0	HR	2							
	40-90	lms	10YR51 00						0	0		0		M					Fe pan 60+
	90-110	scl	10YR72 00	75YR58 00	C			Y	0	0		0		P			Y		
	110-120	c	25 Y72 00	75YR58 00	C			Y	0	0		0		P			Y		
4	0-30	msl	10YR42 00						0	0	HR	2							
	30-85	lms	10YR53 54						0	0	HR	2		M					
	85-105	msl	10YR63 00	75YR58 00	C			Y	0	0		0		M					very wet
	105-120	c	10YR73 00	75YR68 00	C			Y	0	0		0		P			Y		
5	0-30	lms	10YR42 00						0	0	HR	2							
	30-120	ms	10YR54 00						0	0	HR	2		M					
6	0-35	lms	10YR42 00						0	0		0							
	35-95	ms	10YR52 53						0	0		0		M					
	95-120	scl	75YR58 00						0	0		0		M					C + S lenses
7	0-27	msl	10YR42 00						0	0		0							
	27-40	msl	10YR54 00						0	0		0		M					
	40-105	c	10YR52 00	75YR58 00	M		25 Y72 00	Y	0	0		0		P			Y		S lenses 80+
	105-120	ms	10YR58 00					Y	0	0		0		M					
8	0-25	lms	10YR41 00						0	0		0							
	25-40	lms	10YR54 00						0	0		0		M					
	40-90	ms	10YR63 00						0	0		0		M					
	90-120	ms	10YR72 00						0	0		0		M					
9	0-28	lms	10YR42 00						0	0		0							
	28-78	lms	10YR54 00						0	0		0		M					
	78-120	lms	10YR73 00	75YR58 00	C			Y	0	0		0		M					C + S lenses

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	
10	0-28	lms	10YR41 00						0	0		0							
	28-50	ms	10YR52 00						0	0		0		M					
	50-120	ms	10YR73 72						0	0		0		M					
11	0-30	hcl	10YR42 00	75YR46 00	C			Y	0	0		0							
	30-65	hcl	10YR52 53						0	0		0		M					
	65-75	msl	10YR62 00						0	0		0		M					very wet
	75-120	lms	10YR62 00						0	0		0		M					very wet
12	0-32	lms	10YR42 00						0	0		0							
	32-55	ms	10YR54 00						0	0		0		M					
	55-110	ms	10YR64 00						0	0		0		M					
	110-120	msl	10YR73 00	75YR58 00	C			Y	0	0		0		M					
13	0-25	lms	10YR42 00						0	0		0							
	25-75	ms	10YR43 00						0	0		0		M					
	75-120	ms	10YR64 00						0	0		0		M					C lenses

APPENDIX IV

RESULTS FROM PREVIOUS 1995 SURVEY

Contents:

A1

West Sussex Minerals Plan

Site E: South Minsted

Agricultural Land Classification,

ALC Map and Report.

May 1995

AGRICULTURAL LAND CLASSIFICATION REPORT

WEST SUSSEX MINERALS PLAN
SITE E: SOUTH MINSTED

1. Summary

1.1 ADAS was commissioned by MAFF's Land Use Planning Unit to provide information on land quality for 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 Site E comprises 10.3 hectares of land to the west of Midhurst in West Sussex. An Agricultural Land Classification (ALC) survey was carried out during March 1995. The survey was undertaken at a detailed level of approximately one boring per hectare of agricultural land surveyed.. A total of 13 borings and two soil inspection pits 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 The work was carried out by members of the Resource Planning Team in the Guildford Statutory Group of ADAS.

1.4 The agricultural land at this site was in a variety of uses. At the time of survey the southern-most field was in grass whilst the remainder of the site was under maize stubble or recently sown cereals.

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 1:10,000. It is accurate at this scale, but any enlargement would be misleading.

Table 1 : Distribution of Grades and Subgrades

Grade	Area (ha)	% of Site
3a	6.4	62.1
3b	3.9	37.9
Total area of site	10.3	100.0

1.6 Appendix 1 gives a general description of the grades, subgrades and land use categories identified in this survey. The main classes are described in terms of the type of limitation that can occur, the typical cropping range and expected level and consistency of yield.

1.7 The land has been classified principally on the basis of soil droughtiness, good quality and moderate quality land being identified. Soils on the site were generally found to be loamy sand topsoils overlying loamy sand or sand subsoils. Such soils have low reserves of profile available water and despite the relatively moist climatic regime which prevails at this locality, crops are likely to suffer drought stress for part of the growing season. Occasional profiles are affected by a soil wetness limitation where clayey subsoil horizons impede drainage.

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, 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, climatic factors do interact with soil properties to influence soil wetness and droughtiness limitations. At this locality the high average annual rainfall, and correspondingly high field capacity days, increase the likelihood of soil wetness. Similarly the relatively low crop adjusted soil moisture deficits reduce the likelihood of soil droughtiness.

2.4 No local climatic limitations such as exposure or frost risk are believed to adversely affect this site.

Table 2: Climatic Interpolations

Grid Reference	SU 852 208	SU 855 212
Altitude, (m, AOD)	45	40
Accumulated Temperature (day degrees C., Jan.-June)	1492	1498
Average Annual Rainfall (mm)	919	910
Field Capacity Days	201	200
Moisture deficit, wheat (mm)	99	100
Moisture deficit, potatoes (mm)	91	92
Overall Climatic Grade	1	1

3. Relief

3.1 The site slopes gently from 45m AOD in the north west to 40m AOD in the east. The land rises again to 45m AOD, in the south, towards Starveacre Copse.

4. Geology and Soils

4.1 The published geological information (BGS, 1972), shows the majority of the site to be underlain by the Folkestone Beds with some Gault Clay in the south.

4.2 The published soils information (SSEW, 1983), shows the site to be underlain by soils of the Shirrell Heath Association. The legend accompanying the map describes these soils as 'Well drained with a bleached subsurface horizon. Some similar soils with slowly permeable subsoils and slight seasonal waterlogging. Some sandy and coarse loamy soils affected by groundwater often with humose surface horizon.' (SSEW, 1983).

4.3 Detailed field examination revealed the soils on this site to be similar to those described in paragraph 4.2, comprising permeable loamy sands over sands.

5. Agricultural Land Classification

5.1 Paragraph 1.5 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 The majority of the agricultural land on this site has been mapped as good quality, the key limitation being soil droughtiness. The profiles commonly comprise stoneless medium sandy loam or, more usually, loamy medium sandy topsoils over similar or coarser textured (medium sand) upper subsoils. In some profiles the medium sand continues to depth. These soils are free draining and thus, despite the relatively high rainfall, contain low water reserves. This land has therefore been classified as Subgrade 3a as drought stress can limit the level and consistency of crop yields. A thin iron pan was recorded in the some of these profiles. Though this horizon was compacted it was not considered likely to cause a significant restriction to drainage or rooting and thus does not influence ALC grading.

5 4 A number of borings contain sandy clay loam and clay lower subsoils which were identified as being poorly structured and slowly permeable in Pit 2. These subsoil horizons do not generally occur until below 80cm depth thus drainage through the profile is not significantly impeded. These profiles were also classified as Subgrade 3a on the basis of soil droughtiness. Occasionally a moderate soil wetness limitation did occur where slowly permeable clay occurs at 40cm depth causing drainage to be impeded (Wetness Class III is appropriate). Wet soils such as these can reduce plant growth and yields and thus restrict the number of days when cultivations and/or grazing may occur.

5.5 Individual borings of slightly poorer quality were also identified in this mapping unit but were of insufficient number and extent to map separately.

Subgrade 3b

5.6 Along the eastern edge of the site the land has been classified as moderate quality on the basis of soil droughtiness. Soils here are generally more sandy at shallower depths than elsewhere on the site. Profiles comprise stoneless or very slightly flinty (2% total flint) loamy medium sand topsoils over very weakly developed loamy medium sand or medium sand upper subsoils. Loose single grain medium sand lower subsoils then continue to depth. The combination of coarse textures and moderate subsoil structural conditions causes profile available water for crops to be restricted. This land has therefore been assessed as Subgrade 3b since plants may suffer drought stress and yield potential may be affected.

SOURCES OF REFERENCE

British Geological Survey (1972), Sheet 317, Chichester, Solid & Drift Edition. 1:50,000

MAFF (1988), Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.

Soil Survey of England and Wales (1983), Sheet No.6, Soils of South-East England, 1:250,000, and Accompanying Legend.

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

SOIL PIT DESCRIPTION

Site Name : W. SUSSEX MINS, SITE E Pit Number : 1P

Grid Reference: SU85402100
Average Annual Rainfall : 919 mm
Accumulated Temperature : 1498 degree days
Field Capacity Level : 200 days
Land Use : Fallow
Slope and Aspect : 01 degrees S

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 25	LMS	10YR31 00	0	0						
25- 40	LMS	10YR42 00	0	0			WKCSAB	VF	M	
40- 90	MS	10YR53 00	0	0			WKMSAB	VF	M	
90-120	MS	10YR72 00	0	0			SINGLE	LS	M	

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

Drought Grade : 3B
APW : 077mm MBW : -23 mm
APP : 060mm MBP : -32 mm

FINAL ALC GRADE : 3B
MAIN LIMITATION : Droughtiness

SOIL PIT DESCRIPTION

Site Name : W. SUSSEX MINS, SITE E Pit Number : 2P

Grid Reference: SU85302110
Average Annual Rainfall : 919 mm
Accumulated Temperature : 1498 degree days
Field Capacity Level : 200 days
Land Use :
Slope and Aspect : 01 degrees E

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	LITH	MOTTLES	STRUCTURE	CONSIST	SUBSTRUCTURE	CALC
0- 25	LMS	10YR41 00	0	2	HR					
25- 60	LMS	10YR42 00	0	0			WKCSAB	VF	M	
60- 78	LMS	75YR68 00	0	0			STCOPL	FM	M	
78-110	SCL	10YR64 00	0	0		M	MDVCPL	FR	P	
110-120	C	25 Y72 00	0	0		M			P	

Wetness Grade : 2
Wetness Class : II
Gleying :078 cm
SPL :078 cm

Drought Grade : 3A
APW : 096mm MBW : -4 mm
APP : 064mm MBP : -28 mm

FINAL ALC GRADE : 3A
MAIN LIMITATION : Droughtiness

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	SU85402120	CER	E	01			1	1	098	-2	082	-10	3A				DR	3A	2 TOP TEXT
1P	SU85402100	FLW	S	01			1	1	077	-23	060	-32	3B				DR	3B	2 TOP TEXT
2	SU85502120	CER					1	1	078	-22	061	-31	3B				DR	3B	2 TOP TEXT
2P	SU85302110	STB	E	01	078	078	2	2	096	-4	064	-28	3A				DR	3A	PODZOL
3	SU85302110	STB	E	01	090	090	1	1	104	4	073	-19	3A				DR	3A	2 TOP TEXT
4	SU85402110	CER	NE	01	085	105	1	1	114	14	079	-13	3A				DR	3A	
5	SU85502110	CER	NE	01			1	1	077	-23	060	-32	3B				DR	3B	2 TOP TEXT
6	SU85202100	CER	E	02			1	1	097	-3	065	-27	3A				DR	3A	2 TOP TEXT
7	SU85302100	CER	E	01	040	040	3	3A	123	23	104	12	2				WE	3A	
8	SU85402100	FLW	S	01			1	1	077	-23	060	-32	3B				DR	3B	2 TOP TEXT
9	SU85202090	FLW	SW	01	078		1	1	086	-14	067	-25	3A				DR	3A	2 TOP TEXT
10	SU85302090	FLW	NE	01			1	1	077	-23	060	-32	3B				DR	3B	2 TOP TEXT
11	SU85102080	PGR	W	03	0		3	3B	134	34	118	26	1				WE	3B	201 FCD
12	SU85202080	PGR	N	01	110		1	1	087	-13	063	-29	3A				DR	3A	2 TOP TEXT
13	SU85302080	PGR	SE	01			1	1	075	-25	058	-34	3B				DR	3B	

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	
10	0-28	1ms	10YR41 00						0	0		0							
	28-50	ms	10YR52 00						0	0		0		M					
	50-120	ms	10YR73 72						0	0		0		M					
11	0-30	hc1	10YR42 00	75YR46 00	C			Y	0	0		0							
	30-65	hc1	10YR52 53						0	0		0		M					
	65-75	ms1	10YR62 00						0	0		0		M					very wet
	75-120	1ms	10YR62 00						0	0		0		M					very wet
12	0-32	1ms	10YR42 00						0	0		0							
	32-55	ms	10YR54 00						0	0		0		M					
	55-110	ms	10YR64 00						0	0		0		M					
	110-120	ms1	10YR73 00	75YR58 00	C			Y	0	0		0		M					
13	0-25	1ms	10YR42 00						0	0		0							
	25-75	ms	10YR43 00						0	0		0		M					)
	75-120	ms	10YR64 00						0	0		0		M					) C lenses

SAMPLE	DEPTH	TEXTURE	COLOUR	----MOTTLES----- COL	ABUN	CONT	PED COL.	GLEY	----STONES---- >2	>6	LITH	TOT	STRUCT/ CONSIST	SUBS STR	POR	IMP	SPL	CALC	
1	0-25	olms	10YR31 00						0	0		0							
	25-45	ms	10YR41 00						0	0		0		M					
	45-120	ms	10YR52 00						0	0	HR	5		M					
1P	0-25	lms	10YR31 00						0	0		0							
	25-40	lms	10YR42 00						0	0		0	WKCSAB	VF M					very weakly de
	40-90	ms	10YR53 00						0	0		0	WKMSAB	VF M					tending to loose
	90-120	ms	10YR72 00						0	0		0	SINGLE	LS M					
2	0-30	lms	10YR41 00						0	0		0							
	30-70	ms	10YR42 00						0	0		0		M					
	70-120	ms	10YR34 00						0	0		0		M					
2P	0-25	lms	10YR41 00						0	0	HR	2							
	25-60	lms	10YR42 00						0	0		0	WKCSAB	VF M					enriched with C
	60-78	lms	75YR68 00						0	0		0	STCOPL	FM M					Fe pan, poss S
	78-110	scl	10YR64 00	10YR68 00	M			Y	0	0		0	MDVCPL	FR P		Y			
	110-120	c	25 Y72 00	75YR58 00	M			Y	0	0		0		P		Y			
3	0-40	lms	10YR41 00						0	0	HR	2							
	40-90	lms	10YR51 00						0	0		0		M					Fe pan 60+
	90-110	scl	10YR72 00	75YR58 00	C			Y	0	0		0		P		Y			
	110-120	c	25 Y72 00	75YR58 00	C			Y	0	0		0		P		Y			
4	0-30	msl	10YR42 00						0	0	HR	2							
	30-85	lms	10YR53 54						0	0	HR	2		M					
	85-105	msl	10YR63 00	75YR58 00	C			Y	0	0		0		M					very wet
	105-120	c	10YR73 00	75YR68 00	C			Y	0	0		0		P		Y			
5	0-30	lms	10YR42 00						0	0	HR	2							
	30-120	ms	10YR54 00						0	0	HR	2		M					
6	0-35	lms	10YR42 00						0	0		0							
	35-95	ms	10YR52 53						0	0		0		M					
	95-120	scl	75YR58 00						0	0		0		M					C + S lenses
7	0-27	msl	10YR42 00						0	0		0							
	27-40	msl	10YR54 00						0	0		0		M					
	40-105	c	10YR52 00	75YR58 00	M		25 Y72 00	Y	0	0		0		P		Y			S lenses 80+
	105-120	ms	10YR58 00					Y	0	0		0		M					
8	0-25	lms	10YR41 00						0	0		0							
	25-40	lms	10YR54 00						0	0		0		M					
	40-90	ms	10YR63 00						0	0		0		M					
	90-120	ms	10YR72 00						0	0		0		M					
9	0-28	lms	10YR42 00						0	0		0							
	28-78	lms	10YR54 00						0	0		0		M					
	78-120	lms	10YR73 00	75YR58 00	C			Y	0	0		0		M					C + S lenses