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HAMPSHIRE MINERALS PLAN  
SITE 23 MICHELMERSH  
AGRICULTURAL LAND CLASSIFICATION  
ALC MAP & REPORT  
NOVEMBER 1993

**HAMPSHIRE MINERALS PLAN  
SITE 23 MICHELMERSH  
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 Hampshire. The work forms part of MAFF's statutory input to the preparation of the Hampshire Minerals Plan.

1 2 Approximately 5 hectares of land relating to land at Michelmersh, Hampshire, was surveyed in November 1993. The survey was undertaken at a detailed level of approximately one boring per hectare. A total of 6 soil auger borings and 2 soil inspection pits 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 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.

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 Agricultural Area</u>
2	1.4	28.6
3a	0.4	8.2
3b	3.1	63.2
Total area of site	4.9	100% (4.9 ha)

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 Grade 2, Subgrade 3a and Subgrade 3b with soil wetness and droughtiness being the key limitations. Land classified as Grade 2 is limited by slight droughtiness due to sandy textured profiles reducing available water for plant growth. Land classified as Subgrade 3a experiences a moderate wetness limitation and comprises medium clay loam topsoils with moderately structured clay upper subsoils over poorly structured clay lower subsoils. Land classified as Subgrade 3b experiences a significant wetness limitation and consists of soils similar to that of Subgrade 3a but with poorly structured clay below the topsoil.

## 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 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 factors do interact with soil factors to affect soil droughtiness and wetness limitations It should also be noted that field capacity days for the site area are high in a regional context which increases soil wetness/workability problems

Table 2 - Climatic Interpolation

Grid Reference	SU 342 259
Altitude (m)	45
Accumulated Temperature (days)	1501
Average Annual Rainfall (mm)	795
Field Capacity (days)	173
Moisture Deficit Wheat (mm)	109
Moisture Deficit Potatoes (mm)	102
Overall Climatic Grade	1

## 3 0 Relief

3 1 The site lies at an altitude of approximately 45 65 metres with land sloping gently south west 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 sheet for the site Sheet 299 Winchester (BGS 1975) shows the underlying geology to be Palaeocene Reading Beds mottled clay and sand

4 2 The published soils information for the area Sheet 6 Soils of South East England (SSEW 1983) shows the site to comprise the Fyfield 4 association Deep well drained often stoneless loamy and sandy soils Some fine loamy soils with slowly permeable subsoils and slight seasonal waterlogging and some slowly permeable seasonally waterlogged fine loamy over clayey soils (SSEW 1983)

## 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

## **Grade 2**

5.3 Land classified as Grade 2 is mapped to the north of Michelmersh Clay Pit. Profiles typically comprise topsoils of medium clay loam containing 2% total stone by volume over upper subsoils of sandy clay loam or clay containing 0-2% total stones. Underlying this is very freely draining loamy medium sand containing similar stone content which then passes into slowly permeable clay at 110 cm with a poor subsoil structural condition. Soils are assigned to wetness class I as the slowly permeable clay occurs too deep in the profile to seriously affect soil drainage. However soils do suffer from slight droughtiness. The combination of soil textures, structures and climatic factors reduce the available water for crops in the profile such that a grade of 2 is appropriate.

## **Subgrade 3a**

5.4 A small area to the west of Michelmersh Clay Pit is classified as Subgrade 3a. Profiles typically comprise topsoils of medium clay loam or medium silty clay loam containing 2% total stones by volume over upper subsoils of clay or heavy clay loam with 2-5% total stones. Lower subsoils consist of slowly permeable clay with similar stone content. Soils experience a moderate soil wetness problem due to the presence of slowly permeable clay with a poor subsoil structural condition (see Pit 1) from 49-60 cm depth in the profile which impedes drainage. As a result soils are assigned to wetness class III and this combined with topsoil texture and climatic factors limits land to Subgrade 3a, drainage through the profile being moderately impaired.

## **Subgrade 3b**

5.5 The remainder of the site area is classified as Subgrade 3b. Profiles here typically comprise topsoils of medium clay loam containing 2% total stones by volume over poorly structured, slowly permeable clay subsoils. As a result soils suffer from severe wetness problems due to the presence of slowly permeable clay from a depth of 25-26 cm in the profile. Soils are assigned to wetness class IV and this again combined with topsoil texture and climatic factors means that land can be classified no higher than Subgrade 3b, drainage through the profile being severely impaired.

ADAS REFERENCE 1512/219/93  
MAFF REFERENCE EL 15/107

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 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

### REFERENCES

\* BRITISH GEOLOGICAL SURVEY (1975) Sheet No 299 Winchester 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 Notation 1 grid square and 8 figure grid reference

2 USE Land use at time of survey. The following abbreviations are used:

ARA Arable WHT Wheat BAR Barley CER Cereals OAT Oats MZE Mize OSR Oilseed rape  
BEN Field Beans BRA Broadleaved 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 Flow PLO Ploughed SAS Set aside OTH Other

3 GRDNT Gradient measured by hand held optical inclinometer

4 GLEY/SPL Depth in cm to gleying or lowly permeable layers

5 AP (WHEAT/POTS) Crop adjusted available water capacity

6 MB (WHEAT/POTS) Moisture Balance

7 DRT Bedrock coding 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 Sandy LS Loamy Sandy 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 Medium Light Silts

For the sandy loamy sandy sandy loam and sandy silt loam classes the predominant size of sand fraction will be indicated by the size prefix:

F Fine (more than 66% of the sand less than 0.2mm)  
M Medium (10th 66% fine sand and 10th 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 subdivided according to their clay content:

M Medium (<27% clay) H Heavy (27-35% clay)

2 MOTTLE COL Mottle colour

3 MOTTLE ABUN Mottle abundance expressed as 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 rock and stones MSST soft medium or coarse grained sandstone

SI soft weathered igneous or metamorphic SLST soft oolitic or dolomitic limestone

FSST soft fine grained sandstone ZR soft gillaceous or silty rock 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 consistency 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 Soil structural data 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% biopore >0.5 mm Y will appear in this column

11 IMP If the profile is impenetrable Y will appear in this column at the appropriate horizon

12 SPL Slowly permeable layer If the soil horizon is slowly permeable Y will appear in this column

13 CALC If the soil horizon is calcareous 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 HANTS MIN 23 MICHELMERSH Pit Number 1P

Grid Reference SU34202590 Age Annual Rainfall 795 mm  
 Accumulated Temperature 1501 degree days  
 Field Capacity Level 173 days  
 Land Use Permanent Grass  
 Slope and Aspect degree

HORIZON	TEXTURE	COLOUR	STONES	2	TOT STONE	MOTTLES	STRUCTURE
0 26	MCL	10YR42 00	0		2		MDCSAB
26 49	C	25Y 53 00	0		2	C	MDCSAB
49 120	C	25Y 63 00	0		2	M	MDCAB

Wetness Grade 3A  
 Wetness C1 III  
 G1 ying 026 cm  
 SPL 049 cm

Drought Grade 2  
 APW 131mm MBW 22 mm  
 APP 109mm MBP 7 mm

FINAL ALC GRADE 3A  
 MAIN LIMITATION Wetness

SOIL PIT DESCRIPTION

Site Name HANTS MIN 23 MICHELMERSH Pit Numbe 2P

Grid Reference SU34402620 Average Annual Rainfall 795 mm  
 Accumulated Temperature 1501 degree days  
 Field Capacity Level 173 days  
 Land Use  
 Slope and Aspect degree

HORIZON	TEXTURE	COLOUR	STONES	TOT STONE	MOTTLES	STRUCTURE
0 24	MCL	10YR42 00	0	1		WKCSAB
24 37	SCL	25Y 52 00	0	0	C	WKCSAB
37 110	LMS	25Y 62 00	0	0	M	WKVCSB
110 120	C	05Y 61 00	0	0	M	MDCAB

Wetness Grade 1  
 Wetness Classes I  
 Gleying 024 cm  
 SPL 110 cm

Drought Grade 2  
 APW 122mm MBW 16 mm  
 APP 091mm MBP 8 mm

FINAL ALC GRADE 2  
 MAIN LIMITATION Droughtiness

SAMPLE NO	GRID REF	ASPECT USE	WETNESS		WHEAT		POTS		M REL		EROSN	FROST	CHEM	ALC	COMMENTS
			GRDNT	GLEYSPL	CLASS	GRADE	AP	MB	AP	MB	DRT	FLOOD	EXP	DIST	
1	SU34402620	SAS	025	110	1	1	120	14	090	9	2			DR	2
1P	SU34202590	PGR	026	049	3	3A	131	22	109	7	2			WE	3A
2	SU34482615	SAS	025	045	4	3B	130	24	107	8	2			WE	3B
2P	SU34402620	SAS	024	110	1	1	122	16	091	8	2			DR	2
3	SU34202600	PGR	025	025	4	3B	124	15	102	0	2			WE	3B
4	SU34162586	PGR	025	060	3	3A	134	25	112	10	2			WE	3A
5	SU34272588	PGR	025	045	4	3B	130	21	107	5	2			WE	3B
6	SU34402610	SAS	026	045	4	3B	130	24	108	9	2			WE	3B

SAMPLE	DEPTH	TEXTURE	COLOUR	MOTTLES-			PED COL	GLEY	STONES		STRUCT/ CONSIST	SUBS					
				COL	ABUN	CONT			2	6		LITH	TOT	STR	POR	IMP	SPL
1	0 25	mc1	10YR42 00						0	0	HR	2					
	25 30	c	10YR62 00	10YR58	61	C		Y	0	0	HR	2		M			
	30 110	lms	10YR71 00	10YR58	00	C		Y	0	0	HR	2		G			
	110 120	c	10YR51 00	10YR58	00	C		Y	0	0	HR	2		P	Y		Y
1P	0 26	mc1	10YR42 00	09					0	0	HR	2	MDCSAB	FR			
	26 49	c	25Y 53 00	10YR56	00	C		Y	0	0	HR	2	MDCSAB	FR	M		
	49 120	c	25Y 63 00	10YR58	00	M		Y	0	0	HR	2	MDCAB	FM	P	Y	Y
2	0 25	mc1	10YR42 00						0	0	HR	2					
	25 45	c	10YR52 00	10YR58	00	C		Y	0	0	HR	2		M			
	45 120	c	10YR63 00	75YR58	00	M		Y	0	0	HR	2		P	Y		Y
2P	0 24	mc1	10YR42 00						0	0	HR	1	WKCSAB	FR			
	24 37	sc1	25Y 52 00	75YR56	00	C		Y	0	0		0	WKCSAB	FM	P		
	37 110	lms	25Y 62 00	75YR58	00	M		Y	0	0		0	WKVCSB	FR	G		
	110 120	c	05Y 61 00	75YR58	00	M		Y	0	0		0	MDCAB	FM	P	Y	Y
3	0 25	mc1	10YR42 00						0	0	HR	2					
	25 120	c	10YR64 00	10YR58	61	M		Y	0	0	HR	2		P	Y		Y
4	0 25	mzc1	10YR42 00						0	0	HR	2					
	25 60	hc1	25Y 64 00	10YR58	61	M		Y	0	0	HR	5		M			
	60 120	c	25Y 74 00	10YR58	61	M		Y	0	0	HR	5		P	Y		Y
5	0 25	mc1	10YR42 00						0	0	HR	2					
	25 45	c	25Y 64 00	10YR58	61	M		Y	0	0	HR	2		M			
	45 120	c	25Y 63 00	10YR58	61	M		Y	0	0	HR	2		P	Y		Y
6	0 26	mc1	10YR44 00						0	0	HR	2					
	26 45	c	10YR52 00	10YR58	61	C		Y	0	0	HR	2		M			
	45 120	c	10YR63 00	10YR58	61	M		Y	0	0	HR	2		P	Y		Y