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COTE FARM, AUST, AVON

AGRICULTURAL LAND CLASSIFICATION AND ASSESSMENT OF SITE
PHYSICAL CHARACTERISTICS

Report of Survey

1. INTRODUCTION

Twenty eight hectares of land at Cote Farm, Aust were graded using the Agricultural Land Classification (ALC) System in April 1993. The survey was carried out for MAFF as part of its statutory role in connection with a minerals planning application made to Avon County Council.

The fieldwork was carried out by ADAS's Resource Planning Team (Taunton Statutory Unit) at a scale of 1:10,000 (approximately one sample point every hectare). The information is correct at this scale but any enlargement would be misleading. A total of 28 auger borings and 2 soil profile pits were examined.

The published Provisional 1" to the mile ALC map of this area (MAFF 1971) shows the site to be Grade 3. The recent survey supercedes this map having been carried out at a more detailed level and using the Revised Guidelines and Criteria for grading the quality of agricultural land (MAFF 1988).

The Agricultural Land Classification provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use. The grading takes account of the top 120cm of the soil profile. A description of the grades used in the ALC System can be found in the appendix.

Table 1 Distribution of ALC grades: Cote Farm

| Grade | Area (ha) | % of Survey Area | % of Agricultural Land |
|-------|------------|------------------|------------------------|
| 3A | 17.3 | 59.2 | 59.2 |
| 3B | 5.0 | 17.1 | 17.1 |
| 4 | <u>6.9</u> | <u>23.6</u> | <u>23.6</u> |
| TOTAL | 29.2 | 100% | 100% |

2. CLIMATE

The grade of the land is determined by the most limiting factor present. The overall climate is considered first because it can have an overriding influence on restricting land to lower grades despite other favourable conditions.

Estimates of climatic variables were obtained for the site by interpolation from the 5km grid Meteorological Office Database (Meteorological Office 1989) and are shown in Table 2.

The parameters used for assessing overall climatic limitation are accumulated temperature, (a measure of the relative warmth of a locality) and average annual rainfall, (a measure of overall wetness). The values shown in Table 2 reveal that there is no overall climatic limitation.

No locally limiting climatic factors such as exposure were noted in the survey area, despite the site being on the estuary edge. Climatic data on Field Capacity Days (FCD) and Moisture Deficits for wheat (MDW) and potatoes (MDP) are also shown. These data are used in assessing the soil wetness and droughtiness limitations referred to in Section 5.

Table 2 Climatic Interpolations: Cote Farm

| | |
|-----------------------------------|------------|
| Grid Reference | ST 583 901 |
| Height (m) | 10 |
| Accumulated Temperature (day deg) | 1530 |
| Average Annual Rainfall (mm) | 851 |
| Overall Climatic Grade | 1 |
| Field Capacity (Days) | 185 |
| Moisture Deficit, Wheat (mm) | 101 |
| Potatoes (mm) | 94 |

3. RELIEF

The site is virtually flat and lies adjacent to the Severn Estuary. There is a small rise in the south west.

4. GEOLOGY AND SOILS

The published 1:50,000 scale solid and drift geology map, sheet 250 (Geological Survey of England and Wales 1981), shows the majority of the site to be underlain by Keuper Marl. In the north there is an area of Esturine alluvium. Adjacent to the hill in the south west are two small areas of Tea green marl and Cotham and Westbury beds.

The Soil Survey of England and Wales mapped the soils of the area in 1983, at a reconnaissance scale of 1:250,000. This

map shows the soils to be of three associations. The majority of the site is of the Worcester Association, which are described as slowly permeable reddish clays. In the north soils of the Newchurch 2 Association are said to exist. These are deep poorly drained clay soils. A small area in the south west is mapped as the Denchworth association, being poorly drained clays.

Several different types of soil were identified in the area during the recent ALC survey. The majority of the site has heavy clay loam or heavy silty clay loam topsoils. the remainder being medium clay loams. In the north and centre the subsoils are poorly drained. The rest of the site has better drained soils. All are virtually stone free.

5. AGRICULTURAL LAND CLASSIFICATION

The distribution of ALC grades identified in the survey area is detailed in Section 1 and shown on the accompanying ALC map. The information is correct at the scale shown but any enlargement would be misleading.

Subgrade 3a

Part of the site has been classified as Subgrade 3a. This area includes soils that are well drained and also some which show slight restrictions on free drainage. The soils are generally reddish at depth. The topsoils are either heavy clay loam or heavy silty clay loams. These become clays in the lower subsoil. The soils that are Wetness Class I show no evidence of restricted drainage, except occasional manganese concretions. The Wetness Class II soils have evidence of poorer drainage in the form of gleying in the top 40cm but there is no slowly permeable layer at depth as confirmed by a soil profile pit. The procedure for reddish soils where appropriate was followed to determine the extent of drainage restrictions. Both the Wetness Class I and II soils can be graded as 3a.

Subgrade 3b

A small area in the south west has gradients over 7 degrees and so is downgraded to 3b.

The two other areas mapped as 3b have poor drainage caused by slowly permeable layers. These soils are Wetness Class III. The effect of poor drainage are seen in the form of gleying within the top 40cm. This is caused by the presence of a slowly permeable layer typically starting at 65cm and extending to depth. Topsoil textures are heavy silty clay loam and heavy clay loams. In the northern block the subsoils are clays throughout whilst in the central block there is an heavy clay loam upper subsoil with clay lower subsoil. These soils can be graded no better than 3b.

Grade 4

Two areas of Grade 4 have been identified in the survey area. These soils are more poorly drained than those described above. The presence of a slowly permeable layer (SPL) high in the profile is reflected in the presence of gleying within 40cm. A soil profile pit confirmed the presence of the SPL and that these soils are Wetness Class IV. *In the north the soil profile has heavy clay loam or heavy silty clay loam topsoils with clay subsoils.* In the central block of Grade 4 there is a heavy clay loam upper subsoil before a clay lower subsoil.

6. SOIL RESOURCES

The areas referred to can be found on the accompanying Soil Resources map.

6.1 TOPSOIL

"Topsoil" is defined as the organic rich surface horizon. A single topsoil can be identified across the site. The actual depth of the the topsoil varies slightly but it can be typically said to be 30cm deep. The soil is stone free.

A total topsoil resource of 87,600 cubic metres is available as shown in Table 3.

Table 3 Topsoil Resources: Cote Farm

| Map Unit | Depth | Area | Soils | Volume |
|----------|--------|------|----------|--------|
| I | 0-30cm | 29.2 | HCL/HZCL | 87,600 |

6.2 SUBSOIL

"Subsoil" is defined as the less organic rich lower horizons.

Two subsoil units have been identified. Whilst the whole site has clay from 50cm to 120cm and this can be handled as a whole, the upper subsoil should be handled separately. In unit II there is clay throughout the subsoil horizons. In unit III there is a heavy clay loam upper subsoil extending to 50cm on average.

A total subsoil resource of 262,800 cubic metres is available, the distribution of which is shown in Table 4.

Table 4 Subsoil Resources: Cote Farm

| Map unit | Depth | Area | Soils | Volume |
|----------|--------|------|-------|----------------|
| II | 30-120 | 12.2 | C | 109,800 |
| III | 30-50 | 17.0 | HCL | 34,000 |
| III | 50-120 | 17.0 | C | <u>119,000</u> |
| | | | | 262,800 |

REFERENCES

GEOLOGICAL SURVEY OF ENGLAND AND WALES (1981) Solid and Drift edition. Sheet 250 Chepstow, Provisional 1:50,000 scale

MAFF (1971) Agricultural Land Classification Map Sheet 155 Provisional 1:63,360 scale

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

METEOROLOGICAL OFFICE (1989) Published climatic data extracted from the agroclimatic dataset, compiled by the Meteorological Office

SOIL SURVEY OF ENGLAND AND WALES (1983) Sheet 5 Soils of South West England 1:250,000 scale

APPENDIX

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 include 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 and horticultural crops can usually be grown but on some land in 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. Where 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 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.

Descriptions of other land categories used on ALC maps

Urban

Built-up or 'hard' uses with relatively little potential for a return to agriculture including: 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.

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 land cover types, eg buildings in large grounds, and where map scale permits, the cover types may be shown separately. Otherwise, the most extensive cover type will usually be shown.

| | | | | | | | | | | | | |
|------------------------|--|---------------------|--|------------------------------|--|------------------------|--|--|--|--------------------------------|--|--|
| SITE NAME Cote Farm | | PROFILE NUMBER 1 | | SLOPE AND ASPECT 0 | | LAND USE Ley | | Av Rainfall :- 851 ATO :- 1530 FC Days :- 185 Climatic grade :- 1 | | PARENT MATERIAL Keuper Marl | | |
| JOB NO 13/93 | | DATE 1/4/93 | | GRID REFERENCE ST 583 899 | | DESCRIBED BY GMS/RC | | | | | | |

| Horizon Number | Lowest Av Depth | Matrix and Ped Face Colours | Texture | Stoniness: Size, Shape, Type, and Field Method | Mottling Abundance, Contrast Size and Colour | Structure: Development Size and Shape | Pores and Fissures | Structural Condition | Consistence | Roots Abundance Size and Nature | Calcium Carbonate Content | Mangan Concs etc | Horizon Boundary: Distinctness and Form |
|----------------|-----------------|-----------------------------|---------|--|--|--|--------------------|----------------------|-------------|---------------------------------|---------------------------|------------------|---|
| 1 | 0-35 | 75YR42 | M/HCL | 0 | None | WCSAB | Good | - | Friable | Many fine | | None | Abrupt smooth |
| 2 | 35-57 | 05YR53 | C | 0 | cdogn (gleyed) | MCSAB breaking to MMAB | Good | Moderate | Friable | Many fine | | Yes | Sharp wavy |
| 3 | 57-120 | 25YR34 Ped 05YR53 | C | 0 | gleyed | MCSAB becoming MMAB at depth (not SPL) | Low | Moderate | Firm | Few fine | | Yes | |
| | | | | | | | | | | | | | |

Profile Gleyed From:- Gleyed from 35cm

Depth to Slowly Permeable Horizon:- None

Wetness Class :- II

Wetness Grade :- 3A

Available Water Wheat :- 143

Potatoes :- 119

Moisture Deficit Wheat :- 101

Potatoes :- 94

Moisture Balance Wheat :- 42

Potatoes :- 25

Droughtiness Grade :- 1

Final ALC Grade :- 3A

Main Limiting Factor(s) :- Wetness

Remarks :-
Pit dug to 90 cm.

Structure of H3 difficult, mix of CSAB + MAB, all moderately developed.

| | | | | | |
|------------------------|---------------------|------------------------------|------------------------|--|--------------------------------|
| SITE NAME Cote Farm | PROFILE NUMBER 2 | SLOPE AND ASPECT 0 | LAND USE Cereal | Av Rainfall :- 851 ATO :- 1530 FC Days :- 185 Climatic grade :- 1 | PARENT MATERIAL Keuper marl |
| JOB NO 13/93 | DATE 1/4/93 | GRID REFERENCE ST 582 902 | DESCRIBED BY GMS/RC | | |

| Horizon Number | Lowest Av Depth | Matrix and Ped Face Colours | Texture | Stoniness: Size, Shape, Type, and Field Method | Mottling Abundance, Contrast Size and Colour | Structure: Development Size and Shape | Pores and Fissures | Structural Condition | Consistence | Roots Abundance Size and Nature | Calcium Carbonate Content | Mangan Concs etc | Horizon Boundary: Distinctness and Form |
|----------------|-----------------|-----------------------------|---------|--|--|---------------------------------------|--------------------|----------------------|-------------|---------------------------------|---------------------------|------------------|---|
| 1 | 0-23 | 75YR52 | HZCL | 0 | cogm (gleyed) | WFSAB | good | - | Friable | Many fine | | None | Abrupt smooth |
| 2 | 23-40 | 75YR62 | HCL | 0 | 75YR56 | MCAB breaking to MMAB | good | Moderate | Friable | Common V fine | | None | Clear wavy |
| 3 | 40-80+ | 05Y71 | C | 0 | None | WCSAB or massive SPL | Low | Moderate | Firm | Few V fine | | None | |

Profile Gleyed From:- 0 cm

Depth to Slowly Permeable Horizon:- 40 cm

Wetness Class :- IV

Wetness Grade :- 4

Available Water Wheat :- 127

Potatoes :- 119

Moisture Deficit Wheat :- 101

Potatoes :- 94

Moisture Balance Wheat :- 26

Potatoes :- 25

Droughtiness Grade :- 2

Final ALC Grade :- 4

Main Limiting Factor(s) :- Wetness

Remarks :-