

AGRICULTURAL LAND CLASSIFICATION AND SOIL PHYSICAL CHARACTERISTICS
CHIGNALL ST JAMES, ESSEX

1. BACKGROUND

1.1 The site, an area of 42.6 hectares, forms part of the Essex Mineral Subject Plan. The site lies between the village of Chignall St James and the River Can. MAFF surveyed the area in April 1990 to assess the agricultural land quality and the soil physical characteristics.

2. SITE PHYSICAL CHARACTERISTICS

2.1 Climate

Climate data for the site was obtained from the published agricultural climatic dataset (Met Office, 1989). This indicates that for the site's mid range altitude of 40m AOD the annual average rainfall is 578 mm (22.8"). This data also indicates that field capacity days are 108 and moisture deficits are 121 mm for wheat and 117 mm for potatoes. These climatic characteristics do not impose any climatic limitation on the ALC grading of the survey site.

2.2 Altitude and Relief

The land falls gently west/southwest from 46m to 34m AOD at Pengymill. Gradient and altitude do not constitute limitations to the ALC grade.

3. AGRICULTURAL LAND CLASSIFICATION (refer to ALC and Soil Types Maps)

3.1 The land was graded using the criteria set out in the revised Agricultural Land Classification document (MAFF, 1988). The definitions of the Agricultural Land Classification (ALC) grades are included in Appendix 2.

3.2 The table below shows the ALC grades for the survey area.

AGRICULTURAL LAND CLASSIFICATION

Grade	ha	%
2	10.5	25
3a	29.9	70
3b	0.9	2
Non Agricultural	<u>1.3</u>	<u>3</u>
TOTAL	<u>42.6</u>	<u>100</u>

3.3 Grade 2

Approximately a quarter of the site has been graded 2. The soils are slightly droughty, calcareous and typically comprise clay loams or clay topsoils over clay subsoils. (Soil Type A) Soil profile pit observations indicate that the subsoils are slowly permeable at depth; 50/70 cm⁺ (ie wetness class II). Slight wetness, workability and droughtiness limitations combine to restrict this land to grade 2.

3.4 Subgrade 3a

The majority of the survey area has been graded 3a. Three main situations occur.

3.4.1 Firstly, land graded 3a is associated with the decalcified soils of Soil Type B. Profiles are slightly droughty fine textured and non calcareous to depth 40/45 cm⁺. Profile pit observations indicate that soils become slowly permeable at depth 55/70 cm⁺ (ie wetness class II). This land is consequently limited by moderate wetness and workability imperfections which derive from the reduced subsoil permeability at depth combined with the relatively heavy decalcified topsoil textures. These factors exclude the land from a higher grade.

3.4.2 Secondly, in association with the calcareous, fine textured soils of Soil Type A land has been graded 3a. Profiles are calcareous throughout, have slowly permeable layers at depths 40/45 cm⁺ (ie wetness class II) and heavy topsoil textures. Where profiles are slowly permeable the structure of the subsoils is poor, as a result this has a moderate limiting effect on the soils capacity to provide water to the

crops. This over-riding moderate droughtiness imperfection restricts this land to subgrade 3a (good quality agricultural land).

3.4.3 Finally, a small area of land adjacent to the River Can has been graded 3a where less well drained variants of Soil Type A occur. Profiles are calcareous throughout, moderately droughty and slowly permeable directly below the topsoil (ie wetness class III). As a result moderate wetness, workability and droughtiness imperfections preclude this land from a higher grade.

3.5 Subgrade 3b

A small area of land graded 3b has been mapped adjacent to Pengymill where Soil Type B outcrops*. The soils are fine textured, non calcareous and slowly permeable directly below the topsoil (ie wetness class III). These factors combine to impose a significant limitation on the agricultural potential of this land. Thus the land is restricted to subgrade 3b (moderate quality agricultural land).

3.6 Non Agricultural

Woodland has been mapped as Non Agricultural land.

4. SOIL PHYSICAL CHARACTERISTICS

4.1 Geology

The published 1:50,000 solid and drift edition geology sheet 240 (Epping) shows the survey area to comprise boulder clay geological deposits.

4.2 Soils

During the current survey a detailed inspection of the soils identified two main types.

* In this area soils overlie gravelly material at depth 70 cm⁺.

4.2.1 Soil Type A (refer to Soil Types Map and Appendix 1).

These soils cover approximately half of the survey area. They typically comprise calcareous heavy clay loam or clay topsoils over calcareous clays which become chalky 35/60 cms⁺.

4.2.2 Soil Type B (refer to Soil Types Map and Appendix 1).

The remaining half of the survey area has been mapped as Soil Type B where decalcified fine textured soils outcrop. The soils typically comprise non calcareous heavy clay loam or clay topsoils over clay subsoils which ^{often?} ~~invariably~~ become calcareous 40/45 cm⁺. Profiles often become chalky at depth 55/85 cm⁺, however occasionally subsoils are non calcareous to 120 cm.

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Appendix 2

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 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. 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 level of yields. It is mainly suited to grass with occasional arable crops (eg cereals and forage crops) the yield of which are variable. In most 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.

References

GEOLOGICAL SURVEY OF ENGLAND & WALES 1981. Solid and drift edition geology sheet 240 (Epping). Scale 1:50,000.

MAFF 1988. Agricultural Land Classification of England and Wales (Revised Guidelines and criteria for grading the quality of Agricultural Land) Alnwick.

METEOROLOGICAL OFFICE 1989. Climate data extracted from the published agricultural climatic dataset.