

**Agricultural Land Classification**

**Gorefield, Near Wisbech,  
Cambridgeshire**

## AGRICULTURAL LAND CLASSIFICATION

### LAND AT GOREFIELD, NEAR WISBECH, CAMBRIDGESHIRE

#### 1.0 INTRODUCTION

- 1.1 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 limitations can operate in one or more of four principal ways: they may affect the range of crops which can be grown, the level of yield, the consistency of yield and the cost of obtaining it. The classification system gives considerable weight to flexibility of cropping, whether actual or potential, but the ability of some land to produce consistently high yields of a somewhat narrower range of crops is also taken into account.
- 1.2 The principal physical factors influencing agricultural production are climate, site and soil. The main climatic factors which are taken into account are temperature and rainfall, although account is also taken of exposure, aspect and frost risk. The site factors used in the classification system are gradient, micro relief and flood risk. Soil characteristics of particular importance are texture, structure, depth and stoniness. In some situations chemical properties may also influence the long term potential of land and are taken into account.
- 1.3 These factors result in varying degrees of constraint on agricultural production. They can act either separately or in combination, the most important interactive limitations being soil wetness and droughtiness. The grade or subgrade of land is determined by the most limiting factor present. Five grades of land are recognised ranging from Grade 1 land of excellent quality to Grade 5 land of very poor quality. Grade 3, which constitutes about half of the agricultural land in England and Wales is divided into two subgrades designated 3a and 3b.
- 1.4 Details of the Agricultural Land Classification (ALC) System are contained in MAFF's Revised guidelines and criteria for grading the quality of agricultural land. Descriptions of the ALC grades and subgrades are provided in Appendix I.

## 2.0 BACKGROUND

- 2.1 On the Ministry's 1:63,360 scale provisional ALC map (sheet number 124) (MAFF 1972) the site is graded 1. However for detailed site specific appraisals, these maps are inappropriate as they were originally prepared at a reconnaissance level, for strategic planning purposes, and do not show smaller areas (ie. less than 80 ha) for individual ALC grades.
- 2.2 The site extends to approximately 4.4 ha (10.8 acres) and is located on the northern side of the village of Gorefield. The land is bounded to the south and east by existing housing and to the north and west by open farmland.
- 2.3 A detailed survey was carried out on 28 April 1989 and 11 inspections were made using a dutch auger to a depth of 1.2m. In addition a soil pit was dug to assess the physical characteristics of the subsoil.
- 2.4 At the time of survey the field was supporting a crop of winter wheat.

## 3.0 PHYSICAL FACTORS AFFECTING LAND QUALITY

### Climate

- 3.1 Climatic information for the site has been interpolated from the 5km grid data set provided by the Meteorological Office (Met Office, 1989). The average annual rainfall for the site is 563mm making this one of the driest parts of the country. The number of days at which the site is likely to be at field capacity is also low at 98.
- 3.2 The accumulated temperature for this area is approximately 1444 degrees celsius. This parameter indicates the cumulative build up of warmth available for crop growth, and has an influence on the development of soil moisture deficits SMD\* and susceptibility to drought; the soil moisture deficits for wheat and potatoes are 123mm and 119mm respectively.

\* SMD represents the balance between rainfall and potential evapotranspiration occurring during the growing season. For ALC purposes the soil moisture deficits developing under a winter wheat and

maincrop potato cover are considered. These 'reference' crops have been selected because they are widely grown, and in terms of their susceptibility to drought, are representative of a wide range of crops.

3.3 The site is neither particularly exposed, nor frost prone.

3.4 There is no overall climatic limitation to agricultural use on this land.

### Relief

3.5 The site lies at an altitude of approximately 2m AOD and is almost flat, with slight undulations to the south and east. The site is bounded to the south, east and west by deep well maintained ditches.

### Geology and Soils

3.6 The site is located on the marine alluvium associated with the Wash and the soils identified during the survey conform with this Quaternary deposit.

3.7 Two soil types were mapped on the site. The first, occurring on the western side, has a silt loam or medium silty clay loam topsoil overlying a fine sandy silt loam or fine sandy loam upper subsoil, becoming loamy fine sand at depth. These soils are stone free and free draining, although they exhibit faint ochreous mottling which is considered to be a relic of former drainage conditions.

3.8 The second soil type occurring on the eastern side of the site is predominantly heavier textured. These soils have a heavy silty clay loam topsoil overlying a heavy silty clay loam subsoil which becomes lighter textured, medium silty clay loam or silt loam at depth. These soils are also stone free but exhibit distinct ochreous mottling in the subsoil which again is considered to be largely a relic of former times, as they contain a considerable amount of coarse porosity.

## **4.0 AGRICULTURAL LAND CLASSIFICATION**

4.1 The site has been classified in accordance with the guidelines contained

in the Agricultural Land Classification of England and Wales (MAFF 1988) and has been graded 1 and 2. A breakdown of ALC grades in hectares and % terms is provided below:

ALC grade	Hectares	%
1	2.4	54.5
2	2.0	45.5
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Total	4.4	100

#### Grade 1

- 4.2 The lighter textured soils described above have been classified as grade 1. These soils are porous and with the regional groundwater table controlled by the network of ditches and pumps, will seldom be wet and as such are wetness class I. The low rainfall combined with the medium silty clay loam or silt loam topsoil, means that they will be easily worked throughout the year.
- 4.3 As this area is one of low rainfall an assessment of droughtiness was made using the criteria contained in the ALC guidelines (MAFF 1988). Crop adjusted available water capacity (AP)\* values were calculated for each sample profile using maincrop potatoes and winter wheat as reference crops, characteristic of a broad range of arable and horticultural crops. These AP values were then offset against the crop adjusted soil moisture deficit values describe in para 3.2 to obtain moisture balance figures for wheat and potatoes. These moisture balance figures indicate the relative degree of the droughtiness limitation and relate directly to ALC grade. These lighter textured soils were found to be grade 1 from the moisture balance figures.
- 4.4 The only minor limitation associated with these soils is one of capping. The high silt fraction in the topsoil can cause the soils to slake under heavy rainfall and capping can result causing slight difficulties to seedling establishment, but this is not considered to be sufficient to merit any downgrading. The land is therefore extremely versatile and can grow a very wide range of crops.

## Grade 2

- 4.5 The heavier textured soils are slightly less versatile than those referred to above and as such have been graded 2. Despite the higher clay content, the subsoils were still found to contain a large number of macropores and as such are not slowly permeable and are therefore wetness class I. However the heavier textured topsoil means that during the wetter parts of the year they will have slight workability limitations and if worked whilst too wet could result in compaction.
- 4.6 The severity of the droughtiness limitation was also assessed using the criteria referred to in para 4.3. The moisture balance obtained indicates that these soils will be slightly droughty for potatoes and were thus found to be grade 2.

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- \* AP is a measure of the quantity of water held in the soil profile which can be taken up by a specified crop. The water storage capacity of soil is influenced by texture, structure, organic matter content and stone content. Where rooting is impeded for chemical or physical reasons, this is also taken into account.

## References

MAFF (1972) 1:63,360 scale ALC Map Sheet No 124 (Provisional).

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

Meteorological Office (1989) Climatological data for Agricultural Land Classification.

## APPENDIX I

### DESCRIPTION OF THE GRADES AND SUBGRADES

The ALC grades and subgrades are described below in terms of the types of limitation which can occur, typical cropping range and the expected level and consistency of yield. In practice, the grades are defined by reference to physical characteristics and the grading guidance and cut-offs for limitation factors in Section 3 enable land to be ranked in accordance with these general descriptions. The most productive and flexible land falls into Grades 1 and 2, and Subgrade 3a land collectively comprises about one-third of the agricultural land in England and Wales. About half the land is of moderate quality in Subgrade 3b or poor quality in Grade 4. Although less significant on a national scale such land can be locally valuable to agriculture and the rural economy where poorer farmland predominates. The remainder is very poor quality land in Grade 5, which mostly occurs in the uplands.

Descriptions are also given of other land categories which may be used on ALC maps.

#### **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. 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.