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Agricultural Land Classification

Land at Warren Farm, Ingoldisthorpe, Norfolk

AGRICULTURAL LAND CLASSIFICATION

LAND AT WARREN FARM, INGOLDISTHORPE, NORFOLK.

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 3. 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 2.4 ha and is located on the northern edge of the village of Ingoldisthorpe. The land is bounded by the A149 road on the west and by open farmland to the north and east. The southern boundary abuts a housing development.

2.3 A detailed survey was carried out on 19 April 1989 and 11 inspections were made on a 50 m grid, using a dutch auger, to a depth of 1.2 m. 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 5 km grid dataset provided by the Meteorological Office (Met Office, 1989). The average annual rainfall for the site is 643 mm which is high compared with the low lying land to the south and west. The number of days at which the site is likely to be at field capacity is relatively high in local terms at 133.

3.2 The accumulated temperature for this area is approximately 1418 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 112 mm and 106 mm 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, although some soils would be susceptible to drought.

Relief

3.5 The site lies at an altitude of approximately 11 m AOD and is almost flat with a very gentle gradient from east to west. The site is bounded on it western margin by a deep well maintained ditch.

Geology and Soils

3.6 The published 1:50,000 geology map for this area (Geol. Surv. 1978) indicates the site comprises undifferentiated Head deposits. These are described as being poorly sorted and poorly stratified materials of local origin which have moved down hill as solifluxion and downwash in postglacial times and often consisting of soft sands.

3.7 Field observations support this general description and indicate that there is a degree of variability both laterally over short distances and vertically within the soil profile. The topsoils over the site were uniformly medium sandy loams extending to 35-45 cm depth. The subsoils however showed greater variability with the majority having a medium sandy loam upper horizon overlying loamy sand and sand at depth. The deeper sands were generally soft and fine grained. Interspersed with these profiles were soils which had heavier textured subsoils of sandy clay loam or clay loam which were by nature calcareous.

3.8 Most of the soil profiles showed signs of coarse blotchy ochreous mottling at depth indicative of a fluctuating ground water table. However, the ochreous colouration of the sands tended to mask the gleying to some extent.

3.9 The soils were generally non stony, with less than 1% angular flints in the soil profile.

3.10 The soil profile pit indicated that the soils were very porous with a weak angular blocky structure in the upper subsoil. The soils were generally friable or very friable throughout, with the exception of the heavier textured subsoils, which were slightly firmer.

4.0 AGRICULTURAL LAND CLASSIFICATION

4.1 The land on this site has been classified as Grade 2.

4.2 The principal limitation of land quality on this site is considered to be droughtiness, as wetness was not considered to be significant due to the free draining nature of the soils. The soil morphological evidence indicates that whilst there is a fluctuating ground water table, this generally only affects the deeper subsoils. The medium sandy loam topsoils will therefore not present any major workability limitation.

4.3 The severity of the droughtiness limitation was therefore assessed using the revised guidelines and criteria for grading agricultural land (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 described 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.

4.4 The soil profiles examined were found to be grade 2 from the moisture balance figures, with the exception of two profiles of grade 3a, where and subsoils were particularly sandy and 2 profiles with heavier textured subsoils which had a grade 1 potential. Consequently, as these latter profiles were not in mappable areas, the site has been graded 2.

Resource Planning Group

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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

Geological Survey (1978) 1:50,000 scale solid and drift edition geology map, sheet 145 with part 129, King's Lynn and the Wash.

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.