PHYSICAL CHARACTERISTICS REPORT FOR LAND AT ST. MARGARET'S FARM, DARENTH

Background

The site covers approximately 5.1 ha and lies at St. Margaret's Farm, Darenth, Dartford. The site lies away from the main farm buildings to the south east of junction 2 of M25 motorway. The site is bounded to the north by junction 2 of M25, to the east by agricultural land, to the south by the Vicarage and to the west by Darenth Road.

The site was surveyed using a 110cm Dutch auger, with samples being taken at approximately 100m intervals.

Land use

At the time of survey (March 1989), all the survey area was under winter cereals.

Physical Factors Affecting Land Quality

Relief

The site slopes gently down to the west (towards Darenth Road), but gradient was not a significant factor in relation to agricultural land quality. The average height of the site was 25m O.D.

Climate

The average annual rainfall for this area is approximately 593mm/annum. The area is not likely to be frost prone or exposed. Soils are at field capacity for 114 days/annum. The median accumulated temperature above 0 degrees C for January to June is 1476 degree days. Moisture deficits adjusted for wheat and potatoes are 124 and 119 respectively (Meteorological Office 1988).

Geology and Soils

Geological Survey of Great Britain Sheet 271 (Dartford 1977) shows the site to be underlain by Upper Cretaceous Chalk with possibly an area of Thanet Beds along the north eastern edge. Soil Survey of England and Wales 'Soils of Kent' (1980) and 'Soils of South East England' (1983) show the site to be covered by Coombe 1 Association Soils; flinty, well drained, typical brown calcareous earths. Some Fyfield 4 Association soils may be found in areas covered by Thanet Beds; coarse loamy argillic brown earths.

Detailed field examination found soils to fall into two broad groups. Group 1 occurs over most of the site and comprises shallow silt loam and clay loam textured topsoils over soft chalk becoming very hard approximately 10cm into the subsoil. Drought is the major limiting factor. Group 2 occurs only at the lowest part of the site, in the southern corner. These soils are deeper; fine sandy silt loam over very stony sandy clay loam passing back into fine sandy silt loam at depth. These soils are also limited, but to a lesser degree, by drought.

Agricultural Land Classification

Appendix 1 gives a description of the grades discussed in this report.

Grade 2

Occupies 0.75ha (15.4% of the total agricultural land surveyed) and is to be found on the lowest part of the site in the southern corner. The topsoils are very slightly stony and have medium sandy silt loam textures passing into fine sandy clay loam subsoils within 35cm. The subsoil contains 26% measured stone and much chalky material which contributes to the drought-risk in these soils. Below this the textures are lighter, returning to fine sandy silt loams with approximately 15% stones. Most of the stones are flints although chalk fragments are present throughout the profiles.

Grade 3b

This is mapped over 4.12ha and 84.6% of the site to include soils which typically have silt loam and clay loam topsoil textures overlying soft, dirty-white chalk at depths below 25cm. The chalk becomes hard with depth and from pit evidence impenetrable to roots at depths below 50cm. The topsoil was very slightly stony (3% measured stone), increasing in the chalk to approximately 10-15% flints. The combination of a relatively dry climate and the shallow stony nature of the soils means they are prone to drought and thus allocated to Grade 3b.

Breakdown of ALC grades

GRADE	AREA	%
2	0.75	15.4
3b	4.12	84.6
Total	4.87	100.0

Soil Units

Although soils are variable in depth over the chalk substratum one soil unit has been identified due to the small size of the site and the pattern of soils present.

Topsoils are typically 25-35cm deep and uniformly textured across the site comprising grayish brown (10 YR 5/2 and 4/2) and dark brown (10 YR 4/3) silt loam and clay loam textures. These either rest directly over chalk or pass into thin chalky medium silty clay loam subsoils (brown 10 YR 5/3 and very pale brown 10 YR 7/4) over chalk.

In a limited area on the lower slopes (ie. within the area mapped as grade 2) the chalk is absent within auger depth and fine sandy silt loam textures are present from 60cm. These deeper soils have moderately weakly developed fine granular structures.

Stone content was measured at approximately 3% hard stones in the topsoil, increasing to 10-15% in the chalk and 26% in the subsoil of the deeper soils on the lower part of the site. However, below 60cm in these deeper soils there were fewer hard stones (c.15%) but much more calcareous material.

Plant roots were present to at least 50cm in the shallower soils but were abundant to depth in the deeper varients where consolidated chalk was absent.

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March 1989

References

Geological Survey of Great Britain. 1977. Sheet 271 Dartford. 1:50 000

M.A.F.F. 1988. Agricultural Land Classification of England and Wales: Revised Guidelines and Criteria for grading the quality of Agricultural Land.

Meteorological Office. 1988. Climatic Data for Agricultural Land Classification (unprinted).

Soil Survey of England and Wales. 1983. Soils of South East England. Sheet 6. 1:250 000

APPENDIX 1

DESCRIPTION OF THE GRADES AND SUBGRADES

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.