3305-017-91

AGRICULTURAL LAND CLASSIFICATION

LAND NORTH-EAST OF EYNSHAM, OXFORDSHIRE

Reconnaissance Survey

AGRICULTURAL LAND CLASSIFICATION

LAND NORTH-EAST OF EYNSHAM, OXFORDSHIRE - RECONNAISSANCE SURVEY

91

1. BACKGROUND

1.1 Approximately 71 ha of land to the north-east of Eynsham in Oxfordshire was surveyed on 30th October 1991 in connection with a planning application for sand and gravel extraction. This department was consulted in accordance with the 1981 Town and Country Planning (Minerals) Act.

1.2 The site was surveyed at a reconnaissance scale using 1.2 m Dutch soil augers with samples being taken at regular 200 m intervals across the area. In addition, two profile pits were examined to enable more detailed soil descriptions.

Land-Use

1.3 At the time of survey, about half of the site was given over to permanent pasture, whilst the remainder had been sown with winter cereals. A track known as Mill Lane and the A40 have been mapped as land in urban use.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

2.1 The site lies at 62 - 64 m A.O.D. It is adjacent to the River Evenlode along its eastern boundary, and correspondence with the National Rivers Authority, (Thames Region), indicates that the lower lying parts of the site may be prone to occasional flooding. This would have an important influence on the agricultural land quality of any areas thus affected. Land quality on the site is not influenced by either altitude or gradient.

Climate

2.2 Estimates of climatic variables, for a representative location in the survey area, were obtained by interpolation from grid point datasets, (Met. Office, 1989) and adjusted for altitude.

Climatic variables

Grid Reference	SP440100	SP435107
Altitude (m, A.O.D)	62	64
Accumulated Temperature (°days, Jan - June)	1442	1440
Average Annual Rainfall (mm)	647	655
Field Capacity Days	141	142
Moisture deficit, wheat (mm)	110	109
Moisture deficit, potatoes (mm)	103	101

2.3 The important parameters in assessing an overall climate limitation to agricultural land quality, are, average annual

rainfall, (a measure of the degree of wetness) and accumulated temperature (a measure of the relative warmth of a locality). At this locality an overall climate limitation does not exist, although the range of accumulated temperatures indicates that the site enjoys relative warmth in a national context.
Climatic factors however do interact with soil factors to influence land quality, principally by way of soil wetness and droughtiness limitations.

Geology and Soils

2.4 British Geological Survey, Sheet 236, Witney (1982) indicates the presence of a number of geological deposits which outcrop at this locality. Across much of the site, deposits of alluvium have been mapped, whilst the south-western part of the site is underlain by Oxford Clay. A small area towards the north-west is shown to be underlain by Pleistocene Flood Plain Terrace deposits which principally comprise gravels with peat lenses.

2.5 Soil Survey of England and Wales, Sheet 6, Soils of South-East England, (1983) maps two soil associations in the vicinity of the site. The Fladbury association is shown to be most extensive. These deep clayey alluvial soils are mapped across the eastern parts of the site in conjunction with the flood plain of the River Evenlode. Fladbury soils are described as 'pelo-alluvial gley soils which are clayey throughout and prominently mottled directly below the topsoil', (SSEW, 1984). Their occurrence on flood plains results in these soils being affected by groundwater at shallow depth and locally they may suffer prolonged waterlogging. The risk of flooding may also be a problem. Towards the south-west of the site, soils of the Kelmscot association have been mapped. These soils are described as 'calcaro-cambic gley soils with grey fine loamy subsoils over limestone gravel', (SSEW, 1984). These soils are permeable, but are affected by shallow groundwater and flooding.

2.6 Detailed field examination of the soils on the site indicates the presence of two soil groups. However the extent, distribution and physical characteristics of these do not exactly correspond with those mapped on Sheet 6, (SSEW, 1983), and described in Section 2.5, although they are broadly similar.

2.7 The most extensive soil group comprises clayey alluvial soils which are generally poorly drained and may be affected by groundwater and flooding. They typically rest over calcareous or occasionally non-calcareous sand and gravel at variable depths and may become sandy at depths greater than about 60 cm.

2.8 The second soil group is relatively localised in extent and although it comprises similar textures to the more extensive group described above, profiles are generally better drained and do not become impenetrable over sand and gravel.

3. AGRICULTURAL LAND CLASSIFICATION

3.1 The ALC grading of this site is primarily determined by interactions between soil and climatic factors, namely soil wetness and droughtiness, soil wetness being the most influential factor. In addition, however, the risk of occasional flooding resulting from the proximity to the River Evenlode has an influence on the land quality of the site.
ALC grades 2, 3a and 3b have been mapped at this locality and the area and extent is given below.

Grade	Area (ha)	% of total agricultural land
2	1.67	2
3a	2.95	5
3b	64.25	93
Total agricultural area	68.87	100
Urban area	2.6	
Total area surveyed	71.47	

3.2 Appendix 1 gives a generalised description of the grades and sub-grades identified in this survey.

Grade 2

3.3 Land of this quality represents only a small proportion of the total agricultural land on the site and it is located towards the far western boundary. Profiles typically comprise slightly calcareous medium clay loam topsoils overlying similar textures in the immediate subsoil and passing to heavy clay loam and clay in the lower subsoil. Profiles may be imperfectly drained as evidenced by gleying below about 55 cm but were not found to be slowly permeable; wetness class I was therefore assigned to such profiles.
These profiles however are limited by slight droughtiness. Poor structural conditions in the subsoil, associated with clay horizons, cause the water reserves which are available for plant growth to be slightly restricted.

Grade 3a

3.4 Land graded 3a occurs as a single mapping unit towards the western boundary of the site. Slightly stony heavy clay loam topsoils rest over clay in the subsoil. Mottling and gleying below about 45-50 cm provide evidence of impeded drainage; these profiles are assigned to wetness class II. In addition to this wetness and workability restriction, the occurrence of gravelly horizons below about 60 cm imparts a moderate droughtiness limitation. The combination of poor structural conditions in the subsoil and shallow depth over gravelly horizons result in reduced reserves of available water for plant growth.

Overall, soils assigned to this grade are limited by a combination of impeded drainage, workability restrictions and moderate droughtiness.

Grade 3b

3.5 The majority of the site surveyed has been assigned to this quality. The land is principally limited by wetness and workability, although it is also influenced by high groundwater, a risk of occasional flooding, and moderate droughtiness. Profiles typically comprise heavy clay loam topsoils which may be slightly stony and/or slightly calcareous. These rest over clay subsoils which are commonly gleyed in the upper subsoil and slowly permeable. Wetness class III or IV has been assigned to these soils. The profiles tend to pass to sandy textures (ie. sandy clay loam or sandy loam), in the lower subsoil between about 60 cm and 90 cm and rest over gravelly horizons which are impenetrable, (to soil auger), from 70 cm to 90 cm. As a result of slow permeability and heavy topsoil textures the soils are prone to wetness and workability problems. The risk of occasional flooding and the influence of a high groundwater table also restricts the potential of this land. In addition, water reserves available for plant growth are reduced as a result of gravelly horizons and poor structural conditions in the subsoil.

January 1992

Ref: 3305/017/91

MICHELLE LEEK
Resource Planning Group
Reading RO

SOURCES OF REFERENCE

BRITISH GEOLOGICAL SURVEY (1982) Sheet 236, Witney

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

METEOROLOGICAL OFFICE (1989) Climatological datasets for agricultural land classification.

SOIL SURVEY OF ENGLAND AND WALES (1983) Sheet 6 - Soils of South-East England.

SOIL SURVEY OF ENGLAND AND WALES (1984) Bulletin 15 - Soils and their use in South-East England.

APPENDIX 1
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 and 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.

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: golf courses, 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.

Woodland

Includes commercial and non-commercial woodland. A distinction may be made as necessary between farm and non-farm woodland.

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.

FIELD ASSESSMENT OF SOIL WETNESS CLASS

SOIL WETNESS CLASSIFICATION

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile. Six revised soil wetness classes (Hodgson, in preparation) are identified and are defined in Table 11.

Table 11 Definition of Soil Wetness Classes

Wetness Class	Duration of Waterlogging[1]
I	The soil profile is not wet within 70 cm depth for more than 30 days in most years[2].
II	The soil profile is wet within 70 cm depth for 31-90 days in most years *or*, if there is no slowly permeable layer within 80 cm depth, it is wet within 70 cm for more than 90 days, but not wet within 40 cm depth for more than 30 days in most years.
III	The soil profile is wet within 70 cm depth for 91-180 days in most years *or*, if there is no slowly permeable layer within 80 cm depth, it is wet within 70 cm for more than 180 days,but only wet within 40 cm depth for between 31 and 90 days in most years.
IV	The soil profile is wet within 70 cm depth for more than 180 days but not within 40 cm depth for more than 210 days in most years *or*, if there is no slowly permeable layer within 80 cm depth, it is wet within 40 cm depth for 91-210 days in most years.
V	The soil profile is wet within 40 cm depth for 211-335 days in most years.
VI	The soil profile is wet within 40 cm depth for more than 335 days in most years.

[1] The number of days specified is not necessarily a continuous period.

[2] 'In most years' is defined as more than 10 out of 20 years.

Soils can be allocated to a wetness class on the basis of quantitative data recorded over a period of many years or by the interpretation of soil profile characteristics, site and climatic factors. Adequate quantitative data will rarely be available for ALC surveys and therefore the interpretative method of field assessment is used to identify soil wetness class in the field. The method adopted here is common to ADAS and the SSLRC.