0205 -017-90

Agricultural Land Classification

Reconnaissance Survey

Gadbridge Farm, Holyport, Berkshire

AGRICULTURAL LAND CLASSIFICATION
RECONNAISSANCE SURVEY

GADBRIDGE FARM, HOLYPORT, BERKS

1. BACKGROUND

1.1 This 104 hectare site, lies to the south of Maidenhead, Berkshire, near the village of Holyport. Surveying was carried out on the 14th and 17th August 1990, in connection with a proposal for a golf course.

1.2 The site was surveyed using 110 and 120 cm Dutch augers, with borings being taken at 200 m intervals. In addition two soil pits were dug enabling detailed soil inspection.

1.3 At the time of survey, the site was under arable crops such as cereals, beans and oilseed rape. A small area next to the stream was under permanent pasture.

2. PHYSICAL FACTORS AFFECTING LAND USE

2.1 Relief

The site varies in altitude from 28-48 m A.O.D. with the higher ground occurring to the east and south of the site. The ground slopes towards the stream, and to the north. Nowhere on the site does gradient or altitude represent a significant limitation to agricultural land quality.

2.2 Climate

The average annual rainfall for this site, is between 660-665 mm (Met Office 1989), which is low in the national context. The median accumulated temperature above 0°C, between January and June, a measure of the relative warmth of a locality, ranges between 1484 and 1469 day degrees, this being high for the south-east of

England. The site is at field capacity for around 139 days per annum, which provides a measure of the effect of climate on the soil water regime; crop adjusted moisture deficits are within the range 110-111 for potatoes and 115-116 for wheat.

2.3 Climate factors per se place no limitations on agricultural land quality, but do affect interactions between soil and climate, namely wetness and droughtiness.

2.4 Geology and Soils

The British Geological Survey, sheet 269 drift, (Windsor, 1981) , shows most of the site to be underlain by London clay with Reading Beds underlying the southwest of the site.
Both London clay and Reading Beds consist of clays, the London clay generally containing grey/brown clays with scattered cementstone, the Reading Beds comprising green and red clays.

2.5 The Soil Survey of England and Wales, sheet 6, Soils of South East England (1986), shows the soils to comprise the Hurst and Windsor associations. The Hurst association is described as "coarse loamy over gravelly typical argillic gley soils", and the Windsor association as "slowly permeable pelo-stagnogley soils developed over Eocene clay", (SSEW, 1983).

2.6 Field examination of the soils, indicates the presence of three broad soil types across the site.

2.7 The first and most extensive soil type contains those soils which pass to clay in the subsoil. Typically they have topsoils of medium and heavy clay loam, medium silty clay loam and occasionally medium clay textures. These topsoils overlie subsoils of heavier texture which pass into clay, at various depths. Mottling and gleying occurs in most profiles, below a depth of 25-30 cm. Slow permeability of the clay subsoil coupled with gleying, indicates that these soils are poorly drained and are thus assigned to wetness class III or IV. The soils are not significantly stony, but may be very slightly flinty.

2.8 The second type of soils are characterized by an extremely stony subsoil horizon, impenetrable to the soil auger. The soils generally have a sandy loam or sandy silt loam topsoil, overlying a sandy clay loam upper subsoil. This horizon is typically gleyed and overlies a layer of medium and large rounded flints (60% of soil volume), with massive iron accumulation/iron pan. The depth to the impenetrable layer varies from 40-70 cm. The soils are assigned to wetness II, or occasionally III.

2.9 The third type of soils, are generally of a coarser texture, with topsoils covering a range of textures from medium clay loam to fine sandy silt loams and sandy loams. The upper subsoil is usually a sandy clay or sandy clay loam. The group is variable in the texture of its subsoil horizons with a range of sandy clay loams, sandy loams, loamy sands, sandy or medium clays occurring. Almost all the soils show signs of gleying, but the depth at which it occurs tends to vary from 25-65 cm. Such variation results in soils being assigned to wetness class I to IV . The soils are non or only slightly flinty.

3. AGRICULTURAL LAND CLASSIFICATION

3.1 The ALC grading of the survey area is primarily determined by interactions between climate and soil factors namely wetness and droughtiness. ALC grades 2, 3a and 3b have been mapped and the breakdown of these grades in terms of area and extent is given below.

Grade	Area	% of total agricultural area
2	16.42 ha	16%
3a	19.73 ha	19%
3b	66.30 ha	65%
Total Agricultural	102.45 ha	
Non Agricultural	1.69 ha	
Total Area	104.14 ha	

3.2 Appendix 1 gives a general description of the grades and subgrades identified in this survey.

3.3 Grade 2

Land of this quality represents approximately 16% of the site and occurs in two areas to the west of the site, one in the extreme southwest and one following the stream south of Gadbridge Farm. The grade 2 land comprises soils which have sandy silt loam, medium silty clay loam or sandy clay loam topsoils, over variable subsoils whose textures range from silty clay loam and clay loam over silty clay or clay at about 50 cm, to sandy clay loam profiles to depth, to sandy clay loam over clay and sandy loam or loamy sand. Gleying in the subsoil from about 35-50 cm depth and slow permeability in some soil profiles from c. 55 cm results in these soils being assigned to wetness class II or III. These soils contain few stones throughout; (<2% flints >2 cm).
Soils in the area on either side of the Bourne are included in grade 2 due to a slight droughtiness limitation, associated with the sandy nature of the subsoils, whose textures include sandy clay loam, sandy clay and loamy sand. Soil textural characteristics and climatic conditions at this locality combine to cause these soils to be slightly droughty, thereby preventing them from being classed as grade 1.

3.4 Grade 3a

Land of this quality represents approximately 19% of the total agricultural land area, occupying much of the central area of the site, on either side of the stream, and extending slightly to the east of Blackbird Lane. Soils of this grade have loamy topsoils (typically medium clay loams or occasionally silt loams and sandy loams) over gleyed subsoils of similar textures, which become heavier with depth, usually passing to clay below 40 cm. Sand and gravel is present in a few soils below a depth of 70 cm. The majority of the soils have no topsoil stones though a few may have up to 7% flints in the topsoil.

Most of the soils are downgraded to 3a due to a soil wetness limitation associated with the presence of a slowly permeable clay subsoil, and evidenced by gleying, typically from 25-30 cm which assigns these soils to wetness class III.
Occasional soils have a more sandy profile with medium sand and sandy loams occurring at depths greater than 70 cm. This gives rise to soil droughtiness which acts as a limitation. This occurs only in the area next to the stream in the northerly part of the grade 3a land. These sandy subsoils may also contain up to 10% small flints, adding to the droughtiness factor.

3.5 Grade 3b

Land of this quality represents approximately 65% of the total agricultural land on the site, and covers almost all the area east of Blackbird Lane, as well as the area to the north-west of Mount Scripetts Copse, forming a band between the grade 2 and 3a land. Whilst soil wetness is the most limiting factor on most of the grade 3b land some areas are limited chiefly by drought. Such soils consist of sandy silt loam or sandy loam topsoils, over a sandy clay loam or sandy loam subsoil, underlain by an extremely stony layer at 40-50 cm which contains 60% flints over 2 cm and is impenetrable to the soil auger. It would appear that this stony layer may impede drainage and so cause gleying and iron accumulation in the subsoil. However the droughtiness caused by this stoniness is the main limiting factor. Topsoil stones amount to about 3-7% and are flints.
These stony soils only occur very locally and the majority of grade 3 b land has a medium or heavy clay loam, or silty clay loam topsoil, over a gleyed and slowly permeable clay or occasional sandy clay subsoil at 15-35 cm. The soils are classed as wetness class IV, due to gleyed and slowly permeable subsoils. Soil wetness and workability are the most limiting factors in these soils.

19 December 1990

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Ref: 0205/017/90

SOURCES OF REFERENCE

BRITISH GEOLOGICAL SURVEY (1981) Sheet 269, Windsor.

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.

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.