3304-001-91

Statement of Physical Characteristics.

Radley,Abingdon,Oxford.

Ministry of Agriculture Fisheries and Food

STATEMENT OF PHYSICAL CHARACTERISTICS
RADLEY, ABINGDON, OXFORDSHIRE

1. BACKGROUND

1.1 The 3.19 ha site is situated to the south west of Oxford about 3 km north east of Abingdon, near the village of Radley. The eastern boundary of the site is marked by the railway line. The north and west boundary is formed by a drainage ditch and hedgerow, while the southern boundary is marked by hedgerow and fencing. At the tip of the southern boundary there is an area of lowlying land, which shows signs of waterlogging.

1.2 The site was surveyed on the 7th March 1991 using 120 cm Dutch soil augers with samples being taken at approximately 80 m intervals across the site. Additional information was obtained by the examination of two soil pits.

Land Use

1.3 At the time of survey, the site was under winter barley.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

2.1 The site lies at approximately 50 m A.O.D. and is relatively level falling very slightly eastward. Nowhere on the site does gradient or altitude represent a significant limitation to agricultural land quality.

2.2 Climate

Estimates of climatic variables were obtained by interpolation from a 5 km grid database (Met. Office 1989) for a representative location in the survey area.

Climatic Interpolation

Grid Reference	SU526980
Altitude (m AOD)	50
Accumulated temperature (° day Jan-June)	1453
Annual average rainfall (mm)	620
Field capacity days	132
Moisture deficits wheat (mm)	111
Moisture deficits potatoes (mm)	104

2.3 The important parameters in assessing an overall climatic limitation are average annual rainfall (a measure of overall wetness) and accumulated temperature (a measure of the relative warmth of a locality). Although average annual rainfall is relatively low in a national context, there is no overall climatic limitation affecting the land quality of this site. However climatic factors do affect interactive limitations between soil and climate, namely soil wetness and droughtiness.

2.4 Geology and Soils

The British Geological Survey, sheet 253 Abingdon (1971) shows the site to be underlain by River Terrace Gravels over Sand.

2.5 The Soil Survey of England and Wales, sheet 253 Abingdon (1971), shows the site to comprise Lashbrooke and Sutton Series. The Lashbrooke Series is described as "Brown Calcareous, loamy soils over calcareous, coarse, river terrace drift" (SSEW 1984), and the Sutton Series as "loamy non calcareous Brown Earths, overlying calcareous river terrace gravels" (SSEW 1984).

2.6 Field examination of the soil indicates the presence of two soil types.

2.7 Firstly are those soils which rest over calcareous river terrace gravels. They typically comprise slightly calcareous, medium clay loam topsoils overlying calcareous heavy clay loams with c. 1-5%

v/v small rounded to angular flints overlying medium clay or sandy clay subsoils with c. 5-15% v/v flints. The lower subsoil comprises calcareous sandy clay loam and sandy clay with c. 25-70% v/v rounded and angular flints. Occasional profiles comprise calcareous fine sand with c. 5-15% v/v flints.

These soils were found to be mottled and gleyed between 42 and 60 cm. This evidence of poor drainage results in these soils being assigned to wetness class II.

2.8 The second group of soils occur principally towards the southern half of the site. Profiles typically comprise non calcareous medium clay loam topsoils overlying similar textures or slightly heavier textures in the upper subsoil with c. 1-5% v/v flints. The lower subsoil comprises calcareous fine to medium sand, sandy clay loam or sandy clay with c. 2-20% v/v small to medium sized flints.

Profiles exhibited evidence of mottling and gleying between 40 and 60 cm. They are imperfectly drained due to slowly permeable clay within 50 cm of the surface and are thus assigned to wetness class II.

3. AGRICULTURAL LAND CLASSIFICATION

3.1 The ALC grading of the survey area is partially determined by interactions between climate and soil namely wetness and droughtiness. ALC grade 2 represents the quality of land at this site.

Grade	ha	% of total agricultural land
2	3.19	100%
Total Agricultural Area:	3.19	

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

3.3 Grade 2

Land of this quality occurs over the whole site in two situations.

The northern half of the site comprises soils developed over calcareous river terrace gravels. Profiles are typically slightly calcareous in the topsoil becoming increasingly calcareous with depth and are similar to those described in section 2.7.

These soils typically comprise calcareous stoneless medium clay loams, overlying calcareous medium/heavy clay loams that are slightly stony c. 1-5% v/v overlying medium clay or sandy clay subsoils between 50 and 60 cm. This horizon was found to be stony with c. 5-15% v/v calcareous gravels. The lower subsoil comprises 25-70% v/v calcareous gravels within a sandy clay loam or a sandy clay matrix occasional profiles were found to comprise fine sand incorporating c. 5-15% v/v calcareous gravels.

Towards the southern half of the site the soils become less calcareous. Profiles typically comprise non calcareous medium clay loam topsoils overlying similar or slightly heavier textures in the upper subsoil with c. 1-5% v/v small angular flints. These pass to sandy clay loams or sandy clays with c. 5-8% v/v angular flints. The lower subsoil comprises fine to medium sand, sandy clay loam or sandy clay with c. 2-20% v/v calcareous gravels within the soil matrix.

All profiles were found to be mottled and gleyed between 42 and 60 cm resting over slowly permeable clay or sandy clay within 50 cm of the surface. Such evidence of poor drainage results in these soils being assigned to wetness class II.

A combination of wetness and droughtiness, restricts the agricultural potential of these soils, they are assigned to grade 2 accordingly.

4. SOIL RESOURCES

Soil Units: Consideration for Restoration

4.1 The distribution of soil resources on the site falls into one unit. It is emphasised that this is not a soil stripping plan but is an illustration of the soil resources which are available for restoration. Soils were sampled to a maximum depth of 100-120 cm; useful soil forming material may extend below this depth.

4.2 Topsoil Units

One topsoil unit was identified.

4.2.1 Unit 1

The unit comprises 28.4 cm of dark brown to dark yellowish brown (10YR 3/3, 3/4 and 4/3) medium clay loam. The soil is slightly calcareous and stoneless.

4.3 Subsoil Unit

One subsoil unit was identified.

4.3.1 Unit 1

This unit typically comprises an average of 70 cm of (within a range of 25 cm - 110 cm) yellowish brown or olive brown (10YR 4/4, 4/6, 5/4 and 2.5YR 5/4 with 10YR 6/8 - 5/8 and 2.5YR 6/8) medium/heavy clay loam over sandy clay loam, medium clay or sandy clay. These subsoils are variably stony typically containing between 2-25% v/v flints generally becoming increasingly stony with depth resting over calcareous river terrace gravels and sand between 110-120 cm.

All profiles exhibit evidence of mottling and gleying. They are imperfectly drained due to slowly permeable clay within 50 cm of the surface.

These soils comprise moderate to well developed coarse subangular blocky peds of friable consistence tending towards moderately well developed coarse angular block peds of firm to friable consistence becoming prismatic with depth and with <0.5% biopores <0.5 mm.

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NICOLA SHIRT
Resource Planning Group
Reading RO

SOURCE OF REFERENCE

BRITISH GEOLOGICAL SURVEY (1971) Sheet 253 Abingdon.

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 (1971) Sheet 253 Abingdon.

SOIL SURVEY OF ENGLAND AND WALES (1978) Soils and their use in South East England, Bulletin 15.

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.

APPENDIX

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.