AGRICULTURAL LAND CLASSIFICATION
PARK LODGE FARM,
IVER HEATH, BUCKS

STATEMENT OF PHYSICAL CHARACTERISTICS

LAND AT PARK LODGE FARM, IVER HEATH, BUCKS

1. BACKGROUND

1.1 Land on this 23.4 ha site was investigated on 11 and 12 June 1991 in connection with proposals to extract sand and gravel.

1.2 The soils were inspected at 26 locations over the site at approximately 100 m intervals on a regular sampling grid. 3 soil inspection pits were dug to provide additional data, together with numerous small topsoil pits to investigate topsoil stone contents.

1.3 At the time of survey the land was in grass production, grazed mainly by horses.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

2.1 Local climatic data was obtained by interpolation of climatic variables from a 5 km gridpoint dataset (Met. Office, 1989). The data for the site is as follows:

Grid Ref: TQ 018834 Altitude: 62m A.O.D.

Average Annual Rainfall (mm)	704
Accumulated Temperature (day °C)	1441
Field Capacity Days	145
Moisture deficit - wheat (mm)	109
- potatoes (mm)	102

2.2 Climatic factors per se place no limitation on land quality at this location but do influence interactions between soil and climatic factors, namely soil wetness and droughtiness.

Relief

2.3 The site lies on level to very gently sloping ground at an altitude of 60-65 m A.O.D. Gradients are very slight and place no limitation on agricultural land quality.

Geology and Soils

2.4 The geology of the site is mapped at a scale of 1:25,000 by the Institute of Geological Sciences (I.G.S. 1974) as glacial sands and gravels (including undifferentiated head) over London clay.

2.5 There is no published soil map of a detailed nature covering the site but the 1:250,000 scale Soil Map of South East England (SSEW, 1983) places land on the site in the Essendon Soil Association. This is described in the legend accompanying the soil map as comprising "slowly permeable seasonally waterlogged coarse loamy over clayey soils. Associated with similar fine loamy over clayey and fine silty over clayey soils" (SSEW, 1983).

2.6 Detailed inspection of the soils on the site indicates that they comprise non-calcareous variably flinty medium sandy loams and sandy silt loams or occasionally silt loams passing into similar upper subsoils which rest over variably flinty coarse loamy, sandy and clayey lower subsoils. Gravelly horizons are typically encountered from 40-80 cm. Drainage status varies from wetness class I to III depending upon the depth to and presence of clayey slowly permeable horizons. The main agricultural limitation to soils on the site is droughtiness caused by a combination of relatively shallow depth over gravelly horizons and high profile stone content.

3. AGRICULTURAL LAND CLASSIFICATION (ALC)

3.1 The results of the survey work are presented in the form of a coloured ALC map which illustrates the distribution of grades on the site. A breakdown in terms of area and relative extent is given below:

Grade	Ha	%
3a	8.8	38
3b	14.6	62
Total	23.4	100

Grade 3a

3.2 Land of this quality is mapped at two locations on the site namely in separate blocks to the north and south. Topsoils are typically non-calcareous medium sandy loam or medium sandy silt loam (occasionally silt loam) overlying similar textured upper subsoils which pass to coarse textured horizons (sandy loam and loamy sand) with depth. Gravel horizons are usually encountered from around 60-80 cm+. In occasional profiles sandy clay loam horizons were noted. Towards the south of the site some profiles are finer textured having medium and heavy silty clay loam textures.

3.3 These soils are variably gleyed, most exhibiting gleying below 40 cm. Some profiles possessing sandy clay loam and heavy silty clay loam textures are also slowly permeable falling into wetness class II and III depending upon the depth to these layers. Many profiles are freely draining lacking slowly permeable layers within 80 cm, although they show evidence of groundwater fluctuations.

3.4 Topsoil stone content is usually within the range 5-10% v/v flints greater than 2 cm, often with a high percentage (up to a further 10-15%) of stones in the size range 2 mm-2 cm. Whilst topsoil stone contents of 5-10% v/v >2 cm would not in itself limit the land to grade 3a in germs of stone content, in combination with a high total stone content >2 mm, both within the topsoil and in some horizons throughout the profile, and relatively shallow depth over gravel, the profile available water capacities are depressed causing a droughtiness limitation. This is the main reason why land is so graded. A few profiles, are however, limited to grade 3a by a wetness limitation. This occurs where slowly permeable horizons (wetness class III) arise in combination silt loam topsoils.

Grade 3b

3.5 The majority of the site is mapped as grade 3b which occurs as a wide band across the middle of the site. Topsoils are typically non-calcareous medium sandy loams and medium sandy silt loams with occasional profiles of silt loam, usually overlying similar or coarse textured subsoils (medium sandy loam, loamy medium sand and medium sand) with gravel occurring at 40-70 cm. In common with land graded 3a occasional profiles have medium and heavy silty clay loam and sandy clay loam horizons but these are underlain by gravel.

3.6 Total topsoil stone content is similar or higher than land graded 3a, typically having 5-15% flints >2 cm with up to a further 10-15% of stones in the size range 2 mm-2 cm. Only occasional profiles have greater than 15% stones in the >2 cm size range which places in grade 3b solely on the basis of topsoil stone content alone. Subsoils are often very stony with a total stone content in the range 25-40% v/v of flints.

3.7 Although profiles also have a wetness limitation (wetness class III) due to slowly permeable heavy silty clay loam and sandy clay loam horizons this is insufficient to downgrade them to grade 3b. Droughtiness due to the effects of coarse textured subsoils, high total stone contents and relatively shallow depth above gravel (40-70 cm) is the main limitation to agricultural productivity.

4. SOIL RESOURCES

4.1 Due to some variability in soil properties, particularly the subsoils, the soil resources on the site have been assigned to one topsoil and one subsoil mapping unit. It should be emphasized, that due to the presence of gravel layers augering was not possible to 1 m or more at most sampling locations. Consequently useful soil making materials may occur below these maximum augering depths.

Topsoils

4.2 These typically comprise non-calcareous medium sandy loam or sandy silt loam textures with occasional profiles of silt loam, having a mean depth of 24.6 cm (range 20-30 cm). They are commonly very dark greyish brown (10 YR/ 3/2) to greyish brown (10 YR 4/2) in colour. Total stone content (>2 mm) is variable ranging from less than 5% v/v to around 30% v/v of flints. Topsoils are significantly less stony (at or below 10% v/v) towards the south of the site.

Subsoils

4.3 These are variable in texture but predominantly coarse loamy and sandy with sandy clay loam and silty clay loam horizons at some locations. Soils with a higher clay content are more common towards the south of the site.

4.4 Subsoils have a mean depth of 40 cm over gravel with a range of 13-63 cm. These amounts represent the minimum amount of subsoil resource since this may extend below the depths to which observation augering and digging was possible. The gravel layers defined by this survey may not constitute the workable mineral deposits.

4.5 Subsoil colour varies, ranging from strong brown (7.5 YR 5/6) to reddish yellow (7.5 YR 6/6) in coarser textured horizons to lighter brown and greyish brown matrix colours (10 YR 5/3, 6/2, 5/4, 4/2) in gleyed horizons. Total stone content is also variable, both spatially across the site and between horizons of the same soil profile, ranging from 5% v/v to around 40% of flints.

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Source of Reference

INSTITUTE GEOLOGICAL SCIENCES (1974). The sand and gravel resources of the Country around Gerrards Cross, Buckinghamshire.
Report No 74/14.

MAFF (1988) Agricultural Land Classification in 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) Soils map of South East England. 1:250,000 scale (and accompanying legend).

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.

APPENDIX II

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.