STATEMENT OF PHYSICAL CHARACTERISTICS
LAND AT HOME FARM, LALEHAM, SURREY

1. BACKGROUND

1.1 Land on this 70.85 ha site was inspected during May 1990 in connection with proposals to extract sand and gravel.

1.2 The site is contained within an area previously surveyed in detail by MAFF during March and April 1982 in connection with the North West Surrey Minerals Plan. The purpose of the current survey was therefore to update the earlier ALC grading, particularly with respect to the revised guidelines and criteria for grading the quality of land (MAFF, 1988) and to provide additional soil data in order to prepare a statement of physical characteristics. Consequently a further 20 auger boring examinations were made using 1.1 m and 1.2 m Dutch Soil Augers and four soil pits dug. Additional soil pit data supplied by the applicants consultants* was also used in the preparation of this report.

1.3 At the time of survey the land was in grass, cereal and horticultural production with an additional fallowed area.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

2.1 Interpolation of climatic variables to obtain a site estimate from surrounding grid point data (Met. Office, 1989) gives the following climatic information.

*Reading Agricultural Consultants

Grid reference	TQ 060690
Altitude	14 m A.O.D.
Accumulated Temperature	1501° day degrees >°C
Average Annual Rainfall	657 mm
Field Capacity Days	134 days
Moisture Deficit - wheat (mm)	119 mm
- potatoes (mm)	115 mm

2.2 With reference to ALC criteria the relatively warm and dry climate conditions at this location place no limitation on agricultural land quality. However, interactions between soil and climatic factors, namely wetness and droughtiness are important considerations.

Relief

2.3 The site lies on altitudes of 10-15 m A.O.D. level to very gently sloping land within the Thames Valley. Gradients are very small and place no limitation on agricultural land quality.

Geology and Soils

2.4 The published geological survey map covering the site (No. 269; Geol. Surv. G.B., 1964) indicates the site to comprise floodplain gravels, partially covered by brickearth drift away from the southern boundary. A narrow strip of alluvial deposits fringes the River Ash to the north-west. Beneath the floodplain gravels the solid geology is believed to comprise London Clay although Bagshot sands may occur towards the extreme western end of the site.

2.5 There is no detailed published soil survey map covering the Laleham area. The generalised Soils of England, Wales Sheet 6 (S.E. England) at 1:250,000 maps the Hucklesbrook Association. This is described as "well drained coarse loamy and some sandy soils, commonly over gravel. Some similar permeable soils affected by groundwater" in the accompanying map legend.

2.6 Detailed survey of the site indicates some variation in soil type. With the exception of some heavier alluvial topsoil types (heavy clay loam or medium clay) fringing the River Ash the majority have non-calcareous, very slightly stony topsoils of sandy loam, sandy silt loam or medium clay loam/silty clay loam texture. Those of sandy loam or sandy silt loam textured tend to occur towards the centre and southeast of the site whilst those with a slightly higher clay content occur towards the northeast and west of the site. Subsoils are less uniform in nature but generally comprise variable depths of loamy textures (sandy loam, sandy silt loam, medium or heavy clay loam, and sandy clay loam) overlying gravelly horizons often within a clayey matrix. Lenses of clay of variable thickness also occur in the subsoil at some locations. Drainage status is variable depending upon the permeability of subsoil horizons and ranges from wetness class I-IV. The majority of the site is typically within the range wetness class I-III; poorly drained soils (wetness class IV) are confined to the small strip of heavy alluvial soils parts of the River Ash. Droughtiness is a limiting factor at many locations, particularly where the gravelly substratum is closest to the surface; the shallower varients occur in a band running approximately northwestwards from the Recreation Ground, with a second area east of the buildings at Laleham Nurseries.

3. AGRICULTURAL LAND CLASSIFICATION

3.1 A breakdown of the grades in terms of area and extent is given below:

Grade	Ha	% Total Area	% Agricultural Area
2	34.90	48	49
3a	31.65	43	45
3b	4.30	6	6
Non-Ag) Not surveyed)	2.10	3	
Total	72.95	100	100

The area which was not surveyed comprises an overgrown, vacant piece of land to which access for survey work could not be gained.

Grade 2

3.2 Land of this quality occurs in areas to the northeast and west of the site. The associated soils are typically deep (>80 cm over gravelly horizons) well or moderately well drained (wetness classes I and II, occasionally III). Soil textures comprise medium clay loams, silty clay loams, sandy silt loams and sandy loams over similar textured materials to depth in the subsoil or becoming heavier with heavy clay loams, sandy clay loams or clays. These may extend to 120 cm or more or pass to coarser textured and/or gravelly horizons below about 80 cm. The main limitations are either wetness or droughtiness or a combination of both. Wetness limitation result from either a high groundwater or the occurrence of poorly structured clayey horizons in the lower subsoil which decrease overall profile permeability and workability. Minor droughtiness limitations are present in most of the soils of this mapping unit, particularly where gravelly horizons occur within 120 cm.

Grade 3a

3.3 Land of this quality tends to be associated with shallower soils over a very gravelly substratum. Due to the reduction in available water capacity that this causes moderate droughtiness is a common factor within this mapping unit. Topsoils are typical of the site being medium clay loams, medium silty clay loams, sandy loams and sandy silt loams. Subsoils tend to become progressively heavier with depth (i.e. heavy clay loams to clays) but frequently become very gravelly and/or coarser textured below about 65 cm. Occasional profiles lack the heavy clay loam or clay horizons and rest directly over a very gravelly or subsoil sandy substratum. Depending upon subsoil permeability these soils typically fall into wetness class II or III. At some locations permeable soils are affected by a high groundwater with gleying occurring within 40 cm

of the surface. However many soils have poorly structured slowly permeable clayey horizons from about 37-40 cm+. In terms of agricultural land quality droughtiness and/or wetness singly or in combination are the main limitations.

Grade 3b

3.4 Grade 3b land occurs in two situations; firstly on poorly drained alluvial soils fringing the River Ash and secondly on shallow drought-prone soils over gravel. The alluvial topsoils contrast with others on the site having a significantly higher clay content with heavy silty clay loam to medium clay topsoils overlying a poorly structured and pleistic gleyed clay subsoil. This may extend to depth or pass into gravel within 120 cm. Such soils become slowly permeable immediately below the topsoil and are assigned to wetness class IV. The wetness in combination with heavy topsoil textures reduces the workability of such soils and careful timing of field operations is required.

3.5 The remaining area of 3b land is in contrast with the soils described above, with slightly stony light loamy soils of sandy silt loam or sandy loam texture resting above gravel layers at about 45-50 cm. These soils are liable to be drought-prone due to their relatively low available water capacity which in combination with the crop adjusted moisture deficits of the locality give rise to large negative moisture balances.

4. SOIL RESOURCES

4.1 The overlay accompanying the ALC plan illustrates a division of the site into broad soil groupings. It should be emphasized that this is not a soil stripping plan but an indication of the sorts of soil resources available for restoration. Three broad groupings have been identified based on topsoil textural characteristics and depth over gravelly horizons.

TOPSOILS

4.2 Topsoils fall into the three groupings identified previously, ie sandy loams and sandy silt loams (Unit 1a and 1b); medium clay loams and silty clay loams (Unit 2); heavy clay loam, silty clay loams and medium clays (Unit 3).

Unit 1a and 1b

4.3 These are typically non-calcareous, dark grey to dark greyish brown (10YR 4/1, 10YR 4/2 or 10YR 3/2) sandy loams and sandy silt loams with depths in the range 28-35 cm (mean 28.6 cm). Stone content is typically <5% volume of flints >2 mm.

Unit 2

4.4 This typically comprises non-calcareous, dark grey to dark greyish brown (10YR 4/1, 10YR 4/2 or 10YR 3/2) medium clay loams or medium silty clay loams with depths in the range 25-32 cm (mean 28.9 cm). Stone content is typically <5% volume of flints >2 mm.

Unit 3

4.3 This comprises non-calcareous to slightly calcareous soils with a significantly higher clay content giving rise to textures of heavy clay loams, heavy silty clay loam or medium clay, very dark grey in colour (10YR 3/1). Soil depths are variable within the range 10-30 cm (mean 20.8 cm). Stone content may be up to 10% flints >2 mm.

SUBSOILS

Unit 1a

4.4 These comprise upper layers of sandy silt loam, sandy clay loam or medium clay loam passing to clay loams and clays at variable depth, giving rise to a range of soil profile permeability. Where examined, the light to medium loamy upper subsoils comprised

moderately well developed medium blocky structures becoming coarser with depth as clay content increased. Soil textures may become lighter as the gravel substratum is approached below 70 cm.

Unit 1b

4.5 These typically comprise stony sandy silt loams or sandy clay loams resting over gravel at shallow depths (40-70 cm). High stone content may preclude determine of soil structure.

Unit 2

4.6 Subsoils are variable within this unit comprising either deep medium clay loams over sandy loam/sandy silt loam, or heavier upper layers of heavy silty clay loam or heavy clay loam which become coarser (sandy silt loam, sandy loam or sandy clay loam) with depth. Where examined, subsoil structural characteristics were correspondingly variable, ranging from moderately well developed coarse subangular blocky to angular blocky in upper light to medium loamy upper subsoils to moderately well developed medium to coarse blocky tending towards prismatic in horizons with a higher clay content. Again, permeability is variable depending upon the presence/absence of a coarser structured clayey horizon.

Unit 3

4.7 Subsoils in this unit are characterised by silty clay, clay, or heavy silty clay loam textures of variable depth over gravel. Where examined, subsoil structure comprised well developed coarse angular blocky to prismatic structures of firm consistence.

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J HOLLOWAY
Resource Planning Group
ADAS, Reading

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SOURCES OF REFERENCE

GEOLOGICAL SURVEY OF GREAT BRITAIN (1964). Drift Edition Geological Map Sheet No. 269. (1:63360 scale).

MAFF (1988) Agricultural Land Classification in England and Wales. Revised Guidelines and Criteria for the Grading of Agricultural Land.

METEOROLOGICAL OFFICE (1989) Climatological Datasets for Agricultural Land Classification.

SOIL SURVEY OF ENGLAND AND WALES (1983) Soils of SE England (Sheet 6) 1:250,000 Scale. Land accompanying legend).

APPENDIX I

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.

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