0201-025-89

LANDFILL SITE

BOTTLE LANE, WARFIELD, BERKSHIRE

(Only ALC section of larger report)

# 3. THE PRESENT AGRICULTURAL SITUATION

## 3.1 Agricultural Land Classification

3.1.1 A detailed Agricultural Land Classification (ALC) Survey of the 22.56 ha site was undertaken on 3 and 4 July 1989. The Agricultural Land Classification system provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long term limitations on agricultural use. The limitations can operate in one or more of four principal ways: they may affect the range of crops which can be grown, the level of yield, the consistency of yield and the cost of obtaining it. The classification system gives considerable weight to flexibility of cropping, whether actual or potential, but the ability of some land to produce consistently high yields of a somewhat narrower range of crops is also taken into account.

3.1.2 The principal physical factors influencing agricultural production are climate, site and soil. These factors together with interactions between them form the basis for classifying land into one of five grades; Grade 1 land being of excellent quality and Grade 5 land of very poor quality. Grade 3 which constitutes about half of the agricultural land in England and Wales, is now divided into two subgrades designated 3a and 3b. General descriptions of the grades and subgrades are given in Appendix 1.

3.1.3 Further details of the Agricultural Land Classification System are contained in the MAFF publication "Agricultural Land Classification of England and Wales - Revised guidelines and criteria for grading the quality of agricultural land" (MAFF, 1988).

3.1.4 In connection with the detailed ALC survey work at the Bottle Lane site 24 soil pits were excavated to depths of about 1 m or more on a regularly spaced grid with pits at approximately 100 m

intervals. A detailed record of the soil profile was made at each pit location.

## Physical Factors Affecting Land Quality

### Relief

3.1.5 The site lies at between 40 and 50 m A.O.D. within a shallow valley created by "The Cut" a small tributary stream which runs into the River Thames near Bray. Gradients on the site are very gentle (<1°) although there are some very minor surface irregularities. Gradient and microtopography are not however a limitation in terms of agricultural land quality of the site. although they do have an effect on the drainage potential of the land.

### Climate

3.1.6 Site interpolated climate data (Met Office, 1989) gives an average annual rainfall of 668 mm which is relatively dry in national context. Soils are at field capacity, a measure of the effect of climate on the soil water regime for around 140 days per annum (Met Office, 1989). The accumulated temperature*, an indication of the relative warmth of a locality is 1469 day degrees, a value typical of many parts of southern England. Crop adjusted moisture deficits (Met Office, 1989) give values of 115 mm for wheat and 109 mm for potatoes which reflect the relatively dry climate.

3.1.7 In overall terms, climatic factors place no significant limitation in terms of the agricultural land quality of the site, but do affect interactive limitations between soil and climate namely soil wetness and droughtiness.

* Median accumulated temperature above 0°C, January - June.

Geology and Soils

3.1.8 The published geological map sheet covering the area of the site (Sheet 269 - Windsor; Geol. Surv. G.B., 1981) indicates its location in an area of floodplain gravels lying within an extensive belt of London Clay. Detailed field examination of the soils broadly confirms the geological deposits mapped and indicates that the site probably straddles the boundary between the terrace gravels and the surrounding London Clay.

3.1.9 Generalised soil maps which cover the site have been published at 1:250,000 scale (Soil Survey of England and Wales, 1979 and 1983). These indicate that argillic gley and stagnogley soils of the Hurst and Wickham soil associations have been mapped in vicinity of the site. The Hurst association is described as coarse and fine loamy permeable soils mainly over gravel variably affected by groundwater (Soil Survey of England and Wales, 1983). Soils of the Wickham soil association are similarly described as slowly permeable seasonally waterlogged fine loamy over clayey and fine silty over clayey soils associated with similar clayey soils often with brown subsoils.

3.1.10 Detailed examination of the soils on the site indicates that three broad divisions can be made. Firstly, and most extensively are soils developed over river terrace gravels. These are located over the majority of the central and western portions of the site and typically comprise medium and heavy silty clay loam and clay loam topsoils over an upper subsoil of clay and silty clay. This has an increasingly sand content as the gravel substratum is approached. The gravel usually occurs between 40 cm and 80 cm and extends to at least 1 m from the surface comprising up to 40-50% (by volume) of flint gravel in a sandy clay loam, sandy loam or coarser matrix. These soils are limited mainly by wetness but also droughtiness. Wetness restrictions are the result of both slowly permeable upper loamy and clayey subsoils and a fluctuating ground water table within the gravelly horizons. These two forms of waterlogging may occur singly or in combination depending upon the permeability

of the clayey upper subsoil horizons. Droughtiness limitations are most severe where the gravel is found at relatively shallow depths.

3.1.11 The second soil type is confined to a strip of marginally higher ground along the eastern boundary of the site. This is believed to be associated with an outcrop of the London Clay deposits previously discussed in paragraph 3.1.8. The soils typically comprise medium and heavy clay loam and silty clay loam topsoils usually over a clay or silty clay subsoil. Profiles are stoneless or very slightly stony throughout and at occasional locations may contain an increased proportion of sand in the lower subsoil. The main agricultural limitation of these soils is wetness and, at some locations, moderately heavy topsoil textures resulting in workability difficulties which can reduce the overall flexibility of cropping.

3.1.12 The remaining soil type is more limited in extent and is believed to reflect a transitional type between the two groups described previously. Soils are loamy over clayey in nature as before but contain a relatively narrow gravelly horizon about 30-40 cm thick sandwiched in a predominantly clayey subsoil. Topsoils tend to be heavy clay loams or silty clay loams over a clay or heavy clay loam upper subsoil. This rests over a horizon containing gravel in a clayey or sandy matrix, passing abruptly into a stoneless silty clay lower subsoil. These soils are limited by wetness caused by the presence of slowly permeable layers within the subsoil and, depending upon the depth to the intercalated gravel horizon they may also be drought-prone.

3.1.13 All the soils described above are prominently gleyed within 40 cm of the surface and many also contain slowly permeable horizons within 40 cm. Where slowly permeable layers are absent soils are adversely affected by ground water. An assessment of the current drainage status of the site suggests that much of the lower lying land cannot be effectively under-drained to the river due to a lack of falls. It is likely, however, that land

lying roughly south and east of a line approximating to the 42 m contour could be effectively drained. Parts of the lower lying land are also believed to flood.

Results of Agricultural Land Classification Survey

3.1.14 The accompanying plan showing the distribution of land quality grades on the site indicates that grades 3b and 4 have been mapped. The table below indicates the extent of these grades.

| Grade | ha | % |
|---|---|---|
| 3b | 8.84 | 39 |
| 4 | 13.72 | 61 |
| Total | 22.56 | 100 |

The main limitation to the agricultural use of the land is wetness although there are also minor and less significant droughtiness restrictions. The distribution of the ALC grades reflects the drainage potential of the site.

Grade 3

Subgrade 3b

3.1.15 Land of this quality is mapped on the marginally higher ground to the south and east of the site. The associated soils mainly comprise stoneless to very slightly stony medium and heavy clay loam and silty clay loam topsoils over a clay or silty clay subsoil. However, towards the south of the area medium loamy and clayey soils over gravel are also included. Due to the presence of slowly permeable horizons high in the soil profile, and the potential for under-drainage the majority of these soils are appropriately placed in wetness class* IV. Where shallower soils over gravel occur they may fall into wetness class* III.

* Wetness Classes - see Appendix 2.

As stated previously it is considered that these soils can be under-drained; nevertheless, a moderately severe wetness limitation will remain due to the presence of slowly permeable layers in the subsoil. Land of this type is principally suited to cereal and grass production and careful timing of cultivations and grazing management is required in order to avoid damage to soil structure.

Grade 4

3.1.16 Land mapped as grade 4 occurs on the slightly lower lying parts of the site towards its northern and western sides. As discussed in paragraph 3.1.13 it is considered that effective drainage improvements (without pumping or major arterial improvements) would be difficult to achieve due to lack of falls. Consequently this area has a severe wetness limitation. The soils are mainly those developed over river terrace gravels and described in paragraph 3.1.10. Wetness restrictions are the result of both slowly permeable upper clayey subsoils and a fluctuating groundwater table within gravelly horizons. Although there is some variation in permeability, the high groundwater and liability to flood are likely to remain limitations in the long term. Land of this type has a limited flexibility of agricultural use and is best suited to grass production. The wetness will limit root development and restricts the duration of both the growing and grazing seasons.

References

3.1.17 GEOLOGICAL SURVEY OF GREAT BRITAIN (1981) 1:50,000 scale Solid and Drift Edition Geology map 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 Data for Agricultural Land Classification.

SOIL SURVEY OF ENGLAND AND WALES (1979) Soils of Berkshire.

SOIL SURVEY OF ENGLAND AND WALES (1983) 1:250,000 scale map Soils of South East England (Sheet 6) and accompanying Legend.