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AGRICULTURAL LAND CLASSIFICATION

Berkshire Minerals Plan
Chamberhouse Farm
Site 1



AGRICULTURAL LAND CLASSIFICATION

CHAMBER HOUSE FARM, THATCHAM, BERKSHIRE

1. Background

1.1 The 49.2 hectare site lies to the east of Newbury near to the village of Thatcham. The area is bounded to the north by the Kennet and Avon canal, and partially by woodland. The eastern boundary is marked by a farm track, while the River Kennet forms the southern and western boundaries of the site.

1.2 The area was surveyed on the 25 and 26 March 1991 using 120 cm Dutch soil augers with samples being taken at approximately 100m intervals across the site. In addition four soil pits were examined to enable more detailed soil descriptions.

1.3 Land-use

At the time of survey most of the site had recently been ploughed. The remaining fields towards the north eastern corner of the site were under permanent pasture.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

2.1 Relief

The altitude of the site varies between approximately 64-68m A.O.D with the highest land occurring towards the north east of the site, falling gently southwards towards the River Kennet. Nowhere on the site does gradient or altitude represent a significant limitation to agricultural land quality.

Climate

- 2.2 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	SU 4515 1659
Altitude (m A.O.D.)	64-68
Accumulated temperature (°day Jan-June)	1454
Annual average rainfall (mm)	708
Field capacity days	144-146
Moisture deficit wheat (mm)	109
Moisture deficit potatoes (mm)	101

- 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 the site. However, climatic factors do affect interactive limitations between soil and climate namely soil wetness and droughtiness.

Geology and Soils

- 2.4 British Geological Survey, sheet 267, Newbury (1971) shows the site to be underlain by Alluvium over River Terrace Gravels.
- 2.5 The Soil Survey of England and Wales Sheet 6, Soils of South-East England (1983) shows the site to comprise soils of the Frome Association. In the Kennet Valley fine textured deposits rest on flint and/or chalky gravel; calcareous marl and peat bands occur locally and the soils are described as "calcareous alluvial gley

soils. They are grey and mottled silty clay loam soils affected by high groundwater, with calcareous flints and/or chalky gravels at relatively shallow depths", (SSEW, 1984).

- 2.6 Detailed field examination of the soil indicates that there are two broad soil types.
- 2.7 The soil group which extends across much of the site typically comprises calcareous silt loam, medium silty clay loam or occasionally heavy clay loam topsoils over similar textures which contain between c. 5-60% very fine algal marl fragments (which are composed of very small shells) and rest over calcareous algal marl between about 40 and 85cm, (whose composition varies from very gritty coarsed textured marl containing many shelly fragments to more finely textured marl). This horizon typically rests over fibrous peat at 85-110cm depth.

Occasional profiles were found to comprise calcareous silt loam and medium silty clay loam topsoils directly over-lying very gritty algal marl between 35 and 40cm. These profiles then pass to peat or are interbedded with layers of peat and algal marl between 65 and 90cm, with occasional profiles becoming impenetrable (to soil auger) due to gravel between 70 and 100cm.

- 2.8 The second group of soils occur towards the north east of the site. Profiles typically comprise calcareous medium or heavy clay loam topsoils with c. 2-3% v/v small angular flints overlying heavy clay loam, sandy clay loam or organic medium clay with c. 5-10% v/v angular flints in the subsoil. Profiles may be interbedded with algal marl deposits, and become impenetrable, (to soil auger), over gravel between 48 and 60cm.

3. AGRICULTURAL LAND CLASSIFICATION

- 3.1 The ALC grading of this site is primarily determined by interactions between soil and climatic factors namely wetness and droughtiness. In addition at this site soil toxicity poses a limitation in terms of

agricultural land quality. This was confirmed through laboratory analysis of soil samples, indicating a high pH, caused by high calcium carbonate levels in the soil. ALC grades 2 and 3a have been mapped on the site and a breakdown of the grades in terms of area and extent is given.

<u>Grade</u>	<u>Area (ha)</u>	<u>% of total agricultural land</u>
2	38.9	81.6
3a	8.3	18.4
Non Agricultural	1.5	
Total Agricultural Area	47.7	
Total Area of the Site	49.2	

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

Grade 2

- 3.3 Land of this quality occurs across most of the area surveyed, and typically comprises soils similar to those described in Section 2.7. Deep extremely calcareous profiles were identified, with silt loam or medium silty clay loam topsoils, which occasionally have relatively high organic matter contents and are thereby termed organic. Subsoils were variable, but most profiles contained horizons of algal marl over peat, or interbedded layers of algal marl and peat, whose extent and depth from the surface varied considerably across the site. All these soils having developed from calcareous algal marl deposits have very high levels of calcium carbonate in both the topsoil and subsoil, which typically ranging from c. 37-82% (as assessed by laboratory analysis). Such high levels, act to restrict micro nutrient availability to plants. It is therefore judged that these soils have sufficiently high carbonate contents, to impose a slight chemical limitation on plant growth, thereby restricting the agricultural land quality. In addition, most profiles showed evidence of imperfect

drainage, in the form of gleying, found at variable depths, as a result of groundwater movement, such profiles were thereby assigned to wetness class II. However some profiles were found to be well drained and thus assigned to wetness class I accordingly.

Overall the principal limitation to this land is the chemical restriction resulting from very high levels of calcium carbonate, as well as a slight wetness and workability restriction which places these soils in Grade 2.

Grade 3a

- 3.4 Land of this quality is mapped across the north east of the site where the land is slightly higher than the rest of the site. The soil falls into two variants.

Firstly, those profiles which comprise medium or heavy clay loam topsoils with c. 1-3% v/v flints over heavy clay loam or organic medium clay with c. 5-10% v/v flints in the subsoil, and becoming impenetrable (to soil auger) between c. 48 and 60 cm due to the underlying geology of gravels. In addition occasional profiles showed evidence of slight imperfect drainage in the form of gleying, thus being assigned to wetness class II. However most profiles were found to be well drained, wetness class I. The principal limitation to these soils is droughtiness as a result of shallow depth over gravel horizons.

The second group of soils comprise medium or heavy clay loam topsoils with occasional organic silt loam over similar textures with c. 10-50% algal marl in the soil matrix at various depths, overlying organic clays which were gleyed between c. 40 and 45 cm. These rest over sandy clay loams and medium clay loams, becoming impenetrable (to soil auger) due to gravel between c. 70 and 90 cm. As a result of imperfect drainage these soils are assigned to wetness class III.

The principal limitation to this land is a combination of droughtiness, wetness and workability thereby restricting the agricultural land quality to a maximum of grade 3a.

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Resource Planning Group

Reading R0

SOURCE OF REFERENCE

BRITISH GEOLOGICAL SURVEY (1971) Sheet 267 Newbury.

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.

SOIL SURVEY OF ENGLAND AND WALES (1984) Soils and their use in South East England, Bulletin 15.