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AGRICULTURAL LAND CLASSIFICATION

BUCKINGHAMSHIRE MINERALS PLAN

Boveney Court Farm, Dorney, Buckinghamshire.

Ministry of Agriculture Fisheries and Food

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BOVENEY COURT FARM, DORNEY, BUCKINGHAMSHIRE

1. BACKGROUND

1.1 During December and January 1990/1991, a survey of 178.3 ha of land at Boveney Court Farm, southwest of Dorney, Buckinghamshire was undertaken, in connection with the Buckinghamshire Minerals Plan. The survey was carried out by members of the Resource Planning Group, Reading.

1.2 At the time of survey most of the site had been left to set aside, with small areas towards the edge of the site under permanent pasture.

1.3 The survey was carried out on a grid system, with soil auger samples being taken at approximately 100 m intervals, using 120 cm Dutch soil augers. A number of soil pits were dug in order to provide further information and allow more detailed soil description.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Relief

2.1 The site lies between 20 and 22 m, falling gently from a higher central ridge (running from northwest to southeast), towards lower land adjacent to the River Thames and Cress Brook. Information provided by the National Rivers Authority (Thames Region), indicates that land lying below 21.2 m may be affected by flooding although frequent flooding only occurs in small areas lying below 20.5 m. Thus, flood risk is a significant factor affecting the land quality of localised areas on the site. Nowhere is gradient a significant limitation on the site.

Climate

2.2 Climatic variables were obtained by interpolation from a 5 km grid database (Met Office 1989), for a representative location in the survey area. These are as follows:

Grid Reference	SU 49261781
Accumulated Temperature (° days, Jan-June)	1492
Average Annual Rainfall (mm)	665
Moisture Deficit : Wheat (mm)	117
Moisture Deficit : Potatoes (mm)	112
Field Capacity Days	140

2.3 Climatic factors per se place no limitation on agricultural land quality, but do affect interactive limitations between soil and climate, namely soil wetness and droughtiness.

Geology and Soils

2.4 British Geological Survey, sheet 269, Windsor (1981), shows the area to be underlain by Taplow Gravels, a river terrace deposit. A narrow strip of alluvium borders Cress Brook along the northern boundary of the site.

2.5 Soil Survey of England Wales (1983), Sheet 6, Soils of South East England, indicates one main soil association across the area, namely the Sutton 2 association. These soils are described as, 'well drained fine and coarse loamy soils, usually over gravel with a calcareous matrix.'

2.6 Detailed field examination of the soils indicates the presence of seven broad soil groups across the site. These are as follows.

Type 1. Shallow stony soils over gravel, where gravel is found within 40 cm of the soil surface. Soil textures are variable, but are usually clay loams, sandy clay loams or clay. Topsoil stone content is in the order of 10-30%, increasing to 25-50% in the

subsoil. The soils are well drained, and so assigned to wetness class I.

Type 2. Highly calcareous, loamy soils, found in the extreme north of the site consisting of clay loam, sandy clay loam and clay topsoils and upper subsoils, over a highly calcareous, chalky, sandy loam, loamy sand or sandy clay loam lower subsoil. The subsoils are often gleyed below 35 cm, and soils are placed in wetness classes I-II.

Type 3. Sandier soils are found on the higher ground across the centre of the site. Soils consist of sandy clay loam topsoils over sandy clay, sandy clay loam and loamy sand subsoils. Subsoils may be gleyed below 40 cm, but are generally well drained and assigned to wetness class I.

Type 4. Heavier soils becoming sandier at depth, are also found on the higher ground across the centre of the site, often adjacent to those described above. Soils consist of heavy clay loam, clay and sandy clay topsoils and upper subsoils, over sandy clay loam, loamy sand and sandy loam subsoils. Drainage status of the soils is variable; soils may be well drained, or gleyed immediately below the topsoil. The upper subsoil may be slowly permeable. Wetness classes I-IV have been assigned to these soils.

Type 5. Poorly drained clayey soils, are found chiefly on the lower ground towards the edges of the site, and consist of a heavy/clay loam or clay topsoil over gleyed and slowly permeable clay subsoils. These soils are all placed in wetness class IV.

Type 6. Moderately drained heavy soils, are also found on the lower ground towards the edges of the site, and consist of a heavy clay loam or clay topsoil over clay or occasionally heavy clay loam subsoils, which may become gleyed and are slowly permeable at 50-70 cm+. Soils are placed in wetness classes I-III.

Type 7. Clayey Soils over Peat, are found on the eastern boundary of the site, on the lowest land, which borders Cress Brook. Soils consist of clay or heavy clay loam topsoils, over slowly permeable gleyed clay upper subsoils, over humic peat below 70-80 cm.

3. AGRICULTURAL LAND CLASSIFICATION

3.1 The ALC grading of the survey area is primarily determined by interactions between climate and soil factors, namely wetness and droughtiness. However, topsoil stoniness and flood risk act as localised limitations across parts of the site. ALC grades 2, 3a, 3b and 4 have been mapped, and a breakdown of these grades in terms of area and extent is given below.

Grade	Area (ha)	% total agricultural land
2	41.5	24
3a	53.2	31
3b	71.1	42
4	5.8	3
Non-Agricultural	6.7	
Total area of site	178.3	

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

3.3 Due to the variability of soil profiles across the site, the following sections concentrate on describing the factors which limit the agricultural quality of the land rather than detailing the soils found. A broad classification of soils has been given in Section 2.6.

3.4 GRADE 2

Land of this quality occupies approximately 24% of the total agricultural land on the site. In general this good quality agricultural land is associated with the slightly higher land through the centre of the site.

Almost all soils in this grade have a slight droughtiness limitation, brought about by a number of different factors. Poorly structured subsoils found particularly in the lower soil horizons, reduce the area of root-soil contact, thus lowering the plant available water. Soil textures which hold less available water are the clays, sandy clays, loamy sand and sands and where these textures occur in a profile, soil droughtiness may arise. Subsoil stones also reduce the plant available water, as does gravel which may be found below 90 cm in grade 2 soils, reducing the depth of soil and hence the available water.

Although these soils are commonly mottled and gleyed at variable depths greater than about 35 cm, they are not slowly permeable within 48 cm, and are therefore assigned to wetness classes I and II. A number of well drained wetness class I soils have a slight workability limitation, due to heavy clay loam topsoils which make cultivation slightly more difficult and the resulting seedbed less well structured and permeable. Soils which exhibit evidence of imperfect drainage such as mottling and gleying at variable depths are typically placed in wetness class II. This slight wetness problem limits the workability of the soils.

Land lying between 20.8 and 21.1 metres is downgraded to grade 2 on the basis of flood risk. This slight risk is a contributory factor to the downgrading of the site in a few localities, particularly the area adjacent to the Thames opposite Windsor Marina.

3.5 Grade 3a

Land of this quality occupies approximately 31% of the total agricultural land on the site occurring across much of the central part of the site.

Droughtiness and soil wetness are the chief limiting factors causing profiles to be assigned to this grade, although small areas are limited by the risk of flooding.

The factors which affect the droughtiness of the soils are similar to

those described in Section 3.4 above, but are slightly more severe. The principal cause is relatively shallow soil depth over gravel, which is generally found between 55 and 80 cm of the surface. Such profiles are often associated with poorly structured and heavy textured overlying soils, which reduce the available water still further. Loamy sand and sand subsoils towards the bottom of the profile occasionally occur, again reducing available water.

Most of the soils are also affected by soil wetness, and are assigned to wetness classes II or III. Soils placed in wetness class III are gleyed and slowly permeable below 39-46 cm depth, and are usually associated with heavy clay loam and clay topsoils, which being naturally calcareous, gives rise to land of moderate quality. Soils placed in wetness class II, are gleyed and slowly permeable deeper in the profile ie, from c.48-70 cm, and chiefly comprise profiles with calcareous clay topsoils. Grade 3a is thereby an appropriate classification. Soils with non-calcareous heavy clay loam topsoils in wetness class II are also placed in this grade.

All land lying between 20.3 and 20.7 metres is downgraded to grade 3a, due to the occasional flooding risk. This risk is a contributory factor to the down grading of the site in a number of places.

3.5 Grade 3b

Land of this quality occupies approximately 42% of the total agricultural land on the site, and is generally associated with slowly permeable soils, or profiles where gravel occurs near the surface.

Along the eastern edge of site, and in the lower lying ground towards the north of the site, soil wetness is the chief limiting factor. Soils are typically assigned to wetness class IV, being gleyed and slowly permeable within 40 cm of the soil surface. Profiles generally have clay or heavy clay loam topsoils or occasionally medium and silty clay loam textures and are thus downgraded on soil wetness to Grade 3b. Clayey soils over peat as are found along the north-eastern boundary of the site are all placed in this grade, as a result of soil wetness and workability limitations.

Where gravel is found between 40 and 55 cm depth the reduction in available water often reduces the grade to 3b on droughtiness. Slightly deeper profiles resting over gravel, but with coarse sandy textures may also be limited by drought.

Land lying below 20.2 metres is downgraded to grade 3b, due to the frequent flooding risk. This is a contributory factor to the downgrading of land at two locations, namely parts of the area adjacent to Cress Brook on the northeastern boundary of the site, and towards the south of the site, opposite Windsor Marina.

3.6 Grade 4

Land of this quality occupies approximately 3% of the total agricultural land on the site and it occurs, in two locations, towards the north of the site.

Soil droughtiness is the factor that causes the downgrading of land to this grade. Gravel, typically found between about 30 and 40 cm depth is the main cause of this droughtiness limitation, and gravel close to the surface is often associated with high topsoil stones, which further limits the available water. Occasional soils which are deeper (55 cm), over gravel but having loamy sand subsoils, possess a high risk of droughtiness and are thereby assigned to this grade.

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REFERENCES

BRITISH GEOLOGICAL SURVEY, (1981), 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 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), Bulletin 15, Soils and their use in South-East England.

NATIONAL RIVERS AUTHORITY, Frequency of flood water levels 1894-1988 at a point 1000 feet upstream of Boreney Lock. (By personal communication).