AGRICULTURAL LAND CLASSIFICATION

LAND AT CRUMPS FARM QUARRY, LITTLE CANFIELD, ESSEX

1.0 BACKGROUND

1.1 A detailed survey was carried out over 12.9 ha of land just south of the A120 Bishop's Stortford to Great Dunmow road at Canfield End in Essex. The land is the subject of a planning application to extend adjacent gravel extraction and landfill operations. At the time of the survey it was found that the present extent of these operations is such that the area of agricultural land remaining within the application area amounts to only 4.8 ha.

1.2 The agricultural remnant of the site is bounded in the east by existing gravel workings, in the west by gravel workings and landfill operations, in the north by a disused railway line and in the south by other agricultural land.

1.3 On the published 1:63 360 scale Agricultural Land Classification (ALC) map (MAFF, 1968) the site is mapped as virtually all Grade 2 but with a small area of Grade 3 in the north-east corner. However, this map is of a reconnaissance nature and the current survey was undertaken to provide more detail for the site.

1.4 A total of 5 auger borings was made using a dutch auger to a depth of 1.2 m unless stopped by impenetrable stony layers. In addition, 2 soil pits representative of the main soil types found were dug to assess subsoil conditions in more detail.

1.5 At the time of the survey all the agricultural land except for a very small area in the south-west corner (set-aside) carried wheat stubble.

2.0 PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

2.1 Climatic criteria are considered when classifying land as these may have an overriding limitation in terms of the agricultural use of the land. The main parameters used in the assessment of the overall climatic limitation are average annual rainfall, as a measure of overall wetness, and accumulated temperature (day °C Jan-June) as a measure of the relative warmth of an area.

2.2 A detailed assessment of the prevailing climate for the site has been made by interpolation from the 5 km grid dataset produced by the Meteorological Office (Met. Office, 1989). The details are given in Table 1 and these show that there is no overall climatic limitation affecting the site.

2.3 Climatic factors do, however, interact with soil properties to influence soil wetness and droughtiness. The climate in this area is relatively dry and warm and consequently the likelihood of a droughtiness limitation may be enhanced depending on soil conditions.

Table 1: Climatic Interpolation

Grid reference	TL 584 210
Altitude (m)	85
Accumulated Temperature (Day °C, Jan-June)	1385
Average Annual Rainfall (mm)	616
Moisture Deficit, Wheat (mm)	112
Moisture Deficit, Potatoes (mm)	105
Field Capacity (Days)	118
Overall Climatic Grade	1

Altitude and Relief

2.4 Most of the site forms part of an almost flat plateau at 90 m AOD. In the south there are gentle (3%) valley slopes south-eastwards. Altitude and relief do not impose any limitation on the agricultural quality of the site.

Geology and Soils

2.5 The published 1:50 000 scale geological map (Brit. Geol. Survey, 1990) shows most of the site to overlie Boulder Clay. Kesgrave Sands and Gravels, Head deposits and London Clay are shown to occur on the sloping land in the east and south-east of the site.

2.6 The reconnaissance (1:250 000 scale) soil survey map for the area (Soil Survey, 1983) shows the entire site to comprise soils from the Hanslope Association (*1), developed on chalky boulder clay. A more detailed survey (1:63 360 scale; Soil Survey, 1969) restricts the Hanslope Association to the western part of the site, whilst to the east are shown soils of the Chelmer Association (*2), developed in Head deposits.

2.7 The detailed survey carried out on the site shows the presence of two distinct soil types and these are described briefly in the following paragraphs.

Soil Type 1

2.8 Soil Type 1 occurs in the north-western part of the site and corresponds to the Hanslope soils of existing maps. A dark brown, very slightly calcareous clay topsoil overlies a brown, slowly permeable clay with many distinct grey(ish) and yellowish

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(*1) Hanslope Association: Deep, slowly permeable, calcareous (some non-calcareous) clayey soils formed from chalky till.

(*2) Chelmer Association: Deep, permeable, non-calcareous loamy and clayey soils developed in Head deposits over chalky till, London Clay or glacial gravels.

brown mottles and some manganese concretions. This subsoil, extending to 100+ cm is very calcareous, very firm and has a strongly developed prismatic structure and few biopores. Its structural condition is assessed as poor. The soil profile has few chalk fragments and few flints throughout and is assessed as wetness class III.

Soil Type 2

2.9 Soil Type 2 occurs in the south and south-east of the site. The typical profile is non or very slightly calcareous and exhibits a dark brown heavy clay loam or clay topsoil overlying an upper subsoil of dark yellowish brown clay with few yellowish brown mottles. This horizon has a weakly developed coarse angular blocky structure. The lower subsoil is a brown clay with many distinct greyish and yellowish brown mottles and few manganese concretions. Its structure is moderately developed angular blocky. There are few flints and occasional chalk fragments throughout the soil profile. No horizon is slowly permeable and the profile is assessed as wetness class II.

2.10 Intergrades between the two soil types do occur, for example profiles where decalcified clay and clay loam overlie chalky clay at depth. Also, subsoil permeability and degree of wetness can vary locally. However, at the scale of mapping it is impractical to delineate these differences.

3.0 AGRICULTURAL LAND CLASSIFICATION

3.1 The land has been classified using the guidelines contained in the Agricultural Land Classification of England and Wales (MAFF, 1988). Moisture balance calculations indicate that soil available water capacity is high relative to crop requirements. Consequently, there is only a slight droughtiness limitation at this site. Profile drainage and wetness class are the main determinants of the ALC grade within the site. A breakdown of the individual grades found on the site is given in Table 2 and a description of each grade is given in Appendix 1.

Table 2: Distribution of Grades and Subgrades

AGRICULTURAL LAND CLASSIFICATION		
Grade	Area (ha)	%
3a	3.3	25
3b	1.5	12
Urban	0.2	2
Non-Agricultural	7.9	61
TOTAL	12.9	100

Subgrade 3a

3.2 Land having predominantly Soil Type 2 (paragraph 2.9) is restricted to Subgrade 3a on account of a moderate wetness limitation. Although the soils do not have a slowly permeable layer they do show evidence of periodic wetness (mottling, concretions) in the subsoil. This, along with the clay and clay loam textures, will somewhat restrict workability. The soils are assessed as wetness class II and in this area (118 Field Capacity Days, see Table 1) cannot be graded higher than Subgrade 3a. Localised areas of Grade 2 may occur where topsoils are medium clay loam and conversely Subgrade 3b may occur where subsoils are slowly permeable, but such small areas could not be delineated at the scale of mapping.

Subgrade 3b

3.3 The area mapped as Subgrade 3b corresponds to the location of Soil Type 1 (paragraph 2.8). These clay soils have a slowly permeable subsoil and show evidence of periodic wetness. Their workability is more restricted than that of Soil Type 2 (above) and in this area they cannot be graded higher than Subgrade 3b. Better, Subgrade 3a, profiles having medium clay loam or calcareous clay topsoils may occur locally but such areas could not be separately identified at the scale of mapping.

Urban

3.4 The metalled access road within the site is mapped as urban.

Non-Agricultural

3.5 The existing mineral workings and gravel haul roads are mapped as Non-Agricultural.

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REFERENCES

BRITISH GEOLOGICAL SURVEY, 1990. Sheet 222, Solid and Drift. 1:50 000 scale.

MAFF, 1968. Agricultural Land Classification Map. Provisional. Scale 1:63 360, Sheet 148.

MAFF, 1988. Agricultural Land Classification of England and Wales (Revised Guidelines and *Criteria for grading the quality of agricultural land). Alnwick.*

METEOROLOGICAL OFFICE, 1989. Climatological Data for Agricultural Land Classification.

SOIL SURVEY OF ENGLAND AND WALES, 1969. Soils of the Saffron Walden District. Special Survey No. 2. 1:63 360 scale

SOIL SURVEY OF ENGLAND AND WALES, 1983. Sheet 4, "Soils of Eastern England". 1:250 000 scale.

Appendix 1

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 include 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 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 levels of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yield of which are variable. In most 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.