AGRICULTURAL LAND CLASSIFICATION AND STATEMENT OF SOIL CHARACTERISTICS, BRADWELL PIT EXTENSION, BRADWELL, ESSEX

1.0 BACKGROUND

1.1 The site covers an area of 45.0 ha, and is the subject of an application for mineral extraction (Ref ESS.9.95.BTE).

1.2 The site is located on the former wartime Bradwell airfield approximately 1 km to the north east of Silver End.

1.3 This report is based on survey work carried out in May 1993 when the present area was part of a much larger area under planning application to extract sand and gravel.

At the time of the survey the land comprised an area of arable agricultural land dissected by concrete runways. A total of 29 auger borings were made over the site and in addition 3 soil pits were dug to help assess subsoil soil conditions. Reference was also made to the findings of a previous survey which was carried out in 1987.

1.4 On the published provisional ALC map, sheet 149 (MAFF 1974) the whole site is shown as grade 2.

2.0 PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

2.1 Climate 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 climate 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.

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

Table 1. Climatic Interpolation

Grid Reference	TL 815209
Altitude (m)	52
Accumulated Temperature (Day °C Jan-June)	1420
Average Annual Rainfall (mm)	589
Moisture Deficit, Wheat (mm)	123
Moisture Deficit, Potatoes (mm)	119
Field Capacity (Days)	106
Overall Climatic Grade	1

Altitude and Relief

2.2 The site is relatively level with a slight slope from 50 m AOD to 52 m AOD in a westerly direction. Relief does not impose any restriction on the farming of the land.

Geology and Soils

2.3 The entire site is mapped as Boulder Clay on the 1:50000 geological map which covers the area (Geol. Survey, 1982).

2.4 The reconnaissance soil survey map for the area (Soil Survey, 1983) shows the site to comprise Oak 2 Association (1*) with some Hanslope Association (2*) on the northern and western edges.

2.5 Two soil types were distinguished during the survey and their distribution is shown on the soil types map.

2.6 Soil type 1 comprises heavy textured clayey soils developed on the chalky boulder clay. A typical soil profile has a dark greyish brown heavy clay loam topsoil with few subangular flints, over an upper subsoil of a brown clay which in some profiles exhibited faint ochreous mottling. Below this horizon is the chalky boulder clay which generally has ochreous mottling and abundant chalk stones. The chalky boulder clay is typically encountered within 40/70 cm depth and the soils are generally naturally calcareous throughout. The soils have been assessed as Wetness Class II with occasional profiles of Wetness Class I where the boulder clay has a high proportion of chalk stones giving rise to better structure and improved porosity, and wetness class III where the porosity is poorer.

(1 *) Oak 2 Association: slowly permeable seasonally waterlogged fine loamy over clayey and fine siltey over clayey soils. Some clayey soil, with chalky subsoils.

(2 *) Hanslope Association: slowly permeable calcareous clayey and fine loamy over clayey soils. Some slowly permeable non calcareous clayey soils.

2.7 Soil Type 2 comprises decalcified upper layers over chalky boulder clay at depth. A typical soil profile has non calcareous heavy clay loam topsoil to approximately 30 cm depth over a non calcareous brown or grey brown heavy clay loam or clay upper subsoil with faint ochreous mottling. Below approximately 50 cm depth the soils generally become slightly greyer with common distinct ochreous mottling before the chalky boulder clay is encountered between 70-100 cm depth. The soils have been assessed as Wetness Class II although very occasional profiles with gleying above 40 cm were found giving rise to Wetness Class III.

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). A breakdown of the individual grades found within the site is given in Table 2.

The definitions of the various ALC grades are given in Appendix 1.

Table 2. Distribution of Grades and Subgrades

Grade	Area (ha)	% of site
2	7.5	16.7
3a	29.9	66.4
Urban	7.6	16.9
	45.0	100.00

Grade 2

3.2 The area of land mapped as grade 2 has soils which correlate with the better drained calcareous soils developed on the chalky boulder clay as described in

para 2.6. These soils have heavy clay loam topsoils with moderate structure and therefore have a slight droughtiness imperfection restricting to grade 2.

In addition these soils have a minor wetness/workability restriction. The soils were not gleyed within 40 cm, although mottling was generally present within 70cm. In some cases the soils did not have slowly permeable subsoil horizons within 80 cm and they have therefore been classified either as Wetness Class I or II. The presence of calcareous heavy clay loam topsoil restricts the soils to grade 2.

Subgrade 3a

3.3 The area of land mapped as subgrade 3a includes the poorer structural soils of Soil Type 1 (para 2.6) as well as those mapped as Soil Type 2 (para 2.7). Both soil types have clay subsoils with moderate structures in the upper subsoils and poor structures in the lower subsoil.

Within the area mapped as grade 3a, the majority of the soils of both mapping units have been assessed as Wetness Class II, with some profiles of wetness class III. Soils which are Wetness Class II and have heavy clay loam textured topsoils will be restricted to a grade 3a potential, or grade 2 if naturally calcareous. However, where profiles of Wetness Class III are recorded, then the soil is restricted to grade 3b, although if the topsoil is naturally calcareous as in the case of Soil Type 1, this will result in upgrading to grade 3a. Although some grade 2 and 3b profiles do exist, these are not in discrete mapable areas.

Urban

3.4 Areas mapped as urban consist of the remaining concrete runways.

November 1995

Resource Planning Team
ADAS Cambridge

REFERENCES

GEOLOGICAL SURVEY OF GREAT BRITAIN (1982). Solid and Drift Edition Map Sheet No.223 (Braintree) 1:50,000 scale.

MAFF (1974). Agricultural Land Classification Map (provisional) Sheet No. 149 1:63,360 scale.

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. Met. Office, Bracknell

SOIL SURVEY OF ENGLAND AND WALES (1983). Sheet 4. Soils of Eastern England. Scale 1:250,000.

Appendix 2

SOIL PHYSICAL CHARACTERISTICS
BRADWELL PIT EXTENSION, BRADWELL, ESSEX

SOIL TYPE 1 (32.71 ha)

Topsoil	Texture	:	heavy clay loam
	Colour	:	10YR4/3 grey brown
	$CaCO_3$	:	slightly calcareous or calcareous
	Stones	:	2-3% small flints
	Depth	:	25-35 cm typically 30 cm
Subsoil 1	Texture	:	clay
	Colour	:	10YR5/4 yellowish brown
	Mottles	:	few faint ochreous, occasionally none
	$CaCO_3$	:	calcareous
	Structure	:	moderate coarse subangular blocky
	Consistence	:	firm
	Stones	:	few small flints and occasional chalks
	Depth	:	40-70 cm typically 60 cm
Subsoil 2	Texture	:	clay
	Colour	:	2.5Y6/3 light brownish grey
	Mottles	:	common distinct ochreous and few grey
	$CaCO_3$	:	strong calcareous
	Structure	:	moderate coarse angular occasionally subangular blocky
	Consistence	:	firm
	Stones	:	10-20% chalk stones
	Depth	:	variable

Wetness class II with occasional profiles of wetness class I and II

SOIL TYPE 2 (4.75 ha)

Topsoil	Texture	:	heavy clay loam
	Colour	:	10YR4/3 grey brown
	$CaCO_3$	:	non calcareous
	Stones	:	2-3% small flints
	Depth	:	25-35 cm typically 30 cm
Subsoil 1	Texture	:	heavy clay loam
	Colour	:	10YR5/4 yellowish brown
	Mottles	:	few faint occasionally common distinct ochreous
	$CaCO_3$	:	non calcareous
	Structure	:	moderate coarse subangular blocky
	Consistence	:	firm
	Stones	:	3-5% flints
	Depth	:	40-6- cm
Subsoil 2	Texture	:	clay
	Colour	:	2.5Y6/3 light brownish grey
	Mottles	:	common distinct ochreous
	$CaCO_3$	:	slightly calcareous
	Structure	:	moderate coarse angular blocky
	Consistence	:	firm
	Stones	:	3-5% flints
	Depth	:	60-100 cm

Subsoil 3 Chalky boulder clay as per Subsoil 2 horizon of Soil Type 1.

Wetness class II, occasionally III.

FILE NOTE:
RIVENHALL AIRFIELD, KELVEDON, ESSEX

Geoff Senior initially contacted us to see if any work had been carried out on this site. A full survey was carried out in 1993 (46/93). Geoff required a copy of the report which was duly dispatched.

The second enquiry from Geoff required us to look at the restoration of the site. Part of the site is the subject of a new application which includes part of the runway. The mineral company wish to restore the whole area to agriculture and Geoff wanted to know the minimum depth of topsoil to maintain the gradings as at present. This was investigated and in reality the maximum available soil resource should be used. This has been calculated by the company to be 27" which would maintain the existing grades of 2 and 3a providing the restoration is carried out to restore soil structure and not mix soils. Geoff was phoned with this response.

The next enquiry was to produce an amended map (both soils and ALC) and amend the initial report to make it clear that the new application only covered about 25% of the original site. After discussion with Ray it was decided that we need to check the auger boring information to make sure that the soil physical characteristics are still accurate for the smaller site. Have discussed this with Peter Chillingworth and he feels a new map and soils map need to be produced together with a new stand alone report.

We have not received a commission as such from Geoff for any of the above with the work just evolving. I have now signed the job into our system (6-NOV-1995) and any time is now being recorded to this job code (ME30QLY, 111/95). Previous to this date work was recorded under the WRC but had no job number.

ACTION:

Mike could you please check the auger boring information within the new application area and confirm whether or not the soil physical characteristics are accurate for the smaller site. A new ALC map needs to be produced showing the smaller site. The title has changed and this will be confirmed by Geoff asap. If the soil physical characteristics have changed a new key will need to be produced and a new map produced again showing the smaller application area.
An amended report also needs to be produced which only applies to the smaller area. Care is needed to make sure that it is clear that no new survey work has been carried out since 1993 and also that if any changes are made to the soil characteristics key then these are carried through into the report.

The deadline for the work is the 10th Nov 1995 which includes the production of the maps.

Roger (6/11/95).