Cambs 16/92

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Ministry of
Agriculture
Fisheries
and Food

AGRICULTURAL LAND CLASSIFICATION

AND SOIL PHYSICAL CHARACTERISTICS

MARGETTS FARM

BUCKDEN CAMBS

AGRICULTURAL LAND CLASSIFICATION AND SOIL PHYSICAL CHARACTERISTICS

MARGETTS FARM, BUCKDEN, CAMBRIDGESHIRE

1. INTRODUCTION

1.1 The site, an area of 12.4 hectares is the subject of an application, by Redlands Aggregates Ltd, to extract sand and gravel from land at Margetts Farm, Buckden, Cambridgeshire. MAFF carried out a detailed soil survey of the site in April 1989 in conjunction with an earlier proposal. No further fieldwork has been carried out because the 1989 work is sufficiently detailed.

1.2 A total of 30 soil inspections were made using a hand held Dutch soil auger. 4 soil inspection pits were dug to assess subsoil conditions and to supplement soil auger boring information.

1.3 On the published provisional Agricultural Land Classification map, Sheet 134 (1:63660 scale MAFF, 1969) the site is mapped as grade 3. Since this map is of a reconnaissance nature and designed primarily for strategic planning purposes, the current survey was undertaken to provide more detailed information on land quality for the site.

2. AGRICULTURAL LAND CLASSIFICATION

2.1 The definitions of the Agricultural Land Classification (ALC) grades are included in Appendix 1.

2.2 The majority of the site is mapped as subgrade 3a with a small area of grade 2 adjacent to the southern boundary. The table below shows the breakdown of the grades in hectares and % terms for the survey area.

AGRICULTURAL LAND CLASSIFICATION

Grade	ha	%
2	2.1	17
3a	10.3	83
TOTAL	12.4	100

2.3 Grade 2

A small area adjacent to the southern boundary has been graded 2. The land is associated with soil types A and B (described in paras 4.3 and 4.4 respectively). The soils are slightly droughty and are well drained. The occurrence of many flints at depth has a slight limiting effect on the available moisture capacity of these soils. As a result slight droughtiness limitations restrict the land to grade 2 (very good quality agricultural land).

2.4 Subgrade 3a

The remaining land has been graded 3a. This land is associated with soil types B and C and the moderately droughty variants of soil type A (described in paras 4.4, 4.5 and 4.3 respectively). The common occurrence of flints throughout these soil profiles combine to impose a moderate limiting effect on the water holding capacity of these soils. Consequently droughtiness is the major limitation to the ALC grade.

3. SITE PHYSICAL CHARACTERISTICS

Altitude and Relief

3.1 The land forms a fairly level area ranging in altitude from 13 to 15 m AOD. Gradient and altitude do not constitute limitations to the ALC grade.

Climate

3.2 Climate data for the site was obtained from the published agricultural climatic dataset produced by the Meteorological Office (Met Office, 1989). This indicates a site average annual rainfall of 560 mm (22 inches) and that field capacity days are 102. This also indicates that the accumulated temperature (ATO) for this area is approximately 1455 day degrees Celcius. Soil moisture deficits for wheat and potatoes are 120 mm and 116 mm respectively. These climatic characteristics do not impose any climatic limitation to the ALC grading of the site.

Flooding

3.3 Occasionally, a small area along the eastern edge of the site is prone to flooding by the Diddington Brook. However, in this area, this was not considered to be a significant limitation to the ALC grade.

4. SOIL PHYSICAL CHARACTERISTICS

Geology

4.1 The published 1:50,000 scale geology map Sheet No 187 (Geol Surv 1975) and the Institute of Geological Sciences 1:25,000 scale Mineral Assessment sheet TL16 shows the site to comprise mainly first and second terrace gravels with a narrow deposit of alluvium outcropping along the eastern boundary of the site. Both of these deposits overlie a bedrock of Oxford Clay at depth (58-69 m).

Soils

4.2 The Soil Survey of England and Wales have mapped the soils in the Buckden area at a reconnaissance scale of 1:250,000. This map, entitled "The Soils of Eastern England", (S.S.E.W., 1983) shows the occurrence of the Sutton 1 Association* within the survey area. During this survey a more detailed inspection of the soils was carried out and showed the occurrence of three soil types.

4.3 Soil Type A (refer Appendix 2 and Soil Types Map)

These soils cover the majority of the site. They typically comprise very slightly stony medium clay loam or occasionally sandy clay loam topsoils over very slightly stony heavy clay loam or sandy clay loam upper subsoils. At depth these soils typically become slightly or moderately stony* sandy clay loams (or occasionally loamy sand or sands) which merge into gravel 80/90 cms+.

* Sutton 1 Association: Well drained fine and coarse loamy soils locally calcareous and in places shallow over limestone gravel.

* Stony: these flints may be coated with calcium carbonate deposits.

4.4 Soil Type B (refer Appendix 2 and Soil Types Map)

These stonier, lighter textured soils outcrop in two smaller areas to the southwest and northeast. They typically comprise sandy loam or occasionally medium clay loam topsoils over slightly to moderately stony sandy clay loam or sandy loam upper subsoils. At depth subsoils generally comprise moderately stony sandy clay loams or loamy sands which overlie gravelly material below 80/90 cms. Topsoil stone content ranges from 5-10% small and medium subangular flints.

4.5 Soil Type C (refer Appendix 2 and Soil Types Map)

These heavier soils cover a small area at the eastern end of the site. They generally comprise heavy clay loam topsoils over very slightly or slightly stony medium clays which merge into moderately stony sandy clay loams at depth. Below 65/70 cms the soils overlie gravelly material which typically comprises moderately or very stony* sand or occasionally sandy clay loams. Topsoil stone ranges from 3-5% small and medium subangular flints.

4.6 Soils are typically non calcareous, except at depth in soil types A and C where calcium carbonate coating on flints or the presence of limestone fragments make the stony horizons calcareous.

4.7 Field pH measurements range from 6.5 to 7.0 and soil profile pit observations indicate that soils are porous and relatively free draining (ie. wetness class I or II).

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* Stony: these flints may be coated with calcium carbonate deposits.

APPENDIX 1

DESCRIPTION OF ALL GRADE 2 AND SUBGRADE 3a

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 root crops. The level of yield is generally high but may be lower or more variable than Grade 1.

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.

APPENDIX 2

SOIL PHYSICAL CHARACTERISTICS

MARGETTS FARM, BUCKDEN, CAMBRIDGESHIRE

SOIL TYPE A (7.3 ha)

Topsoil	Texture	:	medium clay loam, occasionally sandy clay loam
	$CaCO_3$	:	non calcareous
	Colour	:	dark brown (10YR 3/3)
	Stone	:	3-5% small subangular flints
	Structure	:	cultivation zone - not applicable
	Boundary	:	abrupt smooth
	Roots	:	common and many fine and very fine
	Depth	:	27/30 cm
Upper subsoil	Texture	:	clay loam or sandy clay loam
	$CaCO_3$	:	variably calcareous
	Colour	:	yellowish brown (10YR 5/4)
	Stone	:	1-5% small subangular flints
	Structure	:	moderately developed coarse angular blocky breaking into medium angular blocky
	Boundary	:	abrupt smooth
	Roots	:	common fine and very fine
	Depth	:	50/65 cm
Lower subsoil	Texture	:	sandy clay loam, occasionally loamy medium sand or sand
	$CaCO_3$	:	often calcareous with depth
	Colour	:	yellowish brown (10YR 5/6)
	Stone*	:	typically 20-30% small and medium flints
	Structure	:	moderately developed coarse angular blocky breaking into medium angular blocky
	Depth	:	80/90 cm

Mineral deposit : moderately to very stony (small and medium flints) in lenses of sand, loamy sand and sandy clay loams

* Stony - these flints may be coated with calcium carbonate deposits.

SOIL TYPE B (2.9 ha)

Topsoil	Texture	:	sandy loam, occasionally medium clay loam
	$CaCO_3$	:	non calcareous
	Colour	:	dark brown (10YR 3/3)
	Stone	:	5-10% small and medium subangular flints
	Structure	:	cultivation zone - not applicable
	Boundary	:	abrupt smooth
	Roots	:	common fine and very fine
	Depth	:	26/30 cm
Upper subsoil	Texture	:	sandy clay loam or sandy loam
	$CaCO_3$	:	non calcareous
	Colour	:	strong brown (7.5YR 4/6)
	Stone	:	10-15%, occasionally 20-30% mainly small flints
	Structure	:	weakly developed coarse subangular blocky
	Boundary	:	abrupt smooth
	Roots	:	common fine and very fine
	Depth	:	55/65 cm
Lower subsoil	Texture	:	sandy clay loam or loamy sand
	$CaCO_3$	:	predominately non calcareous
	Colour	:	strong brown (7.5YR 4/6)
	Stone	:	typically 30% flints
	Structure	:	too stony to assess
	Boundary	:	base of pit
	Roots	:	few fine and very fine
	Depth	:	80/90 cm
Gravelly material		:	typically 30-50% flints on a sandy clay loam or sand matrix

SOIL TYPE C (2.2 ha)

Topsoil	Texture	:	clay loam
	$CaCO_3$	:	non calcareous
	Colour	:	dark greyish brown (10YR 4/2)
	Stone	:	3-5% small and medium subangular flints
	Structure	:	cultivation zone - not applicable
	Boundary	:	abrupt smooth
	Roots	:	common fine and very fine
	Depth	:	30 cm
Upper subsoil	Texture	:	medium clay
	$CaCO_3$	:	non calcareous
	Colour	:	yellowish brown (10YR 5/4)
	Stone	:	variable, in the range 3-15% small and medium flints
	Structure	:	moderately developed coarse subangular blocky
	Boundary	:	clear smooth and abrupt smooth
	Roots	:	few fine and very fine
	Depth	:	55/60 cm
Lower subsoil	Texture	:	sandy clay loam
	$CaCO_3$	:	calcareous
	Colour	:	strong brown (7.5YR 4/6)
	Stone	:	20-30% small and medium flints
	Structure	:	too stony to assess
	Boundary	:	base of pit
	Roots	:	few fine and very fine, none seen from 75 cm
	Depth	:	65/75 cm
Gravelly material		:	30-50% gravel in a sand matrix, occasionally sandy clay loam matrix (stone are mainly very small and small, less than 2 cm in size).

References

GEOLOGICAL SURVEY OF ENGLAND AND WALES 1975 Drift edition geology map No. 187, Scale 1:50,000.

INSTITUTE OF GEOLOGICAL SCIENCES 1981 'Sand and Gravel resources of the country around Huntingdon and St Ives, Cambridgeshire'. Sheet TL16. Mineral Assessment Report 54, HMSO, London.

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

METEOROLOGICAL OFFICE (1989) Published rainfall data extracted from ALC agroclimatic dataset, compiled by Meteorological Office.

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

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Map 1: Agricultural Land Classification

Map 2: Location of Soil Pit