Cambs 59/91

AGRICULTURAL LAND CLASSIFICATION AND SOIL PHYSICAL CHARACTERISTICS

WITCHAM MEADLANDS, MEPAL, CAMBRIDGESHIRE

1. INTRODUCTION

1.1 The site is the subject of an application by Steetley Quarry Products Ltd, for the extraction of sand and gravel at Witcham Meadlands, Mepal, Cambridgeshire. This report provides detailed information on agricultural land quality and soil physical characteristics of this 72.4 hectare site. The site survey was carried out in November 1991, 72 soil inspections were made using a hand held 120 cm Dutch soil auger, and 3 soil pits were dug to assess subsoil conditions.

2. SITE PHYSICAL CHARACTERISTICS

2.1 Climate data for the site was obtained from the published agricultural climatic dataset (Met Office, 1989). This indicates that the site has an annual average rainfall of 551 mm (21.1"). This also indicates that the soils are at field capacity for a period of 87 days and moisture deficits are 118 mm for wheat and 114 mm for potatoes. Median accumulated temperature above 0°C January to June (ATO) is 1458 Day °C.

2.2 Although these climatic characteristics do not impose any climatic limitation on the Agricultural Land Classification (ALC) grading of the site, timeliness of cultivations is important to avoid structural damage to the fine textured subsoils within the northern half of the survey area.

Altitude and Relief

2.3 The site comprises a uniform level area at Om AOD with negligible micro-relief, although land to the south is slightly lower. Gradient and altitude therefore do not constitute limitations to the ALC grade.

Irrigation

2.4 Though irrigation is used sporadically, the source and quantity does not

appear to be reliable, thus irrigation has not been taken into account when grading this land.

3. AGRICULTURAL LAND CLASSIFICATION

3.1 On the Ministry's published 1:63,360 scale Provisional ALC Map sheet 135 (MAFF, 1971) the site is mapped as grade 2 in the northern half and grade 1 in the southern half. Since this map is of a reconnaissance nature, designed primarily for strategic planning purposes, the current survey was undertaken to provide more detailed information on land quality for the site.

3.2 The whole survey area has been graded 2. A precise breakdown of the ALC grades in hectares and % terms is provided below. The definition of grade 2 land is included in Appendix 1.

AGRICULTURAL LAND CLASSIFICATION

Grade	ha	%
2	71.8	99.2
Urban	0.4	0.5
Non agricultural	0.2	0.3
TOTAL	72.4	100

Grade 2

3.3 The whole site has been graded 2 and is associated with soils (types 1 and 2) described in detail in paragraphs 4.3 and 4.4 respectively.

3.4 Firstly soil type 1 covers the majority of the site and comprises organic loam topsoils over heavier textured mineral upper subsoils. At depth a stonier narrow band of similar textured subsoil overlies the gravel which comprises a sandy textured matrix with 40% flints. This land is well drained and is limited by slight droughtiness imperfections due to the presence of gravel at depths 60/70 cm+.

3.5 The remainder of the site is covered by peaty soils to depth over narrow bands of fine loamy lower subsoils which merge into gravel towards the

base of the profile from 65/90 cm depth. Droughtiness is again the limitation because acidity in the lower horizons slightly impedes the rooting of the crops. Consequently the land is graded 2, capable of producing a wide range of crops but with reduced flexibility, due to minor limitations, compared to grade 1 land.

4. SOIL PHYSICAL CHARACTERISTICS

Geology

4.1 The published 1:50,000 scale solid and drift edition geology map No. 173 (Ely) (Geological Survey of Great Britain, 1980) shows the northern half of the site to comprise Quaternary first and second terrace river gravels overlying Jurassic Ampthill Clay at 2-5 metres depth. The southern part of the site is mapped as Nordelph peat which also overlies Ampthill Clay from 2-5 metres.

Soils

4.2 The published 1:63,360 scale soils map sheet 173 (Ely) (Soil Survey of England and Wales 1973) shows the site area to consist of two soil types. The humose Fordham/Clayhythe complex to the north and the peaty Adventurers series to the south. The current detailed inspection of the soils broadly confirmed the presence of these two soil types. These are described below.

Soil Type 1 (refer to Appendix 2 and Soil Types Map)

4.3 These soils cover the majority of the site and typically comprise organic loam or occasionally peaty loam topsoils over upper subsoils consisting of slightly stony heavy and medium clay loams or sandy clay loams. Lower subsoils are moderately stony sandy clay loams or sandy clays and occur from 55/70 cm depth. These horizons give way to gravel comprising 40% flints in a loamy medium sand matrix. Occasionally gravel is not encountered until the base of the profile.

Soil Type 2 (refer to Appendix 2 and Soil Types Map)

4.4 The remainder of the site comprises peaty loam or occasionally loamy peat topsoils over peaty loam (or occasionally organic loam) upper subsoils with low pH's. At depth acidic layers with a pH of 4 have caused sporadic root growth. From 55/60 cm the moderately stony sandy clay loam lower subsoils have a less acidic pH of 6.5 but rooting remains sporadic. Below 65/90 cm depth gravel deposits comprising 40% flints in a loamy medium sand matrix predominate.

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APPENDIX 1

DESCRIPTION OF AGRICULTURAL LAND CLASSIFICATION GRADE 2

GRADE 2

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.

APPENDIX 2

SOIL PHYSICAL CHARACTERISTICS

WITCHAM MEADLANDS, MEPAL, CAMBRIDGESHIRE

SOIL TYPE 1 (51.5 ha)

Topsoil	Texture	:	organic loam, occasionally peaty loam
	$CaCO_3$	:	non calcareous
	Colour	:	black (10YR 2/1) and very dark brown (10YR 2/2)
	Stone	:	negligible, occasionally 1-2% small angular, subangular and rounded flints
	Structure	:	cultivation zone - not applicable
	Boundary	:	smooth abrupt
	Roots	:	common fine and very fine
	Depth	:	30/35 cm
Upper Subsoil	Texture	:	medium or heavy clay loams, sandy clay loam or occasionally fine sandy loams
	$CaCO_3$	:	non calcareous
	Colour	:	greyish brown (10YR 5/2), yellowish brown (10YR 5/4) and pale brown (10YR 6/3)
	Stone	:	variable, typically 3-6%, occasionally 10% small angular, subangular and rounded flints
	Structure	:	moderately developed coarse subangular blocky
	Boundary	:	abrupt smooth
	Roots	:	common fine and very fine roots
	Depth	:	in the range 55/70 cm, typically 60/70 cm

Lower Subsoil*	Texture	:	sandy clay loam, occasionally sandy clay
	$CaCO_3$	:	non calcareous
	Colour	:	greyish brown (10YR 5/2) and yellowish brown (10YR 5/6)
	Stone	:	moderately stony, typically 20% small angular, subangular and rounded flints
	Structure	:	weakly developed coarse subangular blocky
	Boundary	:	abrupt smooth
	Roots	:	few fine and very fine
	Depth	:	60/90 cm

* This lower subsoil is a relatively thin band varying from 5-35 cms thick which directly overlies gravel deposits.

Parent Material	:	Gravel - this is found at a typical depth of 60/70 cm and consists of a loamy medium sand matrix with 40% flints

SOIL TYPE 2 (20.9 ha)

Topsoil	Texture	:	peaty loam, occasionally loamy peat
	$CaCO_3$	:	non calcareous
	Colour	:	very dark grey (10YR 3/1)
	Stone	:	in the range 1-7%, typically 5% small angular, subangular and rounded flints
	Structure	:	cultivation zone - not applicable
	Boundary	:	abrupt smooth
	Roots	:	common fine and very fine
	Depth	:	30/35 cm

Upper Subsoil	Texture	:	peaty loam, occasionally organic loam
	$CaCO_3$	:	non calcareous
	Colour	:	very dark brown (10YR 2/2), occasionally black (10YR 2/1)
	Stone	:	negligible
	Structure	:	granular
	Boundary	:	abrupt smooth
	Roots	:	common fine and very fine, but not fully exploiting the subsoil due to the low pH's at depth in this horizon
	Depth	:	variable in the range 55-70 cm, typically 55 cm
Lower Subsoil*	Texture	:	sandy clay loam
	$CaCO_3$	:	non calcareous
	Colour	:	light brownish grey (10YR 6/2) and greyish brown (10YR 5/2)
	Stone	:	20% small angular, subangular and rounded flints, occasionally 10%
	Structure	:	moderately developed coarse subangular blocky
	Boundary	:	abrupt smooth
	Roots	:	few fine and very fine
	Depth	:	in the range 65/90 cm, typically 65 cm

* The lower subsoil comprises a relatively thin band of sandy clay loam, typically 10 cm thick, although it may extend to a maximum of 35 cm.

Parent Material	:	Gravel - 40% flints in a loamy medium sand matrix encountered from a depth of 65/90 cm, typically 65 cm.

REFERENCES

GEOLOGICAL SURVEY OF GREAT BRITAIN 1980, Solid and drift edition geology sheet 173 (Ely) 1:50,000 scale.

MAFF, 1971. Agricultural Land Classification Map Sheet 135 Provisional. 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. Published climatic data extracted from the agroclimatic dataset, compiled by the Meteorological Office.

SOIL SURVEY OF ENGLAND AND WALES 1973. Soil Map Sheet 173 (Ely) 1:63,360 scale.

WITCHAM MEADLANDS

MEPAL

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Map 1 : Agricultural Land Classification

Map 2 : Soil Types