Cambs 1/91

AGRICULTURAL LAND CLASSIFICATION AND SOIL PHYSICAL CHARACTERISTICS

BLACK CAT ROUNDABOUT, ROXTON, BEDS

1. BACKGROUND

1.1 The site, an area of 32.6 hectares, is the subject of an application, by Redland Aggregates Ltd, for the extraction of sand and gravel near Roxton, Bedfordshire. In January 1991 MAFF carried out a site survey of land quality and soil physical characteristics. Rural Planning Services surveyed the site at an earlier date; the data from which was incorporated into the MAFF Survey. The following report and attached maps show the findings of the MAFF Survey.

2. SITE PHYSICAL CHARACTERISTICS

Climate

2.1 Climate data for the site was obtained from the published Agricultural Climatic Dataset (Met Office, 1989). This indicates that for the site's median altitude (of 16M AOD) the annual average rainfall is 547mm (21.5"). This data also indicates that field capacity days are 94 and moisture deficits are 125mm for wheat and 122mm for potatoes. The climatic characteristics do not impose any climatic limitation on the ALC grading of the survey site.

Altitude and Relief

2.2 The survey area comprises a gently sloping valley side of the river Great Ouse. The land falls from a maximum of 20m AOD adjacent to the A1 road to 15m AOD adjacent to the river. Gradient and altitude do not constitute limitations to the ALC grade.

3. AGRICULTURAL LAND CLASSIFICATION

3.1 The definitions of the Agricultural Land Classification (ALC) grades are included in Appendix 2.

3.2 The table below shows the breakdown of the ALC grades for the survey area.

AGRICULTURAL LAND CLASSIFICATION

Grade	ha	%
3a	28.8	88
3b	3.8	12
TOTAL	32.6	100

3.3 Subgrade 3a

Three main situations occur:

3.3.1 Adjacent to the river calcareous clayey soils derived from alluvial deposits have been graded 3a (Soil Type 2, paragraph 4.2.2). Profile pit observations indicate that subsoils are slowly permeable directly below the topsoils (ie wetness class III). Relatively heavy calcareous topsoils and a wetness class of III combine to impose a moderate limitation on the agricultural potential of this land. Thus the land is restricted to subgrade 3a (good quality agricultural land).

3.3.2 Upslope, east of the small holdings, the survey area comprises the better drained variant of the decalcified clayey Soil Type 1 (described in paragraph 4.2.1). The subsoils are slowly permeable at depth (45/65cm^{+}) and the topsoil textures are non calcareous and relatively heavy. These factors combine to impose a moderate drainage and workability limitation on the land. Thus the land is excluded from a higher grade.

3.3.3 At the highest elevations adjacent to the A1 road lighter textured land, which is prone to droughtiness, has been mapped as subgrade 3a (Soil Type 3, paragraph 4.2.3). The combination of light textures and gravelly horizons at depth has a moderate limiting effect on the soils water holding capacity. Consequently moderate droughtiness is the major limitation the the ALC grade.

3.4 Subgrade 3b

A narrow tract of land graded 3b outcrops east of the small holdings. This land is derived from the less well drained variant of soil type 1 (described in paragraph 4.2.1). The subsoils are slowly permeable directly below the topsoil (ie wetness class III) and the topsoil textures are heavy and non calcareous. This land is consequently limited by significant wetness and workability imperfections which derive from the reduced subsoil permeability combined with the clayey topsoil textures. These factors restrict the land to subgrade 3b (moderate quality agricultural land).

4. SOIL PHYSICAL CHARACTERISTICS

4.1 Geology

The published 1:50,000 scale geology sheet 204 shows the survey area to comprise mainly alluvium with smaller deposits of first and second terrace river gravels upslope.

4.2 Soils

During this survey three main soil types were identified.

4.2.1 Soil Type 1 (refer to Appendix 1 and Soil Type Map)
East of the small holdings the land comprises well bodied clayey soils which are decalcified to depth. These soils typically comprise heavy loam or clay topsoils over clay subsoils which may be calcareous at depth. Profile wetness class ranges from II to III depending on the depth at which the clay becomes slowly permeable.

4.2.2 Soil Type 2 (refer to Appendix 1 and Soil Type Map)
Adjacent to the river calcareous alluvial derived soils outcrop. These soils typically comprise calcareous heavy clay loam or clay topsoils over calcareous clay subsoils. Calcium carbonate percentages range from 4 to 11% due to the presence of numerous shell fragments.

4.2.3 Soil Type 3 (refer to Appendix 1 and Soil Type Map)

At the higher elevations, in association with the terrace gravel deposits, lighter textured fine loamy soils predominate. They typically comprise very slightly stony sandy clay loams to depth (55/60cm^{+}) over gravelly material.

February 1991

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APPENDIX 1

DESCRIPTION OF SOIL PHYSICAL CHARACTERISTICS

SOIL TYPE 1

Topsoil	texture	:	heavy clay loam or clay
	$CaCO_3$	:	non
	depth	:	20/25cm
Upper Subsoil	texture	:	clay
	$CaCO_3$	:	non
	structure	:	moderately developed medium prisms or coarse subangular blocks
	consistence	:	friable/firm
	gleying	:	occasionally
	depth	:	55/60cm
Lower Subsoil	texture	:	clay
	$CaCO_3$	:	yes, where shell fragments are present
	structure	:	well developed coarse prisms
	consistence	:	firm
	gleying	:	yes
	depth	:	120cm

SOIL TYPE 2

Topsoil	texture	:	clay or heavy clay loam
	$CaCO_3$	:	yes, common shell fragments
	depth	:	20/25cm
Upper Subsoil	texture	:	clay
	$CaCO_3$	:	yes, many shell fragments
	structure	:	moderately developed coarse subangular blocks which overlie coarse prisms 35cm+
	consistence	:	firm
	gleying	:	yes
	depth	:	55/60cm
Lower Subsoil	texture	:	clay
	$CaCO_3$	:	yes, many shell fragments
	structure	:	weakly developed very coarse prisms tending towards structureless - massive
	consistence	:	firm
	gleying	:	yes
	depth	:	120cm

SOIL TYPE 3

Topsoil	texture	:	sandy clay loam
	stone	:	approx. 3-5% medium flints
	depth	:	30cm
Upper Subsoil	texture	:	sandy clay loam
	stone	:	approx. 5% small and very small flints
	structure	:	moderately developed coarse subangular blocky
	consistence	:	friable
	depth	:	55/60cm
Gravelly Material		:	48-50% very small and small flints in a medium sand and clay loam matrix

Additional Information

Calcium Carbonate	:	Where horizons are calcareous the calcium carbonate percentage ranges from 4 to 11%.
Drainage Status	:	Profiles of soil type 1 and 2 have a wetness class of II or III due to the presence of slowly permeable subsoil clay at varying depths. Soil Type 3 is freely draining (ie Wetness Class I).

References

GEOLOGICAL SURVEY OF ENGLAND AND WALES (1976).
Solid and drift edition geology map sheet 204 Scale 1:50,000.

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

METEOROLOGICAL OFFICE (1989). Climatic Data extracted from the published Agricultural Climatic Dataset.