39/91

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD

PHYSICAL CHARACTERISTICS REPORT INCORPORATING
AGRICULTURAL LAND CLASSIFICATION

MOOR WOOD, BRAUNCEWELL, LINCOLNSHIRE

1.0 INTRODUCTION

1.1 A survey was carried out over 29.3 ha of land at Moor Wood, Brauncewell, Lincolnshire in connection with a planning application by Butterley Aggregates Ltd to extract limestone.

1.2 The site lies approximately 2 km to the north of Cranwell close to an existing limestone quarry and approximately 0.5 km to the west of the A15 road to Lincoln. It is bounded on all sides by open agricultural land.

1.3 A total of 32 observations were made using a spade and dutch auger down to the underlying limestone. In addition a soil pit was dug to assess the subsoil conditions and rooting depth. Due to the stony nature of many of the soils the topsoil was riddled at a number of locations, using a 2 cm riddle, to determine the stone content of the topsoil.

1.4 The site comprises one field with a small area from an adjacent field in the north east corner for access. At the time of survey, the main field was under potatoes and the small area at the north east under lucerne.

2.0 SITE PHYSICAL CHARACTERISTICS

2.1 Climate

Area specific climate data has been obtained by interpolating information contained in the 5 km grid data set produced by the Meteorological Office (Met Office, 1989).

2.2 The average annual rainfall for the site is approximately 596 mm and the soils in this area are likely to be at field capacity for 121 days.

2.3 The accumulated temperature for the site is approximately 1387 degrees Celsius. This parameter indicates the cumulative build up of warmth available for crop growth, and in conjunction with rainfall has an influence on the development of soil moisture deficits and susceptibility to drought. The moisture deficits for wheat and potatoes on this site are 111 and 103 mm respectively.

2.4 There is no overall climatic limitation to the agricultural use of this land.

2.5 Relief

The altitude of the site ranges from a little over 45 m to just below 40 m with a general aspect to the south east. There is a shallow dry valley running north west to south east across the southern end of the site but slopes do not exceed 5°. Gradient and altitude therefore do not impose any limitation on the ALC grading.

3.0 AGRICULTURAL LAND CLASSIFICATION

3.1 The land has been classified in accordance with the guidelines of the Agricultural Land Classification of England and Wales (MAFF 1988). A breakdown of the individual grades and areas is given below:

ALC grade	Area (ha)	%
2	2.4	7.9
3a	24.7	81.5
3b	3.2	10.6
TOTAL	30.3	100

3.2 The majority of the site has been mapped as Grade 3a with the major limitation being droughtiness. All the soils over the site are broadly similar and due to the relatively shallow depth to the underlying limestone are considered to be moderately droughty, despite the crops being able to root into the underlying shattered limestone.

3.3 On the sides and bottom of the western end of the dry valley, some deeper colluvial soils have accumulated, having a greater depth to the underlying limestone, making them less susceptible to drought and have therefore been mapped as Grade 2.

3.4 In the middle of the site on the northern side of the dry valley is a small area of stonier soils. This area has topsoil stone contents ranging from 15 to 20% stones larger than 2 cm thereby limiting the land to Grade 3b.

3.5 The site is shown on the published ALC map (MAFF 1974) as mainly Grade 2 with a small area of Grade 3 at the south west corner.

4.0 SOIL PHYSICAL CHARACTERISTICS

4.1 Geology

The area has been mapped by the Geological Survey (1972) and is shown to be underlain by Undivided Lincolnshire Limestone of the Jurassic age.

4.2 Soils

The Soil Survey of England and Wales have mapped the area at a scale of 1:250,000 (Soil Survey 1983) and it is shown to comprise soils of the Marcham Association. This association is made up of shallow well drained calcareous coarse and fine loamy soils over limestone, with some deeper soils.

4.3 During the current survey one soil type (Mapping Unit 1) was mapped over the whole site with localised variations in depth and stoniness. The soil typically has a medium sandy loam topsoil over a yellowish red medium sandy loam subsoil over weathered limestone which in turn overlies hard shattered limestone. The depth to the underlying hard limestone ranged from 40 to 80 cm and topsoil stone contents ranged from 2 to 20%. The soils are all freely drained and strongly calcareous.

4.4 SOIL MAPPING UNIT 1 (29.3 Ha)

Topsoil	Texture	medium sandy loam
	$CaCO_3$	strongly calcareous
	Colour	dark brown (7.5YR4/4)
	Stone	in range 3-20%, typically 10-12% small and medium subangular limestones
	Depth	in range 27-35 cm, typically 30-33 cm.
	Structure	cultivated
	Roots	common fine and very fine
	Boundary	clear wavy
Subsoil*	Texture	medium sandy loam occasionally sandy clay loam
	$CaCO_3$	strongly calcareous
	Colour	yellowish red (5YR5/6 and 5/7)
	Stone	in range 5-25%, typically 10-15%
	Depth	40-75 cm, typically 50-55 cm
	Structure	weak medium subangular blocky
	Consistence	friable
	Porosity	moderate
	Roots	few fine and very fine
	Boundary	sharp irregular

Weathered limestone*	Texture	medium sandy loam
	$CaCO_3$	extremely calcareous
	Colour	very pale brown (10YR7/4)
	Stone	some hard limestone fragments in a matrix of soft weathered limestone
	Depth	40-75 cm, typically 50-55 cm
	Structure	massive
	Consistence	friable
	Porosity	moderate
	Roots	few fine and very fine

* The yellowish red subsoil and very pale brown weathered limestone are not always both present. In some profiles the weathered limestone occurs directly below the topsoil and in others the yellowish red subsoil lies directly over the hard shattered limestone.

Parent material	Hard tabular fissured limestone with some soil material in cracks. Roots passing down cracks.

July 1991 N A DUNCAN

References

Geological Survey of Great Britain, 1972. Sheet 127, Grantham. Solid and Drift Geology, 1:50,000 scale.

MAFF, 1974. Sheet 113, Lincoln and Grantham. 1:63,360 scale provisional ALC map.

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

Meteorological Office, 1989. Climatic Data for Agricultural Land Classification.

Soil Survey of England and Wales, 1983. Soils and their Use in Eastern England.