

AGRICULTURAL LAND CLASSIFICATION AND SOIL PHYSICAL CHARACTERISTICS
RINGSTEAD GRANGE FARM, RINGSTEAD, NORTHAMPTONSHIRE

1. BACKGROUND

- 1.1 The site, an area of 63.1 hectares, is the subject of an application, by Steetly Quarries Ltd, for the extraction of Limestone at Ringstead Grange Farm, Northamptonshire. The Soil Survey surveyed the site, in detail, in February 1990 to assess the agricultural land quality and the soil resources. In October 1990 MAFF carried out a survey to verify their findings. MAFF's results are shown on the attached Agricultural Land Classification and Soil Types maps; these maps broadly confirm the findings of the Soil Survey.

2. SITE PHYSICAL CHARACTERISTICS

2.1 Climate

Climate data for the site was obtained from the published agricultural climatic dataset (Met Office, 1989). This indicates that for the site's mid range altitude the annual average rainfall is 594 mm (23.4"). This data also indicates that the field capacity days are 119 and moisture deficits are 115 mm for wheat and 108 mm for potatoes. The climatic characteristics do not impose any climatic limitation on the ALC grading of the survey site.

2.2 Altitude and Relief

The survey area comprises a gently sloping land form which rises from 55m in the south/west to 65m AOD towards the northern corner of the site. East of this 65m trig point land levels to form a plateau which extends to the old A605 road. 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	%
2	5.1	8.1
3a	20.8	33
3b	37.1	58.8
Agricultural Buildings	<u>0.1</u>	<u>0.1</u>
TOTAL	<u>63.1</u>	<u>100</u>

3.3 Grade 2

A small area of grade 2 land occurs where deep fine loamy soils outcrop in the northern and southeastern corners of the site. At the northern end of the site these soils often overlie Limestone rubble at depth. Profiles have a wetness class of I or II depending on the presence of a slowly permeable clayey horizon at depth. The fine textures and the presence of stony horizons, when they occur, impose a slight limitation on the potential for these soils to retain water in this low rainfall area. As a result profiles are slightly droughty and restricted to grade 2. Where soils have a wetness class of II minor wetness and workability imperfections combine with droughtiness to exclude this land from a higher grade.

3.4 Subgrade 3a

Two main situations occur.

3.4.1 A narrow tract of grade 3a land runs north/south through the centre of the site. This land is associated with the better drained variant of soil type 1 (described in paragraph 4.2.1). These soils are well bodied and profile pit observations indicate that lower subsoils are slowly permeable from 45/60 cms depth (ie. wetness class II). Relatively heavy topsoils textures and a wetness class of II 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).

3.4.2 Adjacent to the northwestern edge of the site the less stony variant of the Limestone derived soil type 2 has been mapped as 3a. The combination of fine textures and very stony subsoils has a moderate limiting effect on the water holding capacity of this soil. As a result moderate droughtiness is the major limitation to the ALC grade.

3.5 Subgrade 3b

The majority of the survey area has been mapped as 3b; two main situations occur.

3.5.1 The eastern area of 3b land comprises a poorly drained variant of soil type 1. The subsoils are slowly permeable directly below the topsoil (ie. wetness class III) and the topsoil textures are heavy (eg. clays); these factors combine to impose a significant limitation on the agricultural potential of this land. Thus the land is excluded from subgrade 3a.

3.5.2 The remaining area of 3b land outcrops to the west, in association with the stonier Limestone derived soils. Topsoils have a Limestone content range of 17-30% whilst subsoils have a range of 45-90%. These stony topsoils have the potential to do considerable damage to the cultivation and harvesting machinery. Consequently the costs of production are likely to be increased and the flexibility in the use of the land reduced. Furthermore the presence of many stones throughout the subsoils imposes a significant limitation on the water holding capacity of this land. Thus topsoil stone content and significant droughtiness combine to restrict this land to subgrade 3b.

4. SOIL PHYSICAL CHARACTERISTICS

4.1 Geology

The published 1:50,000 geology sheet 186 shows the survey area to comprise boulder clay on the eastern plateau and upper slopes, with thinner bands of Great Oolite Clay, Cornbrash and Great Oolite Limestone deposits outcropping with fall in slope to the west.

4.2 Soils

During this survey two main soil types were identified.

4.2.1 Soil Type 1 (refer to Appendix 1 and the Soil Map).

The eastern half of the site comprises well bodied decalcified soils derived from the boulder clay deposits. These soils typically comprise heavy clay loam or clay* topsoils over clay or occasionally heavy clay loam subsoils which overlies clays below 45/60 cms. Profile wetness class ranges from II to III depending on the depth at which the slowly permeable clay horizon is encountered.

4.2.2 Soil Type 2 (refer to Appendix 1 and the Soil Map).

The western half of the site comprises brashy soils derived from the Limestone geological deposits. Topsoils typically consist of heavy clay loams or occasionally clays which contain Limestone contents in the range of 4-30%**. Subsoils comprise rubble Limestone in a clay loam matrix; quantities of Limestone fragments range from 45-90%. Topsoils and subsoils are less brashy towards the north western edge of the site; as a result this land is more flexible agriculturally.

October 1990

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* In the southeast corner of the site soils comprise deep fine loams.

** In the northern corner of the site a small area of deeper, less stony Limestone derived soils outcrop.

Appendix 1

DESCRIPTION OF SOIL PHYSICAL CHARACTERISTICS

SOIL TYPE 1

Topsoil	texture	:	heavy clay loam or clay
	depth	:	30 cm
Upper subsoil	texture	:	clay or occasionally heavy clay loam
	structure	:	moderately developed coarse subangular blocky or coarse prisms
	consistence	:	firm
	depth	:	45/60 cm
Lower subsoil	texture	:	clay
	structure	:	moderately developed coarse prisms
	consistence	:	very firm
	gleying	:	Yes
	depth	:	120 cm

SOIL TYPE 2

Topsoil	texture	:	heavy clay loam or occasionally clay
	stone	:	4-30% Limestone fragments
	depth	:	30/35 cm
Subsoil:	Rubble Limestone which comprises 45-90% Limestone fragments in a clay loam matrix. These fragments are mainly medium and large in size.		

Additional information

Calcium Carbonate: Soil Type 2 is calcareous throughout whilst Soil Type 1 is only occasionally calcareous in the lower subsoil.

Rooting: Rooting is evident throughout the profiles of both soil types.

Drainage Status:

Profiles of soil type 1 have a wetness class of II or III due to the presence of slowly permeable subsoil clay at varying depths. Soil type 2 is freely draining (ie. wetness class I).

Appendix 2

Grade 1 - excellent quality agricultural land

Land with no or very minor limitations to agricultural use. A very wide range of agricultural and horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

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 more more variable than Grade 1.

Grade 3 - good to moderate quality agricultural land

Land with moderate limitations will affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. When more demanding crops and grown yields are generally lower or more variable than on land in Grades 1 and 2.

Subgrade 3a - good quality agricultural land

Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

Subgrade 3b - moderate quality agricultural land

Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

Grade 4 - poor quality agricultural land

Land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (eg cereals and forage crops) the yield of which are variable. In most climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.

Grade 5 - very poor quality agricultural land

Land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

References

GEOLOGICAL SURVEY OF ENGLAND AND WALES 1974. Solid and Drift edition geology map sheet 186. Scale 1:50,000.

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

METEOROLOGICAL OFFICE 1989. Climate data extracted from the published Agricultural Climatic Dataset.