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MAFF Ministry of Agriculture Fisheries and Food

BASTON FEN

LINCOLNSHIRE

AGRICULTURAL LAND CLASSIFICATION AND SOIL PHYSICAL CHARACTERISTICS

BASTON FEN, LINCOLNSHIRE

1. INTRODUCTION

1.1 The site, an area of 17.7 hectares, is the subject of a proposal by ARC Central, to extract sand and gravel on Baston Fen, Lincs. MAFF carried out a detailed survey of the site in February 1992. Twenty soil inspections, using a hand held Dutch soil auger, were made on a 100 metre grid basis. A soil inspection pit was dug to assess subsoil conditions and to supplement soil auger boring information.

1.2 On the published Agricultural Land Classification (ALC) Map, Sheet 123 the site is shown as grade 2. Since this map is of a reconnaissance nature the current survey was undertaken to provide more detailed information on land quality for the site.

2. SITE PHYSICAL CHARACTERISTICS

Altitude and Relief

2.1 The site forms a level plateau at an altitude of 3m AOD. Neither altitude nor relief constitute limitations to the ALC grade.

Climate

2.2 Climate data for the site were obtained from the published agricultural climatic dataset produced by the Meteorological Office (Met Office, 1989). This indicates that the site has an average annual rainfall of 571 mm (22.5") and that soils are at field capacity for approx. 104 days. This also indicates that the accumulated temperature above 0°C January to June is approximately 1448 day °Celsius and soil moisture deficits for wheat and potatoes are 121 mm and 116 mm respectively. These climatic characteristics do not impose any climatic limitation on the ALC grade.

3. AGRICULTURAL LAND CLASSIFICATION

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

3.2 The majority of the site is mapped as grade 3a with a smaller area, to the centre, of subgrade 3b. The table below shows the breakdown of grades in hectares and % terms for the survey area.

Agricultural Land Classification

Grade	ha	%
3a	12.1	68
3b	5.6	32
TOTAL	17.7	100

Subgrade 3a

3.3 The majority of the site has been graded 3a and is associated with soil type 1 which is described in detail in para 4.3. These fine loamy soils overlie calcareous gravel deposits at moderate depths (typically 55/65 cms). The presence of profile flints and gravel horizons reduces the water holding capacity of these soils. Consequently moderate droughtiness imperfections exclude the land from a higher grade.

Subgrade 3b

3.4 The centre of the site has been graded 3b where profiles are shallower over the gravel deposits (described in para 4.4). Stoniness significantly restricts the profile available water for crop growth. As a result droughtiness limits the land to subgrade 3b.

4. SOIL PHYSICAL CHARACTERISTICS

Geology and Soils

4.1 The published 1:50,000 scale geology map 158 (Peterborough) shows the site to comprise first terrace river gravel deposits.

4.2 The published 1:250,000 reconnaissance scale soil map "Soils of Eastern England" (Soil Survey, 1983) shows the occurrence of the Badsey 2 Association*. The current detailed inspection of the soils confirms the presence of profiles derived from the terrace gravel deposits. Two soil types have been identified.

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

4.3 These soils cover the majority of the site (12.1 ha, 68%) and typically comprise clay loam topsoils over heavy clay loam or sandy clay loam (or occasionally medium sandy loam) upper subsoils which overlie gravel from 55/65 cms depth. The gravel horizons consist of 35-40% flints in a matrix of loamy medium sand or medium sand. Many of the flints are coated with calcium carbonate deposits, consequently the gravel is calcareous.

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

4.4 The central area (5.6 ha, 32%) has been delineated separately because profiles are shallower over the gravel deposits. Topsoils and upper subsoils, where they exist, are similar in texture to Soil Type 1. Gravel deposits are encountered below 40/45 cms and comprise 35 to 40% flints in a loamy medium sand matrix.

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S ESCOTT
Resource Planning Group
Cambridge Regional Office

* Badsey 2 Association: Well drained calcareous fine loamy soils over Limestone gravel. Similar soils affected by ground water.

REFERENCES

GEOLOGICAL SURVEY OF ENGLAND & WALES, 1984. Solid and Drift edition Geology Map 158 (Peterborough) Scale 1:50,000.

MAFF, 1974. Agricultural Land Classification Map No 123, 1:63360 scale.

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.

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

Appendix 1

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 or 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 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.

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.

Appendix 2

SOIL PHYSICAL CHARACTERISTICS

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SOIL TYPE 1 (12.1 hectares, 68%)

Topsoil	Texture	:	clay loam
	$CaCO_3$	:	non
	Stone	:	1-7%, typically 3% small flints
	Depth	:	35/40 cm
Upper Subsoil	Texture	:	sandy clay loam, heavy clay loam (or occasionally medium sandy loam).
	$CaCO_3$	:	yes
	Stone	:	very slightly stony, <5% typically becoming moderately stony 50 cm+ (approx 20% flints)
	Structure	:	weakly developed coarse subangular blocky
	Depth	:	55/65 cm

Mineral Deposit : 35 to 40% flints, often coated in $CaCO_3$, in a matrix of loamy medium sand or medium sand.

SOIL TYPE 2 (5.6 hectares, 32%)

Topsoil	Texture	:	clay loam
	$CaCo_3$	:	non
	Stone	:	3 to 10%, mainly small flints; occasionally 15%.
	Depth	:	35/40 cm
Upper Subsoil* (where it exists)	Texture	:	sandy clay loam
	Structure	:	weakly developed coarse subangular blocky
	Stone	:	slightly stony, typically 10% flints
	$CaCO_3$	:	yes
	Depth	:	40/45 cm

Mineral Deposit : 35 to 40% flints, often coated in $CaCO_3$, in a matrix of loamy medium sand or medium sand.

* Where an upper subsoil exists it forms a narrow layer which cannot practically be split from the topsoil. Consequently the top layer of soil type 2 should be stripped to 40/45 cms, thus mixing the topsoil with the narrow upper subsoil deposit.

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Map 1 : Agricultural Land Classification

Map 2 : Soil Types