

Combs 97/93

AGRICULTURAL LAND CLASSIFICATION

AND

STATEMENT OF SOIL PHYSICAL
CHARACTERISTICS
KETTLEBY THORPE FARM,
KETTLEBY, LINCOLNSHIRE

**AGRICULTURAL LAND CLASSIFICATION AND
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1.0 INTRODUCTION

- 1.1 The site, an area of 23.5 hectares is the subject of an application for sand and gravel extraction. ADAS surveyed the site in September 1993 at an augur boring density of approximately 1 boring per hectare. These borings were supplemented by four soil inspection pits in order to assess subsoil conditions.
- 1.2 On the published provisional 1:63,360 scale Agricultural Land Classification Map Sheet No. 104 (MAFF, 1974) the entire site is shown as grade 3. The current survey was undertaken in order to provide a more detailed representation of the agricultural land quality and to provide a physical characteristic report of the soil resources.

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 for the sites modal altitude of 12m AOD, the annual average rainfall is 635mm. This data also indicates that the field capacity days are 138 and moisture deficits are 109mm for wheat and 101mm for potatoes. These characteristics do not impose any climatic limitation on agricultural land quality of the survey site.

Relief

- 2.2 The whole site is relatively flat. Gradient, altitude and relief do not constitute any limitation to the ALC grading of the survey site.

Geology and Soils

- 2.3 On the published 1:50,000 scale Drift edition geology map sheet 89, BRIGG, (Geological Survey of Great Britain, 1982) the underlying geology is predominantly Quaternary sand and gravel, with a smaller band of Quaternary blown sand in the northern part of the site.
- 2.4 The generalised 1:250,000 scale soil map "Soils in Eastern England" (SSEW, 1983) identifies soils of the Landbeach Association* covering the whole site. The soils observed during the ADAS survey are generally lighter in texture than those shown on the published soil map.
- 2.5 The majority of the site is associated with well drained sandy soils overlying gravel at variable depth. In general topsoils comprise fine sandy loam, loamy fine sand or occasionally fine sand textures which overlie upper subsoils of fine sandy loam, fine sand, or occasionally sandy clay loam, which in turn overlie either lighter textured fine sand and/or gravel and sand at varying depths. Two main soil types were identified. They are more fully described in Appendix II.

Wind Erosion

- 2.6 In a small area in the vicinity of auger borings 7 and 9 a small amount of wind erosion was seen to be occurring in an area of particularly light textured topsoils. This correlates with mapped deposits of blown sand on the 1:50,000 geology map, sheet 89 (Geological Survey of Great Britain, 1982). This localised imperfection would result in land in the area being graded no higher than subgrade 3a.

* Landbeach Association. Permeable calcareous coarse loamy soils affected by groundwater over chalky gravel. Some deep, in part non-calcareous, fine and coarse loamy soils affected by groundwater.

3.0 AGRICULTURAL LAND CLASSIFICATION

- 3.1 The definitions of the Agricultural Land Classification grades are included in Appendix I.
- 3.2 The table below shows the breakdown of the ALC grades in hectares and in % terms for the survey area.

AGRICULTURAL LAND CLASSIFICATION

Grade	ha	%
Subgrade 3a	2.2	9.4
Subgrade 3b	<u>21.3</u>	<u>90.6</u>
TOTAL	<u>23.5</u>	<u>100.0</u>

Subgrade 3a

The subgrade 3a land is associated with the very slightly stony fine sandy loam soils overlying gravel and sand at depths of 65cm to 120cm, as described in Soil Type 1, Appendix II. These soils are well drained (wetness class I) and can be readily worked over long periods. However, the presence of light textured upper horizons and gravel at depth means that the water holding capacity of the soils is reduced and the land is limited to 3a by droughtiness imperfections.

Subgrade 3b

The majority of the site has been graded 3b and is associated with a shallower and slightly stonier variant of the sandy soils described above. Profiles are more fully described in Soil Type 2, Appendix II. Soil drainage is good and profiles are assessed as wetness class I. However, the occurrence of either lighter textured fine or medium sand, or sand and gravel at slightly shallower depths imposes a more severe droughtiness limitation which restricts the land to subgrade 3b. In a small area in the vicinity of auger borings 8 and 11 there is an additional restriction to subgrade 3b on the basis of fine sand topsoil textures.

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REFERENCES

- GEOLOGICAL SURVEY OF GREAT BRITAIN, Sheet 89, 1:50,000 scale. Drift edition.
- MAFF (1974). Agricultural Land Classification Map Sheet 104 Provision 1:63,360 scale.
- MAFF (1988). Agricultural Land Classification of England and Wales (Revised Guidelines and Criteria for grading the quality of land). Alnwick.
- METEOROLOGICAL OFFICE (1989). Published climatic data extracted from the agroclimatic dataset, compiled by the Meteorological Office.
- SOIL SURVEY OF ENGLAND AND WALES (1983). Sheet 4, Soils of Eastern England, 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 include 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 crops. The level of yields 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 which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are 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 winter 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 levels 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.

Appendix II

SOIL PHYSICAL CHARACTERISTICS, KETTLEBY THORPE FARM, KETTLEBY, BIGBY, LINCOLNSHIRE

Soil Type I : 2.2 hectares

Topsoil	Texture	: fine sandy loam
	CaCO ₃	: non-calcareous
	Colour	: 10YR 4/3
	Stone	: in the range 1-10% small, subangular flint
	Structure	: cultivation zone - not applicable
	Boundary	: clear, sharp
	Roots	: common fine and very fine
	Depth	: 30/35 cm
	Upper Subsoil	Texture
CaCO ₃		: non-calcareous
Colour		: 7.5YR 4/3, 7.5YR 4/4, 10YR 4/3
Mottles		: none
Stone		: in the range 10-20% small subangular flint
Structure		: moderately developed, coarse subangular blocky (fine sandy loam)
Consistence		: very friable
Biopores		: >0.5%
Roots		: few fine and very fine
Depth		: 30/35 - 40/45 cm
Lower Subsoil		Texture
	CaCO ₃	: non-calcareous
	Colour	: various: 7.5YR 4/6, 7.5YR 4/3, 10YR 4/3
	Mottles	: common grey patches 7.5YR 5/1 within the sandy clay loam from 50cm
	Stone	: in the range 5-15% small, angular flint
	Structure	: moderately developed, coarse subangular blocky (fine sandy loam).
	Consistence	: very friable
	Biopores	: >0.5%
	Roots	: few fine and very fine
	Depth	: in the range (65cm to 100 cm+)

Underlain by gravel stones approximately 2cm wide, with a small amount (<5% of total volume) medium sand. Wetness class is assessed as I.

Soil Type II : 21.3 hectares

Topsoil	Texture	: fine sandy loam, loamy fine sand and medium clay loam (rarely).	
	CaCO ₃	: calcareous in places	
	Colour	: 10YR 5/3; 10YR 4/3; 10YR 5/2; 10YR 5/4; 10YR 3/2; 10YR 4/4; 10YR 4/2	
	Stone	: in the range (2-18%) typically (8-11%), small subangular flint	
	Structure	: cultivation zone - not applicable	
	Boundary	: smooth; clear	
	Roots	: common or many, fine and very fine	
	Depth	: in the range (20-35cm), typically 30cm	
	Subsoil	Texture	: <i>fine sandy loam, loamy fine sand, sandy clay loam or fine sand</i>
		CaCO ₃	: calcareous in place
Mottles		: no mottles seen	
Stone		: in the range (15-20%) flint, small, subangular with occasional additional (5-10%) chalk stones. Occasional auger borings in the fine sand contain no stone	
Structure		: high stone content makes this impossible to assess	
Consistence		: firm or friable in fine sandy loam, loose in fine sand	
Biopores		: >0.5% in fine sandy loam	
Roots		: common fine and very fine	
Depth		: typically 40/60cm	

Soils are underlain by either fine/medium sand or gravel and sand (sometimes chalky) at depths ranging from 20cm to 95cm, with 40-60cm being the more typical range. Wetness class is assessed as I.