Cambs 36/90

AGRICULTURAL LAND CLASSIFICATION & SOIL PHYSICAL CHARACTERISTICS
OLD ABBEY FARM, KIRKSTEAD, LINCS

1. BACKGROUND

1.1 The site, an area of 59.8 hectares, is the subject of an application, by Bain Aggregates Ltd, for the extraction of sand and gravel at Old Abbey Farm, Kirkstead. MAFF surveyed the site in September 1990 to assess the agricultural land quality and the soil physical characteristics.

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 of 6m AOD the annual average rainfall is 590 mm (23.2"). This data also indicates that the field capacity days are 115 and moisture deficits are 117 mm for wheat and 111 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 land comprises a fairly level plateau ranging in altitude from 5m, adjacent to the River Witham to 7m AOD, adjacent to the B1192 road. Gradient and altitude do not constitute limitations to the ALC grade.

3. AGRICULTURAL LAND CLASSIFICATION (refer to ALC map)

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

3.2 The table overleaf shows the ALC grades for the survey area.

	AGRICULTURAL LAND CLASSIFICATION	
Grades	ha	%
3a	8	13
3b	43.5	73
4	6.6	11
Non Agricultural	0.6	1
Agricultural Buildings	1.1	2
TOTAL	59.8	100

Irrigation

The farmer receives a small amount of water, for irrigation, from the south west drain. This supply is not considered to be adequate so irrigation has not been taken into account when grading this land.

3.3 Subgrade 3a

Two small areas of land, in the vicinity of Old Abbey Farm, have been graded 3a. The land is generally associated with the better bodied soils* described in paragraph 4.2.2. The combination of coarse loamy textures and subsoil stone have a moderate limiting effect on the waterholding capacity of this soil. As a result moderate droughtiness is the major limitation to the ALC grade.

3.4 Subgrade 3b

The majority of the site has been graded 3b; this land lies in association with the coarse textured soils described in paragraphs 4.2.1 and 4.2.3. The coarse textures and the occurrence of flints, in varying densities, throughout the soil profile imposes a significant limitation on the potential for water retention in this soil. As a result droughtiness restricts this land to subgrade 3b (moderate quality agricultural land).

* Small areas of a less stony variant of the soils described in paragraph 4.2.1 have been included in the area of grade 3a land.

3.5 Grade 4

Towards the south-west corner of the site the presence of a thick acidic iron pan in the upper subsoils precludes this land from sub grade 3b. The panning prevents rooting below a depth of 45/60 cm; this rooting depth limitation combines with the coarse textures and profile stone to severely reduce the water-holding capacity of these soils. Thus droughtiness restricts the land to grade 4.

4. SOIL PHYSICAL CHARACTERISTICS

4.1 Geology

The geology of the area has been mapped on two occasions; firstly, in 1953 at a scale of ¼" to 1 mile and secondly, in 1982 at a scale of 1:25,000. These maps show the site to comprise gravel deposits over a bedrock of Jurassic Clay.

4.2 Soils

During this survey a detailed inspection of the soils identified three main soil types.

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

These soils cover the majority of the site. They typically comprise loamy sand or occasionally sandy loam topsoils over loamy sand subsoils which may overlie medium sand at depth 60 cm+. Profile stone content varies with depth ranging from very slightly to slightly stony in the topsoil to slightly to moderately stony in the upper subsoil. Typically in the lower subsoils profiles become less stony before merging into the gravel deposit at depths 120/130 cm+.

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

In the vicinity of Old Abbey Farm a better bodied soil variant predominates. These soils typically comprise very slightly to slightly stony sandy loams which overlie loamy sands, sand and clay loam pockets or sandy loams at depth (50 cm+). These lower horizons only contain a few flints.

4.2.3 Soil Type C (refer to Appendix 1 and the Soil Map)

Towards the north-eastern end of the site a small area of coarser and stonier soils predominate. These soils generally comprise very slightly stony loamy sands which become moderately to very stony in the upper subsoil. In the lower subsoil (50/70 cm+) textures typically comprise sand with a stone content of 10-15%.

SEPTEMBER 1990

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APPENDIX 1

DESCRIPTION OF SOIL PHYSICAL CHARACTERISTICS

SOIL TYPE A

Topsoil	texture	:	loamy medium sand or occasionally medium sandy loam
	stone	:	ranges from 5-10% soil volume, small and medium flints
	depth	:	30 cm
Upper Subsoil	texture	:	loamy medium sand or occasionally medium sand
	stone	:	15-30% flints, small and medium in size
	structure	:	structureless (single grain) or too stony to assess
	consistence	:	loose
	depth	:	approx 60 cm
Lower subsoil	texture	:	loamy medium sand or sand
	stone	:	ranges from 0-10% of soil volume, mainly flints
	structure	:	structureless (single grain)
	consistence	:	loose
	depth	:	120/130 cm+

SOIL TYPE B

Topsoil	texture	:	medium sandy loam
	stone	:	6-10% soil volume, mainly small and medium flints
	depth	:	30 cm
Upper subsoil	texture	:	medium sandy loam
	stone	:	10-15%, mainly flints, occasional sandstone
	structure	:	weakly developed medium and coarse sub-angular blocky
	consistence	:	friable
	depth	:	approx 50 cm

Lower subsoil	texture	:	lenses of sand, clay loams and loams results in a range of textures (sand, sandy clay loam, sandy loams or loamy sands)
	stones	:	Negligible
	structure	:	Weakly developed coarse and medium sub-angular blocky where soils are loamy. In the sandy pockets the soils are structureless.
	depth	:	120/130 cm+

SOIL TYPE C

Topsoil	texture	:	loamy medium sand
	stone	:	5-10% of soil volume namely small and medium flints
	depth	:	30 cm
Upper subsoil	texture	:	loamy medium sand or occasionally medium sand
	stone	:	30-40% mainly less than 2 cm in size
	structure	:	Too stony to assess
	depth	:	50/70 cm
Lower subsoil	texture	:	medium sand
	stone	:	10-15% flints
	structure	:	structureless (single grain)
	consistence	:	loose
	depth	:	120 cm+

Additional information

Drainage : mainly wetness class I, with a small area of Wetness class III outcropping east of Old Abbey Farm.

Field pH : 6-7 in most profiles; however to the southwest pH's of 4.5 are common below 45/60 cm depth, this stops rooting in these profiles.

Gravelly Material : This was encountered at depths of 120/130 cms+.

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 yields 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

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