

AGRICULTURAL LAND CLASSIFICATION AND SOIL PHYSICAL CHARACTERISTICS

LAND AT GRANGE FARM, SPIXWORTH, NORFOLK

1.0 BACKGROUND

- 1.1 The site, an area of 48.1 hectares, is the subject of an application by Redland Aggregates Limited to extract sand and gravel. ADAS Resource Planning Team undertook a detailed Agricultural Land Classification (ALC) and soil physical characteristics survey during October 1992. Soil inspections using a Dutch soil auger were made on a 100 m grid basis and four soil inspection pits were dug to assess subsoil conditions. Riddling was also undertaken to assess the stone content chiefly of the topsoils.
- 1.2 On the published ALC map sheet 126 (Provisional 1:63,360 MAFF 1972) the whole site is mapped as Grade 3. A reconnaissance survey was undertaken by MAFF in 1983 on the area immediately to the south of the site and grades 2 and 3a were mapped.

2.0 SITE PHYSICAL FACTORS

Climate

- 2.1 Climate data for the site was interpolated from data contained in the published agricultural climatic dataset (Met Office 1989). This indicates that for the survey area's average altitude of 20 m AOD, the annual average rainfall is 641 mm (25.2"). The field capacity days are 124 and the moisture deficits for wheat and potatoes are 117 mm and 112 mm respectively. These climatic characteristics do not impose any climatic limitation on the ALC grade of the site.

Altitude and Relief

- 2.2 The site is gently undulating with a small hill (Bunker's Hill) approximately in the centre of the site. Shallow valleys to the north and south of the hill run in a north easterly direction. On the western boundary there is a broad shallow

valley running in a northerly direction. The land lies between 17 and 27 m AOD. Neither gradient nor altitude constitute limitations to the ALC grade.

3.0 AGRICULTURAL LAND CLASSIFICATION

- 3.1 The definitions of the ALC grades are included in Appendix 1.
- 3.2 The site has been mapped mainly as grade 2, on the northern and western parts of the site, with smaller areas of grade 3a land to the east of Bunker's Hill and grade 1 land around the southern flanks of Bunker's Hill and along the south eastern boundary of the site. The table below shows the breakdown of the grades in hectares and % terms for the survey area.

AGRICULTURAL LAND CLASSIFICATION		
Grade	ha	%
1	8.0	16.5
2	28.6	59.5
3a	11.0	23.0
Non Agricultural	<u>0.5</u>	<u>1.0</u>
TOTAL	<u>48.1</u>	<u>100</u>

Irrigation

- 3.3 The entire site is irrigated. The irrigation facility enhances the potential of the agricultural land for crop production and consequently the ALC grades mapped take into account the reduction in drought risk afforded by the irrigation.

Grade 1

- 3.4 Land graded 1 comprises the soil type IV (see paragraph 4.5) and also the very slightly stony variant of soil type II (see paragraph 4.3).
- 3.4.1 The very slightly stony variant of soil type II exhibits no sign of drainage impedence and has been assigned wetness class I. The soils hold moderately good reserves of available water for crop growth, which is enhanced by the availability of irrigation. Consequently the land has no or very minor limitations to agricultural use and has been graded 1.

- 3.4.2 Soil type IV exhibits a slight drainage impedance in the profile at a depth of 60/65 cm (ie wetness class II). The availability of irrigation enhances the water available for crop growth in these coarse loamy soils and as a result profiles are very slightly droughty. Consequently the land has been graded 1 (excellent quality agricultural land).

Grade 2

- 3.5 The grade 2 land occurs in association with two soil types (I and II).
- 3.5.1 Firstly in association with soil type I (see paragraph 4.2). The availability of irrigation water enhances the water available for crop growth in these lighter textured soils and as a result profiles are slightly droughty, thus limiting the land the grade 2 (very good quality agricultural land).
- 3.5.2 In association with the stonier variant of soil type II (see paragraph 4.3) towards the east and west, topsoil stone content averaging 7% greater than 2 cm imposes a slight limitation on the ALC grade. As a result the land is excluded from a higher grade.

Subgrade 3a

- 3.6 The grade 3a area lies in association with soil type III (see paragraph 4.4) east of Bunker's Hill. These are the lightest soils found on the site and this, combined with the relatively dry climate results in a droughtiness imperfection. Since regular irrigation enhances the water holding capacity of these soils the area has been graded 3a (good quality agricultural land).

Non Agricultural

- 3.7 A small copse and a shallow pit have been mapped as non agricultural land.

4.0 SOIL PHYSICAL CHARACTERISTICS

- 4.1 The published 1:233,440 scale drift edition geology sheet 12 (Geological Survey of Great Britain (England and Wales 1971)) shows the site to comprise Pleistocene Pebbly Series deposits. The current detailed inspection of the site

identifies the presence of four soil types which are derived from the above deposits.

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

- 4.2 Light textured soils cover the north west quarter of the site and total 11.9 hectares. Topsoils typically consist of very slightly stony medium sandy loams over upper subsoils of the same texture to a depth of 45/70 cms. Lower subsoils typically comprise loamy medium sands which are very slightly or slightly stony. The soils are freely draining and non calcareous.

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

- 4.3 A stonier soil covering 40% of the site (19.2 hectares) occurs in a tract lying south of soil type I and the south west part of the site. Soils typically comprise very slightly or slightly stony medium sandy loam topsoils over slightly stony medium sandy loam upper subsoils to a depth of 50/55 cms. Lower subsoils consist of moderately stony medium sandy loams. The soil profile is free draining and non calcareous.

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

- 4.4 These sandy soils occur to the east of Bunker's Hill, with a tongue running west, to the south of Bunker's Hill (11.0 ha's, 23%). These soils typically comprise loamy medium sand or occasionally medium sandy loam topsoils over subsoils of loamy medium sand, occasionally medium sand occurs below 70 cm. These soils are freely draining.

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

- 4.5 Towards the south eastern edge of the site, (totalling 6.0 hectares, 12.5%) better bodied soils to depth outcrop. They consist of medium sandy loam topsoils and upper subsoils to a depth 60/65 cm. Stone content is negligible.

The lower subsoils typically consist of heavier textures namely sandy clay loams or occasionally sandy clays. Invariably the lower subsoils are slowly permeable, and have been assessed as wetness class II. The soils are non calcareous throughout.

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APPENDIX 2

SOIL PHYSICAL CHARACTERISTICS

LAND AT GRANGE FARM, SPIXWORTH, NORFOLK

SOIL TYPE I (11.9 hectares)

Topsoil	Texture	: medium sandy loam
	Depth	: 35 cm
Upper Subsoil	Texture	: medium sandy loam
	Stone	: generally 5% flints
	Structure	: moderately developed coarse and very coarse subangular/angular blocky.
	Consistence	: friable
	Depth	: range of 45/70 cm
Lower Subsoil	Texture	: loamy medium sand
	Stone	: typically 5-10% flints occasionally negligible.
	Structure	: too dry to assess
	Consistence	: friable
	Depth	: 120 cm

SOIL TYPE II (19.2 hectares)

Topsoil	Texture	: medium sandy loam
	Stone	: 2-12% flints
	Depth	: 30/35 cms
Upper subsoil	Texture	: medium sandy loam
	Stone	: 7-12% flint, occasionally 1-2%
	Structure	: moderately developed coarse and very coarse subangular blocky.
	Consistence	: friable
	Depth	: 50/65 cm
Lower subsoil	Texture	: medium sandy loam
	Stone	: typically 20% flint, occasionally 5-10%
	Structure	: moderately developed coarse and very coarse subangular blocky.
	Consistence	: friable
	Depth	: 120 cm

SOIL TYPE III (11.0 hectares)

Topsoil	Texture	: loamy medium sand
	Stone	: 1% small flints
	Depth	: 35 cm
Upper subsoil	Texture	: loamy medium sand
	Stone	: negligible
	Structure	: moderately developed coarse angular blocky (below 45 cm becomes weakly developed medium subangular blocky).
	Consistence	: friable becoming very friable 45 cm+
	Depth	: 70/75 cm
Lower Subsoil	Texture	: loamy medium sand or medium sand
	Stone	: negligible
	Structure	: structureless, single grain
	Consistence	: loose
	Depth	: 120 cm

SOIL TYPE IV (6.0 hectares)

Topsoil	Texture	: medium sandy loam
	Stone	: 1-2% flint
	Depth	: 35 cm
Upper subsoil	Texture	: medium sandy loam
	Stone	: negligible
	Structure	: moderately developed coarse and very coarse subangular blocky.
	Consistence	: firm
	Depth	: 60/65 cm
Lower Subsoil	Texture	: sandy clay loam, occasionally sandy clay
	Stone	: negligible
	Structure	: moderately developed, coarse subangular blocky.
	Consistence	: firm; typically gleyed
	Depth	: 120 cm

Additional Information

Profiles are generally non calcareous, occasionally calcareous lenses in subsoils.

Rooting common in upper horizons, few in lower subsoils.

Soil types I, II and III are freely draining, wetness class I.

Soil type IV has a wetness class of II.

REFERENCES

- GEOLOGICAL SURVEY OF GREAT BRITAIN (ENGLAND & WALES) 1971.
Drift edition sheet 12 1:233,440.
- MAFF 1972. Agricultural Land Classification Map Sheet 126 Provisional 1:63,360
- 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.