AGRICULTURAL QUALITY OF LAND AT GLEBE FARM ROPSLEY

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OF LAND AT GLEBE FARM, ROPSLEY

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SUMMARY

An agricultural land quality survey has been undertaken of 93.6 ha of land at Glebe Farm, Ropsley in October 2023. Within the survey area, 62.6 ha is proposed as the location of a solar farm.

The land has a mixture of poorly-draining clays over mudstone and freely-draining soils over limestone. Land quality is mainly limited to Subgrade 3b by wetness/workability or droughtiness and depth, with some areas of deep freely-draining soils of Grade 1 quality, and transitional areas of Subgrade 3a.

1.0 Introduction

1.1 This report provides information on the agricultural quality of 93.6 ha of land at Glebe Farm, near Ropsley, Lincolnshire. Within the survey area, 62.6 ha is proposed as the location of a solar farm The report is based on a survey of the land in October 2023.

SITE ENVIRONMENT

1.2 The survey area comprises eight fields, bordered to the south by Mill Lane, to the east by King Street, and to the north and west by adjoining agricultural land. The site forms a minor plateau, cut by a dry valley running east to west through the centre. Land in the north is lower-lying. Average elevation is approximately 85 m AOD.

1.3 At the time of survey the land in the south was under winter fodder crops grazed by sheep, with the remainder fallow after cereal cropping.

PUBLISHED INFORMATION

1.4 British Geological Survey 1:50,000 scale information records the underlying geology in southern and central parts as Lincolnshire Limestone Member (limestone with interbedded mudstone), with mudstone of the Rutland Formation recorded in the north. Drift cover of Head is recorded in the dry valley running through the centre of the Site.

1.5 The National Soil Map (published at 1:250,000 scale) records the land in the north as Denchworth Association: mainly slowly permeable clays developed in mudstone. The remaining land is recorded as Elmton 1 and Elmton 2 Associations: mainly shallow freely-draining soils over limestone, with some associated heavier slowly permeable soils in mudstone outcrops[1].

[1] Ragg, J.M., *et al.,* (1984). *Soils and their Use in Midland and Western England,* Soil Survey of England and Wales Bulletin No. 12, Harpenden.

2.0 Soils

2.1 The soils were found to vary principally in depth and drainage, as described below. A map showing the distribution of the main soil types (Map 2) is in an appendix to this report.

SLOWLY PERMEABLE CLAYS

2.2 These soils occupy most of the north of the site. They typically comprise clay topsoil, directly over dense slowly permeable clay subsoil. In places the soils are calcareous, but in the main the upper layers are decalcified. These soils were largely wet to the surface at the time of survey. The subsoils show evidence of prolonged seasonal waterlogging (greyish colours with ochreous mottles) at shallow depth, and are mainly judged poorly-draining under the local climate.

2.3 Some brashy calcareous clays (or heavy loams) are found in patches where hard limestone bands occur within the dominant mudstone.

2.4 An example profile is described from a pit at observation point 41 (see Map 1) in an appendix to this report.

SHALLOW SOILS OVER LIMESTONE

2.5 These soils occur on the higher ground in central and southern parts of the site. They typically comprise calcareous stony sandy clay loam topsoil over deeply fractured hard limestone. In large areas the topsoil directly overlies bedrock, but a thin stony subsoil is found in others. These soils are freely-draining (Soil Wetness Class I).

2.6 Example profiles are described from pits at observation points 50, 59, 71, 74, 75 and 80 (see Map 1) in an appendix to this report.

DEEPER SOILS OVER LIMESTONE

2.7 These soils occupy the dry valley running through the site, where drift cover has accumulated. They comprise non-calcareous sandy clay loam topsoil over permeable sandy clay loam subsoil, both with low stone content. These soils are freely-draining (Soil Wetness Class I).

2.8 An example profile is described from a pit at observation point 61 (see Map 1) in an appendix to this report.

3.0 Agricultural land quality

3.1 To assist in assessing land quality, the Ministry of Agriculture, Fisheries and Food (MAFF) developed a method for classifying agricultural land by grade according to the extent to which physical or chemical characteristics impose long-term limitations on agricultural use for food production. The MAFF ALC system classifies land into five grades numbered 1 to 5, with grade 3 divided into two subgrades (3a and 3b). The system was devised and introduced in the 1960s and revised in 1988.

3.2 The agricultural climate is an important factor in assessing the agricultural quality of land and has been calculated using the Climatological Data for Agricultural Land Classification[2].

3.3 The relevant site data for an average elevation of 85 m and a central point at grid reference SK 990, 392 is given below.

- Average annual rainfall: 631 mm
- January-June accumulated temperature >0°C 1346 day°
- Field capacity period (when the soils are fully replete with water) 134 days
- Summer moisture deficits for: wheat: 105 mm; potatoes: 95 mm

3.4 The survey described in the previous section was used in conjunction with the agro-climatic data above to classify the site using the revised guidelines for ALC issued in 1988 by MAFF[3]. There are no overriding climatic limitations at this locality.

SURVEY RESULTS

3.5 The agricultural quality of the land is primarily determined by wetness/workability, droughtiness, soil depth and slope gradient. Other factors have been assessed but do not affect the land grade. Land of grades 1 and 3 has been identified.

Grade 1

3.6 This land has deep freely-draining loamy soils with low stone content and occurs outside the application site. This land has no significant limitations to agricultural use, other than the practical difficulty of farming the small area separately.

[2]Meteorological Office, (1989).*Climatological Data for Agricultural Land Classification*.
[3]MAFF, (1988).*Agricultural Land Classification for England and Wales: Guidelines and Criteria for Grading the Quality of Agricultural Land*.

Subgrade 3a

3.7 This subgrade includes areas with moderately shallow soils over limestone. The principal limitation is droughtiness: under the dry eastern climate the limited moisture storage of the subsurface layers mean summer moisture shortages are likely to lead to reduced average yields of arable crops.

3.8 Some slightly deeper soils with lesser droughtiness restriction are included, as these could not be mapped separately and are judged most appropriately mapped according to the average degree of limitation of this land type.

Subgrade 3b

3.9 This subgrade includes areas with slowly permeable clay soils. The combination of high topsoil clay content and poor drainage (Soil Wetness Class IV) means opportunities for spring machinery land access are not usually possible and arable cropping is mainly limited to autumn sowings. Some observations with calcareous topsoil and imperfect drainage (Soil Wetness Class III) which would otherwise be regarded as of slightly higher grade are included, as they could not realistically be accurately mapped or managed separately, and are effectively subject to the same degree of access restriction as the surrounding wetter land.

3.10 Also included are areas with shallow soils over limestone bedrock. Where bedrock is encountered within 30 cm soil depth is a limiting factor. Elsewhere the limitation is droughtiness: the low moisture available in the subsurface layer for crop uptake is likely to lead to low average yields.

3.11 Calculating droughtiness in soils over limestone is difficult, as the maximum effective depth of rooting into deeply fissured rock is difficult to estimate. However, given the limestone appeared deeply fissured and includes weathered pockets of soil in most places, it is assumed that rooting depth is unrestricted for most crops, although the ability of roots to fully exploit the moisture resource to depth is likely to be impeded by large rocks.

Grade areas

3.12 The land grades are shown on Map 2 and the areas occupied shown below.

Table 1: Areas occupied by the different land grades (ha)

Grade/subgrade	*Survey area (ha)*	*Application site (ha)*	*% of the Application site*
Grade 1	2.3	-	-
Subgrade 3a	16.9	6.0	10
Subgrade 3b	73.0	56.6	90
Other land	1.4	-	-
Total	93.6	62.6	100

APPENDIX

DETAILS OF OBSERVATIONS

MAPS

SELECTED DROUGHTINESS CALCULATIONS