AGRICULTURAL LAND CLASSIFICATION AND STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

GRENDON LAKES, GRENDON, NORTHAMPTONSHIRE

1.0 BACKGROUND

1.1 A detailed survey was carried out over 29.5 ha of land at Grendon Lakes to the north of the village of Grendon in Northamptonshire centred on grid reference SP 875 622. The land is the subject of a planning application for the extraction of sand and gravel.

1.2 Within the site is a lake presently having amenity uses. The agricultural land within the application area is predominantly grassland with a single field in the north east site, at the time of the survey, containing cereal stubble.

1.3 On the published 1:63 360 scale Agricultural Land Classification (ALC) map (MAFF, 1974) the site is shown in the east as grade 2 with the central and western areas being mapped as grade 3. However, this map is of a reconnaissance nature and the current survey was undertaken to provide site specific details.

1.4 ADAS Statutory Resource Planning Team undertook a detailed ALC and soil physical characteristics survey of the site during October 1995. Information was collected from auger borings, spaced at 100m intervals, to a depth of 120 cm wherever possible. Subsoil conditions were assessed from four soil pits.

2.0 PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

2.1 Climatic criteria are considered when classifying land as these may have an overriding limitation in terms of the agricultural use of the land. The main parameters used in the assessment of the overall climatic limitation are average annual rainfall, as a measure of overall wetness, and accumulated temperature (day °C Jan-June), as a measure of the relative warmth of an area.

2.2 A detailed assessment of the prevailing climate for the site has been made by interpolation from the 5 km grid dataset produced by the Meteorological Office (Met Office, 1989). The details are given in Table 1 and these show that there is no overall climatic limitation affecting the site.

Table 1: Climatic Interpolation

Grid Reference	SP 875 622
Altitude (m)	45
Accumulated Temperature (Day °C, Jan-June)	1429
Average Annual Rainfall (mm)	585
Moisture Deficit, Wheat (mm)	115
Moisture Deficit, Potatoes (mm)	109
Field Capacity Days	121
Overall Climatic Grade	1

Altitude and Relief

2.3 The site is relatively flat at an altitude of approximately 45m. the area to the north of the lake is however more undulating than the remainder of the site with maximum slopes of only 3°. Altitude and relief do not therefore impose any limitation on the agricultural quality of the site.

Geology and Soils

2.4 The published 1:50 000 scale geological map (Geol. Survey, 1974) shows the north of the site to consist of First Terrace River Gravels with the south of the site shown as Second Terrace River Gravels. A small ribbon of Alluvium is mapped on the western edge of the site.

2.5 The reconnaissance soil survey map (1:250 000 scale) for the area (Soil Survey, 1983) shows the majority of the site to comprise soils of the Waterstock Association(*1). A small area on the western edge of the site is shown as the Fladbury 1(*2) Association.

2.6 The detailed survey carried out on the site shows the presence of two distinct soil types and these are described briefly in the following paragraphs.

Soil Type 1 (see Appendix 1 and Soil Types Map)

2.7 Soil Type 1 occurs in the north east and south west of the site. This soil type consists of a heavy clay loam or clay or very occasionally a medium clay loam topsoil which overlies a similar textured, distinctly mottled, upper subsoil. This horizon in turn overlies a lower subsoil of medium sandy clay loam or occasionally heavy clay loam/clay. All horizons are stoneless or very slightly stony with manganese concretions being found in the subsoil horizons. The profiles of this soil type are relatively free draining but are affected by groundwater and hence are assessed as Wetness Class II or III.

(*1) Waterstock Association: Deep permeable mainly fine loamy soils variably affected by groundwater. Some deep well drained find and coarse loamy soils, formed on River Terrace drift.

(*2) Fladbury 1 Association: Stoneless clayey soils, in places calcareous, variable affected by groundwater. Formed in River Alluvium.

Soil Type 2 (see Appendix I and Soil Types Map)

2.8 Soil Type 2 occurs in the north and west of the site and to the south east and east of the lake. This soil type consists of a relatively stoneless clay topsoil which overlies a similar textured subsoil. The subsoil is prominently mottled with common manganese concretions present. The moderately developed coarse and very coarse prismatic structure with few biopores indicate that this subsoil is only slowly permeable and hence wetness class for profiles of this soil type is assessed as Wetness Class III.

Occasionally within this soil type the profile is calcareous with small chalk fragments evident, particularly within the subsoil.

3.0 AGRICULTURAL LAND CLASSIFICATION

3.1 The land has been classified using the guidelines contained in the Agricultural Land Classification of England and Wales (MAFF, 1988). A breakdown of the individual grades found on the site is given in Table 2. A description of each grade is given in Appendix 2.

Table 2. Distribution of grades and subgrades

Grade	Area (ha)	% of site
3a	9.4	31.9
3b	11.1	37.5
Urban	0.5	1.5
Non-Agricultural	0.1	0.5
Open Water	8.4	28.6
TOTAL	29.5	100.0

Subgrade 3a

3.2 Land of subgrade 3a quality occurs in the extreme south and east of the site. Additionally a small length of the haul route in the north of the site is assessed as subgrade 3a. These areas correspond to Soil Type 1 (paragraph 2.7) where the soil profiles are assessed as wetness class II and areas of Soil Type 2 (paragraph 2.8) where the topsoil and underlying subsoil is calcareous. A distinction is made between calcareous soils and non-calcareous soils as the former are usually better structured and more workable. All of the soils will however have restricted workability during the wetter periods of the year thus limiting the land to subgrade 3a.

Subgrade 3b

3.3 The area mapped as subgrade 3b corresponds to a small area of Soil Type 1 (paragraph 2.7) assessed as wetness class III in the north east of the site. Additionally those areas of Soil Type 2 (paragraph 2.8) which are not calcareous were assessed as subgrade 3b. These soils have a moderately severe workability limitation during the wetter periods of the year and the heavy clay loam and clay topsoils will impose a significant limitation on the agricultural potential of the site restricting the land to subgrade 3b.

Urban

3.4 A small area of land consisting of a metalled road was mapped as urban.

Non-agricultural

3.5 A small spit of land extending into the lake in the south of the site was mapped as non-agricultural.

Open Water

3.6 A large lake currently used for water sports covers much of the land in the south of the site. A second smaller area of open water is also shown in the east of the site.

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Resource Planning Team
ADAS Cambridge

REFERENCES

GEOLOGICAL SURVEY OF GREAT BRITAIN (ENGLAND AND WALES), 1974 Sheet 186 Wellingborough, Solid and Drift. 1:50 000 scale.

MAFF, 1974. Agricultural Land Classification Map. Provisional. Scale 1:63 360 Sheet 133.

MAFF, 1988. Agricultural Land Classification of England and Wales (Revised Guidelines and Criteria for grading the quality of agricultural land). Alnwick.

METEOROLOGICAL OFFICE, 1989. Climatological Data for Agricultural Land Classification.

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

APPENDIX 1

STATEMENT OF PHYSICAL CHARACTERISTICS

SOIL TYPE 1

Topsoil	Texture	:Clay or heavy clay loam (very ocasionally medium clay loam).
	Colour	:Dark brown (10YR 4/3)
	Stone	:Very slightly stony (1-3%) small and medium sized angular and subangular stones
	Boundary	:Abrupt, smooth
	Roots	:Many, fine and very fine
	Depth	:28 cm
Upper Subsoil	Texture	:Clay or heavy clay loam
	Matrix colour	:Yellowish brown (10YR5/4, 5/6) or brown (10YR5/3)
	Stone	:Stoneless - slightly stony (1-6%) small and medium sized angular and subangular (few rounded) stones.
	Mottles	:Common - many distinct ochreous mottles
	Structure	:Weakly - moderately developed coarse and very coarse subangular blocky
	Consistence	:Friable
	Porosity	:>0.5% biopores
	Boundary	:Abrupt, smooth
	Roots	:Common - many fine and very fine
	Depth	:58 cm

Lower Subsoil	Texture	:Medium sandy clay loan (occasionally heavy clay loam/clay).
	Matrix colour	:Yellowish brown (10YR5/4, 5/6)
	Stone	:Stoneless - slightly stony (1-9%) small and medium sized angular and subangular (few rounded) stones.
	Structure	:Weakly developed coarse and very coarse subangular blocky.
	Consistence	:Friable
	Porosity	:>0.5% biopores
	Roots	:Common fine and very fine
	Depth	:100 + cm
	Comments	:Calcareous

STATEMENT OF PHYSICAL CHARACTERISTICS

SOIL TYPE 2

Topsoil	Texture	:Clay
	Colour	:Dark greyish brown (2.5Y/2), occasionally olive brown (2.5Y 4/3).
	Stone	:Stoneless - very slightly stony (1-3%) small, angular and subangular stones.
	Boundary	:Smooth, abrupt
	Roots	:Many fine and very fine
	Depth	:26 cm
Subsoil	Texture	:Clay
	Matrix colour	:Light olive brown (2.5Y5/3)
	Mottles	:Many - very many distinct/prominent ochreous mottles.
	Stone	:Stoneless - very slightly stony (1-3%) small, angular and subangular stones
	Structure	:Moderately developed coarse and very coarse prismatic.
	Consistence	:Firm
	Porosity	:<0.5% biopores
	Roots	:Common fine and very fine
	Depth	:100 + cm

Comments: Topsoil occasionally calcareous

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 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 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 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 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 levels of yields. It is mainly suited to grass with occasional arable crops (e.g. 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.