LAND AT DORKET HEAD, ARNOLD, NOTTS.
Agricultural Land Classification and Soil Resource Report, Validation Survey
July 1997

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AGRICULTURAL LAND CLASSIFICATION AND SOIL RESOURCES REPORT VALIDATION SURVEY

Land at Dorket Head, Arnold, Notts

INTRODUCTION

1. This report presents the findings of a detailed, Agricultural Land Classification (ALC) validation survey of 12.0 ha of land located at Dorket Head, Arnold in Nottinghamshire. The survey was carried out during July 1997.

2. The survey was carried out by the Farming and Rural Conservation Agency (FRCA) for the Ministry of Agriculture, Fisheries and Food (MAFF), in connection with an application to extend the existing Dorket Head clay pit. The area was surveyed to confirm the consultant's (RAC) ALC grading and soil resource mapping. MAFF surveyed adjacent land to the north in 1986 (job No. N/12/86), this indicated that most of the land was 3a.

3. The work was conducted by members of the Resource Planning Team in the Eastern Region of FRCA. The land has been graded in accordance with the published MAFF ALC guidelines and criteria (MAFF, 1988). This survey supersedes previous ALC information for this site. A description of the ALC grades and subgrades is given in Appendix I.

4. At the time of survey, the majority of the site comprised grassland, with a long narrow plantation of trees in the east.

SUMMARY

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:10 000; it is accurate at this scale but any enlargement would be misleading.

6. The area and proportions of the ALC grades and subgrades on the surveyed land are summarised in Table 1.

Table 1: Area of grades and other land

Grade/Other land	Area (hectares)	% surveyed area	% site area
3a	9.0	80	75
3b	2.3	20	19
Other land	0.7	N/A	6
Total surveyed area	11.3	100	-
Total site area	12.0	-	100

7. The fieldwork was conducted at an average density of 1.5 auger borings per hectare. A total of 17 auger borings and 2 soil pits was described.

8. Most of the site has been graded 3a (good quality agricultural land). The land is typically limited by moderate wetness and workability constraints. Occasionally Sandstone

rock is encountered at moderate depth, this imposes an equally limiting droughtiness imperfection.

9. The remainder of the site has been graded 3b (moderate quality agricultural land). Within this grade the chief limitation is the steeply sloping land. Gradients exceed 7° (to a maximum of 8°) and preclude the land from a higher grade. Overlapping and extending north of this steeply sloping land is an area in which significant wetness and workability constraints limit the land to 3b. In the area of overlap, the land is equally limited by the two constraints.

FACTORS INFLUENCING ALC GRADE

Climate

10. Climate affects the grading of land through the assessment of an overall climatic limitation and also through interactions with soil characteristics.

11. The key climatic variables used for grading this site are given in Table 2 and were obtained from the published 5km grid datasets using the standard interpolation procedures (Met. Office, 1989). Two sets of data have been presented to cover the site's climatic range.

Table 2: Climatic and altitude data

Factor	Units	Values	
Grid reference	N/A	SK 595 471	SK 600 468
Altitude	m, AOD	140	115
Accumulated Temperature	day°C (Jan-June)	1290	1319
Average Annual Rainfall	mm	720	688
Field Capacity Days	days	151	145
Moisture Deficit, Wheat	mm	91	96
Moisture Deficit, Potatoes	mm	78	85
Overall climatic grade	N/A	Grade 2	Grade 1

12. The climatic criteria are considered first when classifying land as climate can be overriding in the sense that severe limitations will restrict land to low grades irrespective of favourable site or soil conditions.

13. The main parameters used in the assessment of an overall climatic limitation are average annual rainfall (AAR), as a measure of overall wetness, and accumulated temperature (ATO, January to June), as a measure of the relative warmth of a locality.

14. The majority of the site lies at or above 120m AOD and has a climatic grade of 2. In the extreme southeast corner, where the land lies below 120m AOD, there is no climatic limitation (i.e. grade 1).

Site

15. The majority of the site occupies a relatively level plateau ranging from 135 to 140m AOD (just south of the existing Dorket Head Clay Pit). From here the land falls to the south and east at slight to moderate gradients, which in places exceed 7°. In these areas steep gradients limit the land to grade 3b.

Geology and soils

16. At a scale of 1:50 000 the geology sheet 126 (Geological Survey of Great Britain [England and Wales], 1972) shows the majority of the site to comprise Keuper Marl deposits (i.e. Red and Green Marl with thin Sandstones 'Skerries'). The lower lying ground to the east extends into Waterstones, flaggy Sandstones and Marl.

17. At a reconnaissance scale of 1:250 000 the Soil Survey of England and Wales, (Sheet 3, Soils of Midland and Western England, 1983) shows most of the site to comprise the Hodnet Association, with a small area in the extreme north shown as the Worcester Association.

These soils are described briefly as:-

- Hodnet: Reddish fine and coarse loamy soils with slowly permeable subsoils and slight seasonal waterlogging. Some similar well drained reddish fine loamy soils.
- Worcester: Slowly permeable non-calcareous and calcareous reddish clayey soils over mudstone, shallow on steeper slopes. Associated with similar non-calcareous fine loamy over clayey soils.

18. In the present survey one main soil type was found (see Appendix II). The topsoil typically comprises non calcareous, stoneless to very slightly stony, medium (occasionally heavy) clay loams. The upper subsoil generally consists of heavy clay loams, or occasionally slowly permeable clays or silty clays. Below this, lower subsoils comprise clays or silty clays, which are often gleyed and slowly permeable with lenses of Sandstone. Occasionally, Sandstone rock is encountered below 50/80cm.

19. The details of the classification of the site are shown on the attached ALC map and the area statistics of each grade are given in Table 1, page 1.

20. The location of the auger borings and pits is shown on the attached sample location map. A detailed description of a typical profile is presented in Appendix II.

AGRICULTURAL LAND CLASSIFICATION

Subgrade 3a

21. Land graded 3a occupies the majority of the site. The presence of slowly permeable clay horizons at moderate depth results in a wetness class assessment of III. This combines with the fine topsoil textures (described in paragraph 18) to impose a moderate wetness and workability limitation which excludes the land from a higher grade. Occasionally the land is equally limited by droughtiness. This occurs where an impenetrable layer of Sandstone rock is encountered below 50/55cm depth. The restricted depth to which roots can penetrate, combines with the fine soil textures to limit the amount of water available for crop growth.

This imposes a moderate droughtiness imperfection and restricts the land to 3a (good quality agricultural land).

Subgrade 3b

22. Land graded 3b is principally limited by steep gradients which exceed 7° (to a maximum of 8°). Such gradients adversely affect the efficiency and safety of certain types of agricultural machinery. The land is thus restricted to grade 3b. In a small area, which overlaps and extends (north) beyond the steep slopes, slowly permeable clay subsoils lie directly below the topsoil resulting in a wetness class assessment of IV. This wetness class combines with the fine topsoil textures to impose a significant wetness and workability constraint, which precludes the land from a higher grade. In the area of overlap wetness and gradient are equally limiting.

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SOURCES OF REFERENCE

Geological Survey of Great Britain (England and Wales), 1972, *sheet 126, Nottingham.* 1:50 000 scale.

Ministry of Agriculture, Fisheries and Food (1988) *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land.* MAFF: London.

Met. Office (1989) *Climatological Data for Agricultural Land Classification.* Met. Office: Bracknell.

Soil Survey of England and Wales (1983), *Sheet 3, Soils of Midland and Western England,* 1:250 000 scale, SSEW: Harpenden.

APPENDIX I

DESCRIPTIONS OF THE GRADES AND SUBGRADES

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 or horticultural crops can usually be grown but on some land of this 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 or more variable than Grade 1 land.

Grade 3: Good to Moderate Quality Land

Land with moderate limitations which affect the choice of crops, the timing and type of cultivation, harvesting or the level of yield. When 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 the level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist 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 severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

APPENDIX II

STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

Topsoil	Texture	medium clay loam, occ. heavy clay loam
	Colour	10YR3/2 or 7.5YR4/2 becoming 10YR or 7.5YR 4/3 or 4/4
	Stone content	stoneless to very slightly stony (up to 3% Sandstones/small hard stones)
	Roots	many very fine and fine
	Calcium carbonate	non calcareous
	Boundary form	smooth / abrupt
	Depth	typically 25cm, range 20/30cm
Upper subsoil	Texture	heavy clay loam, occ. clay or silty clay
	Colour	typically 5YR5/4, occ. 5YR5/3, 2.5YR3/4, 4/4 or 4/6.
	Stone content	stoneless to very slightly stony (up to 3% Sandstones/small hard stones)
	Structure	moderately developed coarse and medium subangular blocky, occ. coarse prismatic
	Consistence	friable, occ. firm
	Porosity	typically >0.5%
	Roots	common very fine and fine
	Calcium carbonate	non calcareous
	Concretions	few manganese concretions
	Boundary form	smooth abrupt
	Depth	typically 45cm, occ. 40/60cm
Lower subsoil	Texture	clay or silty clay occ. into Sandstone rock (50/80cm+)
	Colour	5YR and 2.5YR5/2, 5/3 and 5/4 with common streaks of 2.5Y and 10YR6/2 and 6/1.
	Stoniness	stoneless to slightly stony (up to 10% Sandstones)
	Structure	moderately developed coarse prismatic breaking to very coarse angular blocky.
	Consistence	firm
	Porosity	<0.5%
	Roots	common very fine and fine.
	Calcium carbonate	non calcareous, occ. slightly calcareous.
	Concretions	few to common manganese concretions
	Depth	120cm, occ. Sandstone rock at 50/80cm+

Notes: Site area is 12ha
Sandstone is typically only rootable for 2cm.
Wetness class: typically III, occ. IV.