

DOVERIDGE BY PASS

**Agricultural Land Classification &
Statement of Site Physical Characteristics
June 1996**

**Resource Planning Team
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ADAS Cambridge**

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AGRICULTURAL LAND CLASSIFICATION REPORT

DOVERIDGE BY PASS

Introduction

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 21.3 ha of land to the north east of the village of Doveridge, Derbyshire. The survey was carried out during June 1996.
2. The survey was commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF) Land Use Planning Unit, Cambridge in connection with the proposal to build the Doveridge by pass. This survey supersedes previous ALC surveys on this land and in particular the provisional 1 : 63 360 scale ALC map published by MAFF which shows the whole site as Grade 3 land (MAFF, 1972).
3. The work was conducted by members of the Resource Planning Team in the Huntingdon Statutory Group in ADAS. The land has been graded in accordance with the published MAFF ALC guidelines and criteria (MAFF, 1988). A description of the ALC grades and subgrades is given in Appendix I.
4. At the time of survey all the fields in the survey area were under grassland.

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)	% Total site area
3a	9.4	44.1
3b	11.9	55.9
Total site area	21.3	100

7. The fieldwork was conducted at an average density of one borings per hectare. A total of nineteen borings and three soil pits were described.
8. The land within the site has been assessed as Subgrade 3a (good quality agricultural land) in the east and Subgrade 3b (moderate quality agricultural land) in the west of the site.

the main limiting factors for the agricultural quality of land within the site are a combination of wetness and topsoil stoniness.

Factors Influencing ALC Grade

Climate

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

10. 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).

Table 2: Climatic and altitude data

Factor	Units	Values
Grid reference	N/A	SK 129 345
Altitude	m, AOD	90
Accumulated Temperature	day°C (Jan-June)	1363
Average Annual Rainfall	mm	775
Field Capacity Days	days	186
Climatic grade	N/A	1
Moisture Deficit, Wheat	mm	91
Moisture Deficit, Potatoes	mm	79

11. 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.

12. 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.

13. The combination of rainfall and temperature at this site mean there are no climatic limitations to the quality of the agricultural land.

Site

14. The site lies at a maximum altitude of approximately 100 mAOD in the north west and falls to a minimum of approximately 80 mAOD in the south east. Slopes are all gentle and do not exceed 3°. Therefore neither gradient or relief impose any limitation to the agricultural quality of the site.

Geology and soils

15. The published 1 : 50 000 scale solid and drift edition geology map (Geol. Survey, 1982) shows the east of the site to comprise Mercia Mudstone while the west of the site is mapped as fluvio-glacial gravel over Mercia Mudstone.

16. No detailed soil map exists for the area but the reconnaissance (1 : 250 000 scale) soil map (Soil Survey, 1983) shows the whole site as soils of the Salop association. These soils are briefly described as reddish fine loamy over clayey soils with slowly permeable subsoils. The present survey identified the presence of two soil types within the site which are described briefly below.

Soil Type I : this soil type covered the majority of the site and consisted of a medium clay loam textured topsoil overlying a similar or slightly heavier textured upper subsoil. This in turn overlay a clay or occasionally heavy clay loam textured lower subsoil horizon. Stone content of all horizons was very variable throughout the site.

Soil Type II : this soil type was limited to the north west corner of the site and consisted of a medium clay loam textured topsoil directly overlying a reddish clay textured subsoil which usually extended to below sample depth.

Agricultural Land Classification

17. 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.

18. The location of the auger borings and pits is shown on the attached sample location map.

Subgrade 3a

19. Land of this subgrade was limited to the east and extreme south of the site corresponding to those areas of the site in which the depth to the slowly permeable clay textured lower subsoil horizon was sufficient for the profiles to be assessed as Wetness Class II or III (Appendix II). This wetness class assessment together with the medium clay loam texture of the topsoil results in a moderate wetness and workability limitation which reduces the flexibility of the land in terms of timing of cultivations and grazing. At a limited number of locations the content of stones larger than 2 cm within the topsoil was greater than 10% and hence as stones act as an impediment to cultivation, harvesting and crop growth, such stone contents limit the quality of those areas of land to Subgrade 3a.

Subgrade 3b

20. Land in the west of the site is restricted to Subgrade 3b quality by significant wetness and workability limitation. Land of Subgrade 3b quality is associated with those areas of Soil Type I in which the upper subsoil is relatively thin and hence the slowly permeable lower subsoil horizon is near to the soil surface resulting in such profiles being assessed as Wetness Class IV. Additionally in a limited area the content of stones larger than 2 cm within the topsoil was greater than 15% which limits the quality of such areas to Subgrade 3b. Also assessed as land of Subgrade 3b quality is the area mapped as Soil Type II in the north west of the site. This soil type is slowly permeable in the subsoil immediately underlying the topsoil hence these profiles are assessed as Wetness Class IV with a resultant restriction on land quality to Subgrade 3b due to a significant wetness and workability limitation.

Soil Resources

21. Two distinct soil types have been identified within the site and their distribution is shown on the accompanying soil resource map which is illustrative of the soil resources available within the site for restoration purposes but is not a stripping map for the site. A statement of the physical characteristics of these two soil types is given in Appendix III. The thicknesses and volumes given in Table 3 below should be treated with some caution due to variability in the soils, additionally the subsoils may extend below 120 cm.

Table 3 : soil resources

	Area (ha)	Thickness (m)	Volume (m ³)
Soil Type I			
Topsoil	4.0	0.30	12000
Upper subsoil	4.0	0.18	7200
Lower subsoil	4.0	0.72	28800
Soil Type II			
Topsoil	17.3	0.29	50170
Subsoil	17.3	0.91	157430

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SOURCES OF REFERENCE

Geological Survey of Great Britain (1982) *Sheet No.140, Burton Upon Trent,Solid and Drift Edition, 1 : 50 000 scale*. BGS: London.

Ministry of Agriculture, Fisheries and Food (1972) *Agricultural Land Classification Map, Provisional, 1 : 63 360 scale*. MAFF: London.

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

SOIL WETNESS CLASSIFICATION

Definitions of Soil Wetness Classes

Soil wetness is classified according to the depth and duration of waterlogging in the soil profile. Six soil wetness classes are identified and are defined in the table below.

Wetness Class	Duration of waterlogging ¹
I	The soil profile is not wet within 70 cm depth for more than 30 days in most years. ²
II	The soil profile is wet within 70 cm depth for 31-90 days in most years or, if there is no slowly permeable layer within 80 cm depth, it is wet within 70 cm for more than 90 days, but only wet within 40 cm depth for 30 days in most years.
III	The soil profile is wet within 70 cm depth for 91-180 days in most years or, if there is no slowly permeable layer present within 80 cm depth, it is wet within 70 cm for more than 180 days, but only wet within 40 cm depth for between 31-90 days in most years.
IV	The soil profile is wet within 70 cm depth for more than 180 days but not wet within 40 cm depth for more than 210 days in most years or, if there is no slowly permeable layer present within 80 cm depth, it is wet within 40 cm depth for 91-210 days in most years.
V	The soil profile is wet within 40 cm depth for 211-335 days in most years.
VI	The soil profile is wet within 40 cm depth for more than 335 days in most years.

Assessment of Wetness Class

Soils have been allocated to wetness classes by the interpretation of soil profile characteristics and climatic factors using the methodology described in *Agricultural Land Classification of England and Wales: Revised guidelines and criteria for grading the quality of agricultural land* (MAFF, 1988).

¹ The number of days is not necessarily a continuous period.

² 'In most years' is defined as more than 10 out of 20 years.

APPENDIX III

STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

SOIL TYPE I

Topsoil	Texture	: Medium clay loam
	Colour	: Brown (7.5YR4/2), dark yellowish brown(10YR4/4)
	Stone	: Variable; range 3 - 23%, typically 12%
	Boundary	: Smooth, abrupt
	Roots	: Many fine and very fine
	Depth	: 30 cm.
	Upper Subsoil	Texture
Matrix colour		: Brown (10YR5/3, 7.5YR5/3)
Mottles		: Common ochreous
Manganese		: Few concretions
Stone		: Variable; range 2 - 45%, typically 10%
Structure		: Weak - moderately developed coarse and very coarse angular blocky.
Consistence		: Friable
Porosity		: 1% biopores
Boundary		: Smooth, abrupt
Roots		: Common fine and very fine
Depth		: 48 cm.
Lower Subsoil	Texture	: Clay occasionally heavy clay loam
	Matrix colour	: Reddish brown (5YR5/4, 5YR4/4)
	Mottles	: Occasionally common
	Stone	: Typically 5%, occasionally very stony
	Manganese	: Few concretions
	Structure	: Moderately developed coarse angular blocky
	Porosity	: <0.5% biopores
	Roots	: Common fine and very fine
Depth	: 120 cm.	

Comments : Profile non calcareous

APPENDIX III

STATEMENT OF SOIL PHYSICAL CHARACTERISTICS

SOIL TYPE II

Topsoil	Texture	: Medium clay loam
	Colour	: Brown (7.5YR4/2)
	Stone	: Variable; range 8 - 18%, typically 15%
	Boundary	: Smooth, abrupt
	Roots	: Many fine and very fine
	Depth	: 29 cm.
Subsoil	Texture	: Clay
	Matrix colour	: Reddish brown (2.5YR4/4)
	Mottles	: None - few ochreous
	Stone	: Stoneless - slightly stony, typically 8%
	Structure	: Moderately developed very coarse and coarse prismatic, breaking to coarse angular blocky
	Consistence	: Firm
	Porosity	: <0.5% biopores
	Roots	: Many fine and very fine
Depth	: 120 cm	

Comments : Profile non calcareous