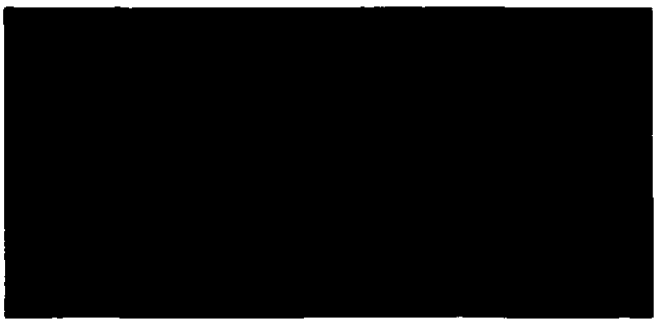

MAFF Ministry of Agriculture Fisheries and Food

Extension to Whisby Quarry, Lincs.
Agricultural Land Classification &
Statement of Site Physical Characteristics
November 1996

Resource Planning Team
Eastern Statutory Centre
ADAS Cambridge

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AGRICULTURAL LAND CLASSIFICATION REPORT

Extension to Whisby Quarry, Lincs.

Introduction

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 60.3 ha of land adjacent to the existing Whisby Quarry, Lincolnshire, centred on grid ref. SK 891 667. The survey was carried out during November 1996.

2. The survey was commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF) Land Use Planning Unit, Cambridge in connection with an application to extend the existing quarry. This survey supersedes previous ALC surveys on this land.

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 the land use on the site was a mix of winter cereals, sugar beet, set aside and uncultivated cereal stubble.

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
2	7.6	12.6
3a	36.5	60.5
3b	15.2	25.2
Other land	1.0	1.7
Total site area	60.3	100

7. The fieldwork was conducted at an approximate density of one borings per hectare. A total of fifty six borings and four soil pits were described.

8. Two small areas in the south east of the site the land were assessed as Grade 2 quality (very good quality agricultural land) with the majority of the site being assessed as Subgrade 3a quality (good quality agricultural land). An area in the north and north west of the site was assessed as Subgrade 3b quality (moderate quality agricultural land). The main limiting factor on the site was assessed as droughtiness which varied in its severity across the site.

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 5 km grid datasets using the standard interpolation procedure (Met. Office, 1989).

Table 2: Climatic and altitude data

Factor	Units	Values
Grid reference	N/A	SK 891 667
Altitude	m, AOD	15
Accumulated Temperature	day°C (Jan-June)	1417
Average Annual Rainfall	mm	577
Field Capacity Days	days	113
Moisture Deficit, Wheat	mm	113
Moisture Deficit, Potatoes	mm	107
Climatic grade	N/A	1

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 (AT0, 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 is no overall climatic limitation to land quality.

Site

14. The site is generally level at an altitude of approximately 15 mAOD with only slight undulations in the landform evident. Therefore there are no relief or gradient limitations to the quality of the agricultural land.

Geology and soils

15. The published 1: 50 000 scale geology map of the area (Geol. Survey, 1973, Solid and Drift edition) shows the occurrence of Older River sand and gravel overlying Lower Lias Clay over the whole site.

16. The reconnaissance scale (1 : 250 000) soil survey map for the area (Soil Survey, 1983) shows the site to comprise soils of the Blackwood association. This association is briefly described as deep permeable sandy and coarse loamy soils with groundwater controlled by ditches.

17. The present survey found a single main soil type within the site, however, this soil type was very variable across the site. The soil consisted predominantly of a very slightly to slightly stony relatively deep medium sandy loam or occasionally sandy clay loam textured topsoil. However in a small area in the north of the site the topsoil was found to be moderately stony. The topsoil overlies variably stony subsoil horizons which consist of sandy clay loam, medium sandy loam, loamy medium sand or medium sand textures with very occasionally a sandy clay textured horizon encountered. No general pattern was found as to the distribution of the subsoil horizons, with each sample point usually consisting of a mix of the various textured subsoil horizons. Similarly the stone content of the various subsoil horizons varied significantly within the site. Mottling was generally evident within the subsoil, however the profiles were usually well drained and assessed as Wetness Class I or II (Appendix II). Very occasionally a slowly permeable sandy clay horizon was present close to the soil surface and hence such profiles were assessed as Wetness Class III. Droughtiness of the soil profiles was, however, the limiting factor for the agricultural quality of the site.

Agricultural Land Classification

18. 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.

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

Grade 2

20. Land of Grade 2 quality was limited to those profiles in which the stone content of the profile was generally low and hence the available water for plant growth was only slightly limiting (paragraph 17).

Subgrade 3a

21. Land of Subgrade 3a quality was found over much of the site in which available water was found to be moderately limiting for plant growth. Available water was limited by a combination of stone content and coarse textured subsoil horizons (paragraph 17).

Subgrade 3b

22. Land of Subgrade 3b quality is found in the north and north west of the site and is associated with areas in which topsoil and subsoil stone contents are relatively high and/or coarse textured subsoil horizons predominate (paragraph 17). Droughtiness of these soil profiles is a significant limitation to agricultural productivity. The stones present within the topsoil are generally small in size and therefore are not limiting to cultivations on the site but stones do reduce the amount of moisture available for plant growth.

Other Land

23. The area of other land mapped within the centre of the site consists of a derelict building and associated garden/orchard and access track.

Soil Resources

24. A statement of the physical characteristics of the soil type 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)
Topsoil	59.3	0.37	219410
Subsoil	59.3	0.83	492190

Resource Planning Team
Eastern Statutory Centre
ADAS Cambridge

SOURCES OF REFERENCE

Geological Survey of Great Britain (England and Wales) (1973) *Sheet 114, Lincoln, Solid and Drift Edition*. BGS 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, *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

Topsoil	Texture	: Medium sandy loam, occ. sandy clay loam
	Colour	: Dark greyish brown (10YR4/2), v. dark greyish brown (10YR3/2)
	Stone	: Variable, predom. slightly (8%) but v. slightly (4%) to moderately (17%)
	Boundary	: Abrupt, smooth
	Roots	: Many fine and very fine
	Depth	: 37 cm
Subsoil	Texture	: sandy clay loam, medium sandy loam, loamy medium sand, medium sand
	Matrix colour	: Variable - brown (10YR5/3), yellowish brown (10YR5/4,5/6), light brownish grey (10YR6/2) and brownish yellow (10YR6/6)
	Mottles	: Usually common distinct ochreous
	Stone	: Variable - v. slightly (4%) to very stony (40%) but predominantly slightly stony (10%)
	Structure	: Weakly developed medium and coarse subangular blocky
	Consistence	: Friable/very friable
	Porosity	: >0.5% biopores
	Roots	: Common fine and very fine
	Depth	: 120 cm.

Comments : Predominantly Wetness Class I or II very occasionally Wetness Class III.