LITTLE WEIGHTON
RAILWAY CUTTING

Agricultural Land Classification and Statement of Physical Characteristics
March 1997

Resource Planning Team
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ADAS Leeds

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AGRICULTURAL LAND CLASSIFICATION AND STATEMENT OF PHYSICAL CHARACTERISTICS REPORT

LITTLE WEIGHTON RAILWAY CUTTING

Introduction

1. This report presents the findings of a detailed Statement of Physical Characteristics and Agricultural Land Classification (ALC) survey of 4.9 ha of land at Little Weighton Railway Cutting. The survey was carried out during March 1997.

2. The survey was commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF) Land Use Planning Unit, Northallerton in connection with a proposal to extract chalk from land adjacent to a disused railway cutting.

3. The work was conducted by members of the Resource Planning Team in the Leeds 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 agricultural land on the site was in arable use. The northern part of the application area consists of the disused railway cutting and is not in agricultural use.

Summary

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:7,500. 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	% Surveyed Area
3a	1.4	28.6	42.4
3b	1.9	38.8	57.6
Other land	1.6	32.6	-
Total surveyed area	3.3	-	100
Total site area	4.9	100	-

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

Subgrade 3a

8. Two areas of Subgrade 3a land were mapped. They both contained medium textured topsoils over similar or slightly heavier textured subsoils. Both horizons were slightly stony with common chalk stones and flints. At about 55 cm weathering chalk is encountered. Droughtiness limits ALC grade.

Subgrade 3b

9. Remaining land is Subgrade 3b. Topsoils are medium textured and contain common chalk stones and flints. Subsoils are generally absent or very thin (less than 5 cm thick). Weathering chalk occurs at about 35 cm depth. A droughtiness limitation, more severe than on the 3a land limits this area to Subgrade 3b.

Other land

10. This comprises the railway cutting in the north west of the application area.

Soil Resources

11. One topsoil was identified on the site - T1. It is medium textured and slightly stony with a mean thickness of 30 cm.

12. Subsoil (S1) only occur towards the eastern and western ends of the agricultural land. Elsewhere on the farmed land subsoils are absent (see soil resource maps). The subsoil is medium textured and slightly stony. It has a mean thickness of 25 cm. Below the subsoil or topsoil where subsoil is absent is found weathering chalk bedrock.

Factors Influencing ALC Grade

Climate

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

14. 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	SE 991 331
Altitude	m, AOD	85
Accumulated Temperature	day°C (Jan-June)	1306
Average Annual Rainfall	mm	698
Field Capacity Days	days	158
Moisture Deficit, Wheat	mm	96
Moisture Deficit, Potatoes	mm	84

15. 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.

16. 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.

17. The combination of rainfall and temperature at this site means there is an overall climatic limitation of Grade 2 on the site.

Site

18. Agricultural land on the site gently slopes from 90m AOD in the west to 75m AOD in the east with a south easterly aspect.

Geology and soils

19. Solid deposits of Middle Cretaceous Chalk with flint outcrop within a metre of the surface across the site. Drift cover over a metre in depth is absent, BGS Sheet 72, Beverley, Solid and Drift (1960).

20. The Soil Survey of England and Wales have published a detailed soils map of the area - Soils of Market Weighton (1987). This shows the site contains Andover Series soils which are relatively shallow, medium textured and overlie weathering chalk. This description conforms with soils found on the site. A more detailed description of soils on the site is contained in the Statement of Physical Characteristics section of this report.

Agricultural Land Classification

21. 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.

Subgrade 3a

22. This subgrade occurs in the east and west of the agricultural land on the site. It is found where soil profiles are deepest. Topsoils are typically a medium silty clay loam over a similar or slightly heavier textured subsoil. Both horizons contain common chalk and flints. At about 55 cm weathering chalk occurs. Profiles are freely drained, Soil Wetness Class I, but have a relatively low water holding capacity especially for deep rooting crops such as cereals. Droughtiness limits this land to Subgrade 3a.

Subgrade 3b

23. This land occurs between the two areas of Subgrade 3a land. Topsoils are medium silty clay loam and slightly stony. Subsoils are generally absent or very shallow (less than 5 cm thick). Weathering chalk bedrock occurs at about 35 cm depth. These shallow soils have a significant droughtiness problem limiting the land to Subgrade 3b.

Other land

24. This comprises the railway cutting in the west of the site.

Statement of Physical Characteristics

25. One main soil type was identified on the site, a description of which is given below. Topsoil and subsoil resources are shown on the accompanying maps along with soil thickness and volume information. Soil profile pit descriptions are given in Appendix III.

a. Soil Type 1 T1/S1 Medium textured shallow chalk soil

This soil type occurs over all agricultural land on the site. It is medium textured and slightly stony. Subsoils are often absent.

Topsoils

Topsoil T1 covers the whole site and is medium textured and contains common chalk and flint stones. It has a strongly developed medium subangular blocky structure and a mean thickness of 30 cm.

Subsoils

Subsoils S1 directly overlies weathering limestone but is absent in the centre of the agricultural land on the site (see soils maps). It is medium textured and contains common chalk and flint stones. It has a moderately developed medium angular blocky structure and a mean thickness of 25 cm.

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SOURCES OF REFERENCE

British Geological Survey (1960) *Sheet No. 72, Beverley Solid and Drift.* 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 (1987) *Sheet No. 106 Soils of Market Weighton Area.,* 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

Pit 1

T1 Medium textured shallow chalk soil (variant without subsoil or very thin subsoil)

Location:	SE 99153295
Land use:	Arable
Slope:	2° SE
Weather:	Misty and cool

Depth (cm)	
0-30	Very dark greyish brown (10YR3/2), unmottled, medium silty clay loam; 8% volume chalk and flint stones; (3% >2 cm 0% >6 cm); moist; strongly developed medium subangular blocky; very friable; >0.5% pores >0.5 mm; few fine fibrous roots; moderately sticky; moderately plastic; abrupt wavy boundary.
30-34	Reddish brown (5YR4/4), unmottled; heavy silty clay loam; 25% volume chalk stones; moist; moderately developed medium angular blocky; friable; >0.5% pores >0.5 mm; very few fine fibrous roots; moderately sticky; moderately plastic; abrupt wavy boundary.
34+	Weathering chalk.

Pit 2

T1/S1 Medium textured shallow chalk soil

Location:	SE 99153320
Land use:	Arable
Slope:	Level
Weather:	Cool and misty

Depth (cm)	
0-28	Very dark greyish brown (10YR3/2) unmottled; medium silty clay loam; 6% total chalk and flints, 3% >2 cm 0% >6 cm; moist; strongly developed medium subangular blocky; friable; >0.5% pores >0.5 mm; many fine fibrous roots; moderately sticky; moderately plastic; abrupt wavy boundary.
28-54	Strong brown (7.5YR4/6) unmottled heavy silty clay loam; 5% total flint and chalk stones; moist; moderately developed medium angular blocky; friable >0.5% pores >0.5 mm; common fine fibrous roots; moderately sticky; moderately plastic; abrupt smooth boundary.
54+	Weathering chalk.