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Ministry of
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FORMER WEST SILKSTONE COLLIERY - OCCS

Agricultural Land Classification and Statement of Physical Characteristics Report

October 1996

Resource Planning Team
Leeds Statutory Group
ADAS Leeds

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FORMER WEST SILKSTONE COLLIERY - OCCS AGRICULTURAL LAND CLASSIFICATION AND STATEMENT OF PHYSICAL CHARACTERISTICS REPORT

Introduction

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) and Statement of Physical Characteristics survey of 11.1 ha of land at Silkstone Common, near Barnsley. The survey was carried out during October 1996.

2. The survey was commissioned by the Ministry of Agriculture, Fisheries and Food (MAFF) Land Use Planning Unit, Northallerton in connection with the proposal to opencast this land.

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 the land on the site was under permanent grass in the south and west and derelict in the north-east, where previous mining activity has taken place.

Summary

5. The findings of the survey are shown on the enclosed ALC map. The map has been drawn at a scale of 1:5,000. 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	% Surveyed Area
Subgrade 3b	5.3	47.7	91.4
Grade 4	0.5	4.6	8.6
Other land	5.3	47.7	-
Total surveyed area	5.8	-	100
Total site area	11.1	100	-

7. The fieldwork was conducted at an average density of one boring per hectare. A total of six borings and one soil pit were described.

8. Subgrade 3b, moderate quality agricultural land, covers most of the agricultural area. The soils are poorly drained and consist of medium-textured topsoils and medium to heavy-textured upper subsoils overlying gleyed and slowly permeable silty clay at between 35 cm and 40 cm depth. Soil wetness limits the ALC grade of this land, as do slopes of 8 - 10° which occur in much of the centre of the site.

Grade 4, poor quality agricultural land, occurs in a small area in the centre of the site. The soils are similar to those on the Subgrade 3b land but the topsoils consist of heavy silty clay loams in places. This further reduces the workability of the topsoil and limits some areas to Grade 4. Slopes of around 15° are the factor limiting remaining areas to Grade 4.

Other land occurs in the north-east of the site and consists of derelict land covered with colliery shale.

One main soil type occurs on the site and it consists of a medium to heavy-textured topsoil (median depth 25 cm) overlying a generally heavy-textured upper subsoil (mean depth 15 cm) and a heavy-textured lower subsoil (mean depth 80 cm). In a small part of the south-east of the site weathering sandstone directly underlies the topsoil.

There are no soils in situ on the derelict land in the north-west of the site, although two soil mounds are found on the southern edge of this area.

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	SE 286 040
Altitude	m, AOD	165
Accumulated Temperature	day°C (Jan-June)	1243
Average Annual Rainfall	mm	743
Field Capacity Days	days	183
Moisture Deficit, Wheat	mm	84
Moisture Deficit, Potatoes	mm	68

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 that the land is limited by the climate of the area to Grade 2.

Site

14. The land on the site is generally moderately sloping to moderately steeply sloping (4° to 15°) and much of the centre of the site is limited to Subgrade 3b by slopes of 8° - 10°. A small area, also in the centre, is limited to Grade 4 by slopes of around 15°. However, neither microrelief nor flood risk are of any significance on this site.

Geology and soils

15. The site is underlain by Lower Coal Measures consisting of interbedded sandstones and shales. There is no drift cover on this site (BGS, Sheet 87, Barnsley).

16. The soils on the site have been mapped as Dale association (Soil Survey of England and Wales, 1983). The field survey found Dale series soils over most of the undisturbed area, with Rivington series on the highest land, in the south-eastern corner.

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.

Subgrade 3b

18. Land in this subgrade, defined as moderate quality agricultural land, covers most of the agricultural areas on the site. The soils are generally poorly drained, falling in Wetness Class IV (see Appendix II), and consist of medium silty clay loam or medium clay loam topsoils overlying medium or heavy silty clay loam upper subsoils and, at between 35 cm and 40 cm depth, gleyed and slowly permeable silty clay lower subsoils. Soil wetness limits this land to Subgrade 3b, as does the gradient in much of the centre of the site where slopes of 8° to 10° restrict the safe and efficient use of some types of agricultural machinery.

Grade 4

19. A small area of Grade 4, poor quality agricultural land, occurs in the centre of the site. Most of this area is limited to Grade 4 by slopes of around 15°. A small area is limited to Grade 4 by severe soil wetness and workability restrictions where heavy clay loam topsoils and thin upper subsoils overlie gleyed and slowly permeable silty clay at around 35 cm depth.

Other land

20. This category occurs in the north-east of the site, where the land has been subject to previous mining activity and colliery spoil has been spread.

Statement of Physical Characteristics

21. 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. A representative pit description is given in Appendix III.

a) Soil Type 1 (T1/U1/L1), Medium to heavy-textured soil

This soil type occurs over all of the agriucltural land on the site. It is characterised by a medium or heavy-textured topsoil and upper subsoil overlying a heavy-textured lower subsoil, although in one corner of the south-east of the site weathering sandstone directly underlies the topsoil.

Soil Resources

Topsoil

22. Unit T1 covers all of the agricultural land on the site. It consists of medium clay loam, medium silty clay loam, heavy clay loam or heavy silty clay loam and it is very slightly stony, with between 1% and 3% very small to medium sandstones. The structure is strongly developed fine subangular blocky and the median depth is 25 cm.

Upper Subsoil

23. Unit U1 underlies topsoil T1 in all but a corner of the south-east of the site, where the topsoil is underlain by weathering sandstone. It consists of medium clay loam, medium silty clay loam or, more often, heavy silty clay loam and has a weakly developed coarse angular blocky structure. It is typically very slightly to slightly stony, with up to 14% very small to medium sandstones. Unit U1 has a mean thickness of 15 cm.

Lower Subsoil

24. Lower subsoil L1 is heavy-textured (silty clay) and occurs over all of the agricultural land with the exception of the small area in the south-east where sandstone outcrops. This lower subsoil has a weakly to moderately developed medium prismatic and coarse angular blocky structure and a mean thickness of 80 cm. Although this unit is typically slightly or very slightly stony, with 2 - 10% very small to medium sandstones, it contains moderately stony bands which appear to be the remains of thin bands of weathered sandstone. These bands are penetrable to both spade and auger and need not be stripped separately.

Other Soil Resources

25. Although no soils remain in situ on the site of the former West Silkstone Colliery, two soil mounds occur on the southern edge of the derelict area. Both are approximately 100 m in length, 10 m in width and 5 m or so high. One appears to consist of subsoil and the other of topsoil. The exact volume and content of these mounds should be determined and the soil should be utilised in any restoration.

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ADAS Leeds

SOURCES OF REFERENCE

British Geological Survey (1976) *Sheet No. 87, Barnsley (Solid and drift), 1:50,000 scale.* 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 1, Soils of Northern England.* SSEW: Harpenden.

Soil Survey of England and Wales (1984) *Soils and their Use in Northern England* 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

SOIL PROFILE DESCRIPTION

Soil Type 1: Medium to heavy-textured soil.

Location: Boring 6.

Land Use: Permanent Grass.

Slope: 8° W.

Recent Weather: Mild and overcast after recent rain.

Depth (cm)	Horizon Description
0 - 19	Dark brown (10YR3/3) medium silty clay loam; common brown (10YR5/3) mottles; very slightly stony, with approximately 3% angular and subangular sandstones (1% > 2 cm); dry; strongly developed fine subangular blocky structure; slightly hard; slightly porous; abundant fine and very fine fibrous roots; moderately sticky; moderately plastic; non-calcareous; clear smooth boundary.
19 - 41	Light yellowish brown (10YR6/4) medium clay loam; no mottles; slightly stony, with approximately 14% very small to medium angular and subangular sandstones; dry; weakly developed coarse angular blocky structure; very hard; slightly porous; many fine and very fine fibrous roots; moderately sticky; moderately plastic; non-calcareous; clear smooth boundary.
41 - 120	Light grey (2.5YR7/2) silty clay with many reddish yellow (7.5YR6/8) mottles; slightly stony, with approximately 10% very small to medium angular and subangular sandstones rising to moderately stony (around 30% sandstones) in places; dry; weakly to moderately developed medium prismatic and coarse angular blocky structure; very hard; slightly porous; common very fine fibrous roots; moderately sticky; very plastic; non-calcareous.