# MARKHAM MAIN COLLIERY
# SOUTH YORKSHIRE

**Agricultural Land Classification**
**and Statement of Physical Characteristics**
**Report**
***June 1998***

**Resource Planning Team**
**Northern Region**
**FRCA, Leeds**

**RPT Job Number:** 25/98
**MAFF Reference:** EL 10059
**LURET Job Number:** ME2JPW8

RPT 20,329

# MARKHAM MAIN COLLIERY, ARMTHORPE

# AGRICULTURAL LAND CLASSIFICATION AND STATEMENT OF PHYSICAL CHARACTERISTICS REPORT

## INTRODUCTION

1. This report presents the findings of a detailed Agricultural Land Classification (ALC) survey of 19.8 ha of land at Markham Main Colliery, Armthorpe. The survey was carried out during June 1998.

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 the proposal for the reclamation and development of the closed colliery site being prepared by Doncaster MBC. A previous survey carried out in 1983 (Ref. 12/83) classified the land as Grade 2 and subgrade 3a. This was carried out prior to the implementation of the revised guidelines for grading the quality of agricultural land (MAFF 1988). It has therefore been necessary to undertake a further field survey of the site, although account has been taken of the previous report.

This survey supersedes previous ALC information for this land.

3. The work was conducted by members of the Resource Planning Team in the Northern Region of FRCA . 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 cereals.

5. The findings of the survey are shown on the enclosed ALC and topsoil/subsoil maps. The maps have been drawn at a scale of 1:5,000. They are 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 |
|---|---|---|---|
| 2 | 16.4 | 82.8 | 82.8 |
| 3a | 3.4 | 17.2 | 17.2 |
| Total surveyed area | 19.8 | 100 | - |
| Total site area | | - | 100 |

7. The fieldwork was conducted at an average density of one boring per hectare. A total of 18 borings and one soil pit were described.

## FACTORS INFLUENCING ALC GRADE

### Climate

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

9. 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 620 033 |
| Altitude | m, AOD | 8 |
| Accumulated Temperature | day°C (Jan-June) | 1415 |
| Average Annual Rainfall | mm | 579 |
| Field Capacity Days | days | 119 |
| Moisture Deficit, Wheat | mm | 113 |
| Moisture Deficit, Potatoes | mm | 105 |
| Overall climatic grade | N/A | Grade 1 |

10. 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.

11. 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.

12. The combination of rainfall and temperature at this site means that there is no overall climatic limitation of ALC grade.

**Site**

13. The land on the site is level at 8m AOD.

**Geology and soils**

14. This site is underlain by Bunter Sandstone with no mapped drift deposits. (BGS Sheet 88, Doncaster). However, field survey evidence would indicate soil derivation from medium to heavy drift.

15. The soils on the site have been mapped as mainly Stockbridge (now Blackwood) series, comprising loamy sand topsoils over loamy sand or sand subsoils, with some Ryther (now Sessay) series in the north and west of the site. (Soils in Yorkshire II, Sheet SE 60 (Armthorpe)). However, field survey suggests that most of the site is Ryther (Sessay) series, with little or no Stockbridge (Blackwood) series present.

## AGRICULTURAL LAND CLASSIFICATION

16. 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.

*Grade 2*

17. Grade 2, very good quality agricultural land, occurs over the majority of the site. The profiles are imperfectly drained, falling in Wetness Class III, and consist of clay loams through to sandy loam topsoils, with predominantly sandy clay loam upper subsoils underlain by sandy clay loam or heavy clay loam lower subsoils. Topsoils were stoneless to slightly stony, containing 0-8% total stones of hard rock (0-6% greater than 2cm in size). Subsoils were also slightly stony, containing 0-8% total stones of mixed lithology. The ALC grade of this land is limited by soil droughtiness and soil wetness.

*Subgrade 3a*

18. A small proportion of the land falls into Subgrade 3a, good quality land. This is located as two separate blocks, one in the east of the site, and the other filling the south western corner of the site. The eastern area comprises medium textured clay loam with a poorly structured sandy clay loam subsoil giving rise to wetness limitations. The south western block of land consists of a medium clay loam topsoil directly overlying slowly permeable sandy clay loam subsoils, giving a soil wetness limitation. The profiles are slightly stony, containing around 8% stones of mixed lithology in the topsoil, and approximately 5% in the subsoil.

**Statement of Physical Characteristics**

Two main topsoil types were identified on the site, underlain by subsoils of variable depths and textures. Descriptions of these are given below, and 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 II.

Soil Resources

Topsoils

Unit T1 occurs over 91% of the site (18.1ha). It is light-textured, comprising mainly medium sandy loams to a mean depth of 30 cm and slightly stony, containing between 2 and 8% total stones of hard rock of mainly small to medium size. The topsoil has a moderately developed medium to coarse subangular blocky structure.

Unit T2 occurs as a small pocket (1.7ha) in the east of the site, and consists of light to medium textured soils of medium sandy loam to medium clay loam to a depth of 30cm. These are very slightly stony, containing a total of 2% small stones of hard rock, and have a moderately developed medium to coarse subangular blocky structure.

Upper Subsoils

Unit U1 occurs over 68% of the site, underlying all but the eastern third of the area. It is light to medium textured and consists mainly of sandy loam or sandy clay loam with a mean thickness of 40cm, and is stoneless to slightly stony (5-6% total). A great deal of variability is exhibited throughout in terms of texture, structure and colouring, with frequent dark reddish brown occurrences indicative of manganese accumulations.

Unit U2

The remainder of the site is underlain by Unit U2, a light-textured subsoil (medium sandy loam) of 30 cm mean thickness. It is slightly stony, containing 5-10% stones of mixed lithology, and has a strongly developed coarse angular blocky structure.

Lower Subsoils

Lower subsoil L1 underlies the whole site to a depth of 120cm. It is variable in thickness, texture and structure, being made up of slightly stony (5-8% mixed lithology) medium sandy loams through to clay with no discernible pattern of distribution. The structure is moderately developed coarse angular and sub-angular blocky.

Resource Planning Team
**Northern** Region
FRCA Leeds

## SOURCES OF REFERENCE

British Geological Survey (1969) *Sheet No. 88, Doncaster, 1:63,360 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 (1973) *Soils in Yorkshire II, Sheet SE 60 (Armthorpe).* 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 PROFILE DESCRIPTION

**Location:** Grid Reference SE 619 034

**Land Use:** Winter wheat

**Slope:** None

**Recent weather:** Cold and wet

| Depth (cm) | Horizon Description |
|---|---|
| 0-32 | Dark grayish brown (10YR4/2) medium sandy loam; no mottles; slightly stony, with 1-2% stones greater than 2cm, small and nmedium subround, hard; moist; moderately developed medium and coarse sub-angular blocky structure; firm; very porous; many fine fibrous roots; slightly sticky; moderately plastic; non-calcareous; abrupt smooth boundary. |
| 33-61 | Light brownish gray (10YR6/2) medium sandy loam; mottles common, brownish yellow (10YR6/6) and strong brown (7.5YR5/8); slightly stony, with 10%total stones of mixed lithology (8% greater than 2cm); slightly moist; strongly developed coarse angular blocky structure; firm; very porous; few very fine fibrous roots; slightly sticky; slightly plastic; non-calcareous; clear smooth boundary. |
| 62-120 | Light brownish gray (10YR6/2) sandy clay loam; mottles common, strong brown (7.5YR5/8) and dark gray (7.5YR4/0); slightly stony with 6% total stones of mixed lithology; slightly moist; moderately developed coarse angular and sub-angular blocky structure; firm to very firm; moderately porous; few very fine fibrous roots; moderately sticky; moderately plastic; non-calcareous. |