Shirebrook, Derbyshire

AGRICULTURAL LAND CLASSIFICATION

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SHIREBROOK, DERBYSHIRE

1. BACKGROUND

1.1 The site, an area of 179.4 hectares, is the subject of an application for residential and industrial development at Shirebrook, Derbyshire. Much of the site (to the east) comprises the working area and associated land of Shirebrook Colliery, consequently a significant proportion of the site (58%) has been mapped as Urban and Non Agricultural. The agricultural land was surveyed in detail in September 1992, by the ADAS Statutory Unit, in order to assess the agricultural land quality.

1.2 At the time of survey the land mainly comprised stubble with the rotation consisting of barley, wheat and oilseed rape. Smaller areas of grassland also existed and these were grazed by horses.

1.3 On the published Agricultural Land Classification Map Sheet 112 (Provisional, scale 1:63,360, MAFF 1970) the site is shown as mainly grade 2 with a smaller area of 3 to the east. Since this map is of a reconnaissance nature designed primarily for strategic planning purposes, the current survey was undertaken to provide more detailed information on land quality for the survey area.

1.4 Soils information was collected from auger borings at 100m intervals. Subsoil structural conditions and rooting in the limestone were assessed from soil pits.

2. PHYSICAL FACTORS AFFECTING LAND QUALITY

Climate

2.1 Climate data for the site was obtained from a recently published agricultural climatic dataset (Met Office 1989). This indicated that for the modal altitude of 125m AOD the annual average rainfall is 703mm (27.7"). This data also indicates that field capacity days are 156 and moisture deficits are 94mm for wheat and 81mm for potatoes. The relatively high rainfall and the accumulated temperature above 0°C (ATO

January to June) of 1300 Day °C slightly limit the time available for crop growth. Consequently these climatic characteristics exclude the majority of the survey area from grade 1.

Altitude and Relief

2.2 The land gently undulates, and in a few areas steeply, throughout the survey area. Slopes in excess of 7° outcrop towards the south of the site (Grid Ref: SK525664) and to the north at the edge of Shirebrook town (Grid Ref: SK516672). In these steeper areas slopes range from 7.5 to 10°, consequently significant gradient limitations restrict the land to subgrade 3b. The survey area altitude ranges from 85 to 135m AOD, with altitudes of 125-130m AOD predominating in the agricultural area (to the west).

Geology and Soils

2.3 The published 1:63,360 scale geology map 112 (Geological Survey of Great Britain, 1963) shows the whole site to comprise Lower Magnesium Limestone deposits.

2.4 The Soil Survey of England and Wales have mapped the soils in the Shirebrook area at a reconnaissance scale of 1:250,000. This map shows mainly the occurrence of the Aberford Association (*1) with a smaller area of the Whimpole 3 Association (*2) to the north east.

Three main soil types occur over the site.

2.4.1 The majority of the survey area comprises relatively deep soils derived from the Limestone deposits. Profiles typically comprise medium clay loam topsoils over heavy clay loam (or occasionally medium clay loam)

(*1) Aberford Association: Shallow, locally brashy, well drained calcareous fine loamy soils over Limestone. Some deeper calcareous soils in colluvium.

(*2) Whimpole 3 Association: Reddish fine loamy or fine silty over clayey soils with slowly permeable subsoils.

upper subsoils which overlie fragmented Limestone rock from 45/60 cms depth. Sporadically deeper and slightly shallower profiles over Limestone also occur.

2.4.2 Typically on the brows of slopes the fragmented Limestone rock occurs closer to the surface. As a result soil profiles generally comprise slightly stony medium clay loams of 20/30 cms depth over fragmented Limestone rock. Rooting is restricted and typically does not occur below a depth of 80 cms.

2.4.3 In small areas west of Stinting Lane and southwards adjacent to Wood Lane fine textured profiles with drainage imperfections predominate. Profiles are non calcareous and typically comprise medium clay loam topsoils over heavy clay loam or clay subsoils.

3. AGRICULTURAL LAND CLASSIFICATION

3.1 The majority of the agricultural land lies to the west of the Shirebrook Colliery. This area has been classified mainly grades 2 and 3a (58%) with a smaller proportion of subgrade 3b land (42%). A precise breakdown of the ALC grades in hectares and % terms is provided below.

	AGRICULTURAL LAND CLASSIFICATION		
Grade	ha	% Agricultural land	% Survey area
2	20.7	28	11
3a	22.7	30	13
3b	31.7	42	18
Non Agricultural/ Agricultural Buildings/ Urban	104.3	-	58
TOTAL	179.4	100	100

3.2 The definition of the ALC grades is included in Appendix 1.

Grade 2

3.3 The grade 2 land outcrops west of Stinting Lane where relatively deep soils over Limestone predominate (see para 2.4.1). Profile pit observations indicate that rooting is prolific through the soil horizons between the Limestone fragments and in addition sporadically through the rock fragments. The presence of the Limestone at depth slightly reduces the water available for crop growth. Consequently the land is restricted as a result of slight droughtiness imperfections to grade 2 (very good quality agricultural land).

Subgrade 3a

3.4 East of Stinting Lane and in a small area to the west much of the agricultural land has been graded 3a. The land coincides with the shallower variants of the Limestone derived profiles (para 2.4.1) and the better drained variants of the profiles described in paragraph 2.4.3.

3.4.1 In association with the Limestone the reduction in available moisture reserves results in moderate droughtiness* limitations. As a result land has been graded 3a (good quality agricultural land).

3.4.2 Typically west of Stinting Lane and towards the southern edge of the site fine textured soils with a wetness of III predominate. The topsoil textures, decalcified nature of the profiles and slow permeability at depth combine to impose a moderate wetness/workability limitation on the land. Consequently the land is excluded from a higher ALC grade.

* Sporadically within this area deeper and shallower soils over Limestone outcrop, however they cover too small an area to map separately at this survey scale.

3.5 Land graded 3b coincides with the shallow Limestone derived soils (see para 2.4.2) and the small, steeply sloping areas to the north and south**. In the former areas the presence of Limestone fragments directly below the topsoil and restricted rooting at depth significantly restricts the moisture available for crop growth. As a result droughtiness imperfections restrict the land to subgrade 3b (moderate quality agricultural land).

Non Agricultural

3.6 Scrub areas and woodland have been mapped as Non Agricultural.

Urban

3.7 The Shirebrook Colliery and associated workings have been mapped as urban.

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** Occasionally poorly drained (wetness class IV) well bodied soils outcrop in water-receiving hollows.

References

GEOLOGICAL SURVEY OF ENGLAND AND WALES, 1963. Solid and Drift edition, Sheet 112 Chesterfield 1:63,360 scale.

MAFF, 1970. Agricultural Land Classification Map Sheet 112 (Provisional 1:63,360 scale).

MAFF, 1988. Agricultural Land Classification of England and Wales (Revised Guidelines and Criteria for grading the quality of Agricultural Land) Alnwick.

METEOROLOGICAL OFFICE, 1989. Climate data extracted from the published agricultural climatic dataset.

SOIL SURVEY OF ENGLAND AND WALES, 1983. Soils of Eastern England Sheet 3 1:250,000 scale.

Appendix 1

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 and horticultural crops can usually be grown but on some land in the 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.

Grade 3 - good to moderate quality agricultural land

Land with moderate limitations with affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. When more demanding crops and 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 level of yields. It is mainly suited to grass with occasional arable crops (eg cereals and forage crops) the yield of which are variable. In most 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 very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

AGRICULTURAL LAND CLASSIFICATION MAP

Shirebrook, Derbyshire