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Cromhall Quarry, Avon

**Agricultural Land Classification
and Site Physical Characteristics**

*Prepared for MAFF by
G. Shaw
ADAS Statutory Unit
Bristol*

CROMHALL QUARRY, CROMHALL, AVON
AGRICULTURAL LAND CLASSIFICATION
AND
SITE PHYSICAL CHARACTERISTICS

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CROMHALL QUARRY, CROMHALL, AVON

AGRICULTURAL LAND CLASSIFICATION SURVEY AND SITE PHYSICAL CHARACTERISTICS

SUMMARY

The survey was carried out by ADAS on behalf of MAFF as part of its statutory role in response to an ad hoc planning application made to Avon County Council for an extension to Cromhall Quarry.

The fieldwork adjacent to the existing quarry at Cromhall was completed in July 1995 at a scale of 1:2,500.

Data on climate, soils, geology and from previous Agricultural Land Classification (ALC) Surveys was used and is presented in the report. The distribution of grades is shown on the accompanying ALC map and summarised below. Information is correct at this scale but could be misleading if enlarged.

Distribution of ALC grades: CROMHALL QUARRY

Grade	Area (ha)	% of Survey Area	% of Agricultural Land (1.7ha)
3a	1.5	83	88
3b	0.2	11	12
Non Agricultural	0.1	6	0
TOTAL	1.8	100	100

The soils at the site were found to be variable. Medium clay loam topsoils are slightly stony. The subsoils are mostly stonier and heavier in texture overlying weathered sandstone. In places deeper, less stony soils are found which may or may not have restricted drainage.

1. INTRODUCTION

An Agricultural Land Classification (ALC) Survey was carried out in July 1995 adjacent to Cromhall Quarry, Avon on behalf of MAFF as part of its statutory role in response to an ad hoc planning application for a quarry extension made to Avon County Council. The fieldwork covering 1.8 ha of land was conducted by ADAS at a scale of 1:2,500. A total of 6 auger borings were examined and 3 soil profile pits used to assess subsoil conditions. In addition topsoil stone content was assessed at 3 locations.

The published provisional one inch to the mile ALC map of this area (MAFF 1970) shows the grades of the site at a reconnaissance scale to be Grade 3.

The recent survey supersedes this map having been carried out at a more detailed level and using the Revised Guidelines and Criteria for grading the quality of agricultural land (MAFF 1988). These guidelines provide a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on agricultural use. The grading takes account of the top 120 cm of the soil profile. A description of the grades used in the ALC system can be found in Appendix 2.

2. CLIMATE

The grade of the land is determined by the most limiting factor present. The overall climate is considered first because it can have an overriding influence on restricting land to a lower grade despite other favourable conditions.

Estimates of climatic variables were interpolated from the published agricultural climate dataset (Meteorological Office 1989). The parameters used for assessing overall climate are accumulated temperature, a measure of the relative warmth of a locality, and average annual rainfall, a measure of overall wetness. The results shown in Table 1 indicate there is no overall climatic limitation.

Table 1: Climatic Interpolations: Cromhall Quarry

Grid Reference	ST 690 898
Altitude (m)	61
Accumulated Temperature (day °)	1470
Average Annual Rainfall (mm)	836
Overall Climatic Grade	1
Field Capacity Days	185
Moisture deficit (mm):	
Wheat	95
Potatoes	84

Climatic data on Field Capacity Days (FCD) and Moisture Deficits for wheat and potatoes are also shown. These data are used in assessing the soil wetness and droughtiness limitations referred to in later sections.

3. RELIEF AND LANDCOVER

The site forms a slightly undulating area adjacent to the existing quarry at Cromhall at around 61m AOD. At the time of survey the large field was in maize, the small field in the northeast in grass and the small field to the south of this was a slurry pit.

4. GEOLOGY AND SOILS

The geology of the site is shown on the published 1:63,360 scale solid and drift geology map, sheet 251, Institute of Geological Sciences 1970.

The site is shown as the Cromhall Vein within sandstone of the Millstone Grit series which lies above Upper Cromhall Sandstone of the Hotwells Group.

The soils were mapped by the Soil Survey of England and Wales in 1983 at a reconnaissance scale of 1:250,000 and in 1974 at a scale of 1:63,360. The smaller scale maps the site as the Neath Association, which are described as well drained fine loamy soils over rock with small patches of similar soils with slowly permeable subsoils and slight seasonal waterlogging. The larger scale map shows the site as the Swindon Bank series which are described as loamy, stony soils over carboniferous sandstone. Neath soils were originally mapped as Swindon Bank.

The soils found during the recent survey were variable over parent material and reflected the variability described under the Neath Association. Medium clay loam topsoils were found across the site which were slightly stony (1% > 2cm, 7% > 2mm). Subsoils were heavier in texture and stonier with occasional less stony deeper pockets. Parent material was encountered generally by 90cm, but occasionally clays extended to 120cm. Some of the clays showed evidence of poor drainage, but generally colour variation in the soil is the result of variation in the parent material.

5. AGRICULTURAL LAND CLASSIFICATION

The distribution of ALC grades is shown in Table 2 and on the accompanying ALC map. This information could be misleading if shown at a larger scale.

Table 2: Distribution of ALC grades: CROMHALL QUARRY

Grade	Area (ha)	% of Survey Area	% of Agricultural Land (1.7ha)
3a	1.5	83	88
3b	0.2	11	12
Non Agricultural	0.1	6	0
TOTAL	1.8	100	100

Subgrade 3a

The majority of the site is mapped as Subgrade 3a. These soils experience a moderate droughtiness limitation caused by stony horizons and the presence of parent material within 120cm of the surface. Also within this area are less droughty Grade 2 profiles, but they do not form a cohesive block to be mapped separately. The soils are Wetness Class I (see Appendix 3) and have medium clay loam topsoils. Topsoil stone content is typically 8% in total (1% > 2cm) and is not limiting.

Subgrade 3b

A small area is mapped as Subgrade 3b on the basis of a moderate wetness limitation. These soils are Wetness Class IV with slowly permeable layers at depth. The upper horizons of this soil are no more stony than elsewhere on the site.

6. SOIL RESOURCES

The areas defined can be found on the accompanying Soil Resources map.

"Topsoil" is defined as the rich organic surface horizon. The topsoils across the site are medium clay loams, typically found to a depth of 22cm. The topsoil has low stone contents, commonly with 1% > 2cm and the maximum measured was 3% > 2cm. The structure of the friable topsoil was seen to be moderately developed coarse sub angular blocky.

A total topsoil resource of 3740 m³ is available as shown in Table 3.

"Subsoil" is defined as the less organic rich lower horizons. The subsoils across the site were found to be variable. A single stony subsoil is described across the majority of the site, but within this there will be pockets of less stony soil. Maximum stone contents measured in subsoils were 23% by volume. Clay loam subsoils were found over clay subsoils. The former had moderately developed coarse subangular blocky structures whilst the latter was more weakly developed. Some weakly developed sandier soils were also found lying above the parent material. The shallowest depth that parent material was found was 70cm whilst in other places it was not encountered within 120cm. As a result of the variability of the subsoil, the available resource in Unit A is said to lie between 7200m³ and 14700m³ as indicated in Table 3. Soils obtained beyond 7200m³ will enhance the resource available. In Unit B stony upper subsoils are found more consistently over clays and are drawn out as a separate unit but with similar structures as described in Unit A.

Table 3: Soil Resources

Map Unit	Depth (cm)	Area (ha)	Soils	Volume (m ³)
A, B	0-22	1.7	MCL	3740
B	22-45	0.2	HCL	460
B	45-120	0.2	C	1500
A	22-70 (min)	1.5	HCL, C	7200 (min)
A	22-120 (max)	1.5	HCL, C	14700 (max)

Resource Planning Team
 Taunton Statutory Unit
 August 1995

APPENDIX 1

REFERENCES

INSTITUTE OF GEOLOGICAL SCIENCES (1970) Solid and Drift Edition, Sheet 251, Malmesbury 1:63,360.

MAFF (1970) Agricultural Land Classification Map, Sheet 156, 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) Climatological Data for Agricultural Land Classification.

SOIL SURVEY OF ENGLAND AND WALES (1983) Sheet 5, Soils of South West England, 1:250,000 scale.

SOIL SURVEY OF ENGLAND AND WALES (1974) Sheet 251 and 265 Malmesbury and Bath, 1:63,360 scale.

APPENDIX 2

DESCRIPTION OF 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 include 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 which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where 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 level of yields. It is mainly suited to grass with occasional arable crops (eg cereals and forage crops) the yields 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.

Descriptions of other land categories used on ALC maps

Urban

Built-up or 'hard' uses with relatively little potential for a return to agriculture including: housing, industry, commerce, education, transport, religious buildings, cemeteries. Also, hard-surfaced sports facilities, permanent caravan sites and vacant land; all types of derelict land, including mineral workings which are only likely to be reclaimed using derelict land grants.

Non-agricultural

'Soft' uses where most of the land could be returned relatively easily to agriculture, including: private park land, public open spaces, sports fields, allotments and soft-surfaced areas on airports/airfields. Also active mineral workings and refuse tips where restoration conditions to 'soft' after-uses may apply.

Agricultural buildings

Includes the normal range of agricultural buildings as well as other relatively permanent structures such as glasshouses. Temporary structures (eg polythene tunnels erected for lambing) may be ignored.

Open water

Includes lakes, ponds and rivers as map scale permits.

Land not surveyed

Agricultural land which has not been surveyed.

Where the land use includes more than one of the above landcover types, eg buildings in large grounds, and where may be shown separately. Otherwise, the most extensive cover type will usually be shown.

Source: MAFF (1988) Agricultural Land Classification of England and Wales (Revised Guidelines and Criteria for Grading the Quality of Agricultural Land), Alnwick.

APPENDIX 3

DEFINITION OF SOIL WETNESS CLASSES

Wetness Class I

The soil profile is not wet within 70 cm depth for more than 30 days in most years.

Wetness Class 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 not wet within 40 cm depth for more than 30 days in most years.

Wetness Class 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 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 and 90 days in most years.

Wetness Class IV

The soil profile is wet within 70 cm depth for more than 180 days but not within 40 cm depth for more than 210 days in most years or, if there is no slowly permeable layer within 80 cm depth, it is wet within 40 cm depth for 91-210 days in most years.

Wetness Class V

The soil profile is wet within 40 cm depth for 211-335 days in most years.

Wetness Class VI

The soil profile is wet within 40 cm depth for more than 335 days in most years.

Notes: The number of days specified is not necessarily a continuous period. 'In most years' is defined as more than 10 out of 20 years.

Source: Hodgson, J M (in preparation), Soil Survey Field Handbook (revised edition).