

## COLEMAN'S QUARRY, HOLWELL, SOMERSET

## AGRICULTURAL LAND CLASSIFICATION

## REPORT OF SURVEY

1. Introduction

In April 1992, a detailed Agricultural Land Classification (ALC) survey and assessment of site physical characteristics was carried out over 12 ha of land at Holwell. This was in response to English China Clays Limited proposal to extend the quarry. The survey was carried out for MAFF in order to fulfil its statutory role under the Town and Country Planning (Minerals) Act 1982, by providing a statement of the land quality and the site physical characteristics.

The fieldwork was carried out by ADAS's Resource Planning Team (Wessex Region) at a scale of 1:10,000 (one sample point every hectare). The information is correct at the scale shown but any enlargement would be misleading. A total of 12 borings and 2 soil pits were examined.

The ALC system provides 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 the appendix.

The distribution of ALC grades identified in the survey area is detailed below and illustrated on the accompanying map.

Table 1 Distribution of ALC grades: Coleman's Quarry

<u>Grade</u>	<u>Area (ha)</u>	<u>% of Survey Area</u>	<u>% of Agricultural Land</u>
2	7.8	58.2	58.2
3a	5.6	41.8	41.8
Total	13.4	100%	100%

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 lower grades despite other favourable conditions.

To assess any overall climatic limitation, estimates of important climatic variables were obtained for the site by interpolation from the 5 km grid Met Office/MAFF Database (Met Office/MAFF/SSLRC 1989). The parameters used for assessing 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 2 reveal that

there is a climatic limitation across the survey area. The site is restricted to grade 2 at best.

No local climatic factors such as exposure were noted in the survey area. Climatic data on Field Capacity Days (FCD) and Moisture Deficits for Wheat (MDW) and Potatoes (MDP) are also shown. This data is used in assessing the soil wetness and droughtiness limitations referred to in Section 5.

Table 2 Climatic Interpolations: Coleman's Quarry

Grid Reference	ST 725458	ST 728458
Height (m)	150	140
Accumulated Temperature (° days)	1387	1398
Average Annual Rainfall (mm)	1019	1000
Overall Climatic Grade	2	2
Field Capacity (Days)	210	208
Moisture Deficit, Wheat (mm)	75	77
Potatoes (mm)	59	62

3. Relief.

The site gently slopes downhill to the north east from 154 m to 138 m.

4. Geology and Soils

The whole of the survey area is underlain by limestone (Inferior Oolite, Jurassic).

The soils across the survey area become heavier with depth. Topsoils of medium silty clay loams and heavy silty clay loams give way to silty clays and heavy clay loams in the subsoil respectively. The soils are free draining. Some of the soils are typically stonefree and in others the stone content increases with depth to about 85%.

5. Agricultural Land Classification

The distribution of ALC grades identified in the survey area is detailed in Section 1 and shown on the accompanying ALC map. The information is correct at the scale shown but any enlargement would be misleading.

Grade 2: Over half of this site has been classified as Grade 2. These are deep, well-drained soils with a topsoil texture of Medium Silty Clay Loam. The soils become heavier with depth typically becoming a Heavy Silty Clay Loam which in turn overlies a Silty Clay horizon. The stone content increases to approximately 10% after a depth of 100 cm. The main limitation of these soils is of workability. The workability of a soil affects the ease with which it can be cultivated and grazed without causing structural damage. With the prevailing Field Capacity Day level of 210 these soils can be graded no higher than Grade 2.

Sub-grade 3a: This area typically consists of soils with a Heavy Silty Clay Loam topsoil overlying a Heavy Clay Loam

subsoil. The soils are well-drained. Stone content is high within this sub-grade. The stoniness of the soil increases from approximately 10% within the topsoil to approximately 85% of limestone rock within the lower subsoil. This high stone content restricts the available water to crops and causes a droughtiness limitation but this is not more limiting than the workability limitation. With a Heavy Clay Loam topsoil these soils can be classified no higher than Sub-grade 3a.

## 6. Statement of Site Physical Characteristics

### 6.1 Soil Resources: Topsoil

The areas referred to can be found on the accompanying Soil Resource maps.

"Topsoil" is defined as the organic rich surface horizon. Two topsoil units exist in the survey area.

The first unit has a topsoil depth which varies from 30 cm to 40 cm. The median value is 30 cm and this is taken as the working depth.

The second unit has a topsoil depth which varies from 20 cm to 30 cm. The median value is 25 cm and this is taken as the working depth. This unit contains 10% hard stones all less than 6 cm in size.

The two units have medium silty clay loam and heavy silty clay loam textures respectively. These distinct topsoils should be handled separately as they are significantly different in terms of workability.

A total topsoil resource of  $m^3$  is available, distributed as shown in Table 3 and on the accompanying Topsoil Resource map.

Table 3 Topsoil Resources

<u>Map Unit</u>	<u>Depth</u>	<u>Area (ha)</u>	<u>Soils</u>	<u>Volume</u>
I	30 cm	7.99	MZCL	23970
II	25 cm	5.58	HZCL	13950
				----- 37920 $m^3$

Unit 1: 30 cm dark brown, medium silty clay loam. Moderately developed, coarse sub-angular blocky structure. This soil was stone free.

Unit 2: 25 cm dark brown, heavy silty clay loam. Moderately developed, medium granular structure. There were 10% hard stones present.

### 6.2 Soil Resources: Subsoil

"Subsoil" is defined as the less organic rich lower horizons.

There are 2 subsoil units. Across the site there is a variation in soil depth. The subsoil textures vary in different areas and depths which are described below.

Unit 3: 30-70 cm strong brown heavy silty clay loam.  
Moderately developed, coarse sub-angular blocky.  
Porosity good.

70-120 cm strong brown silty clay/clay.  
Moderately developed, coarse angular blocky.  
Porosity good.

Unit 4: 25-60 cm yellowish brown heavy silty clay loam.  
Porosity good. 55% hard stones.

60-120 cm yellowish brown heavy clay loam.  
Porosity good. 85% hard stones.

The depths at which each horizon exists are variable so the median depths for the horizons have been taken in each unit.

A total subsoil resource of  $m^3$  is available, the distribution of which is shown in Table 4.

Table 4 Subsoil Resources

<u>Map Unit</u>	<u>Depth</u>	<u>Area (ha)</u>	<u>Soils</u>	<u>Volume</u>
III (Upper)	30- 70 cm	7.99	HZCL	31960
III (Lower)	70-120 cm	7.99	ZC/C	39950
IV (Upper)	25- 60 cm	5.58	HZCL	19530
IV (Lower)	60-120 cm	5.58	HCL	33480
				-----
				124920 $m^3$

## COLEMANS QUARRY, HOLWELL

Pit Number : 1P

Grid Reference : ST72564597    Average Annual Rainfall : 1019 mm  
 Accumulated Temperature : 1387 degree days  
 Field Capacity Level : 210 days  
 Land Use : Permanent Grass  
 Slope and Aspect : 01 degrees N

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 45	MZCL	10YR44 00	0	0		MDCSAB
45- 81	ZC	10YR56 00	0	0	C	MDCSAB
81-117	ZC	10YR46 00	0	0	C	MDCAB

Wetness Grade : 2                      Wetnesss Class : I  
 Gleying : 000 cm  
 SPL : No SPL

Drought Grade : 1                      APW : 147 mm    MBW : 71 mm  
 APP : 123 mm    MBP : 63 mm

FINAL ALC GRADE : 2  
 MAIN LIMITATION : Workability

## COLEMANS QUARRY, HOLWELL

Pit Number : 2P

Grid Reference : ST72634577    Average Annual Rainfall : 1019 mm  
 Accumulated Temperature : 1387 degree days  
 Field Capacity Level : 210 days  
 Land Use : Permanent Grass  
 Slope and Aspect : 03 degrees N

HORIZON	TEXTURE	COLOUR	STONES >2	TOT.STONE	MOTTLES	STRUCTURE
0- 28	HZCL	10YR44 00	0	10		MMGR
28- 63	HZCL	10YR54 00	0	55		
63- 80	HCL	10YR56 00	0	85		

Wetness Grade : 2                      Wetnesss Class : I  
 Gleying : 000 cm  
 SPL : No SPL

Drought Grade : 3A                      APW : 076 mm    MBW : 0 mm  
 APP : 079 mm    MBP : 19 mm

FINAL ALC GRADE : 3A  
 MAIN LIMITATION : Droughtiness

## DESCRIPTION OF THE GRADES AND SUB-GRADES

### 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 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 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: golf courses, private parkland, 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 land cover types, eg buildings in large grounds, and where map scale permits, the cover types may be shown separately. Otherwise, the most extensive cover type will usually be shown.