

ROOKERY FARM, GREEN ORE, WELLS

Agricultural Land Classification

Report of Survey

(1) Introduction

In March 1990, a detailed Agricultural Land Classification (ALC) survey was carried out over 64 ha of land at Rookery Farm, Green Ore near Wells in Somerset. The survey was in response to an ad hoc planning application for a proposed golf course.

The field work was conducted by the Resource Planning Group at an approximate observation density of 1 auger boring per hectare. A total of 61 borings and 3 soil pits were examined.

The ALC provides a framework for classifying land according to the extent to which its physical or chemical characteristics impose long-term limitations on its use for agriculture. The distribution of ALC grades is detailed below and illustrated on the accompanying ALC map at a scale of 1:10,000. The information is accurate at this scale, but any enlargement would be misleading.

Table 1: Distribution of ALC grades

Grade	Area (ha)	% of Survey Area	% of Agricultural Land
3A	21.3	33.3	33.0
3B	42.2	65.9	69.0
Non Ag	0.5	0.8	
	<u>64.0</u>	<u>100%</u>	<u>100% (63.5 ha)</u>

(2) Climate

Estimates of important climatic variables were obtained for the site by interpolation from a 5 km grid database in order to assess any overall climatic limitation. The indicative parameters for assessing such a limitation 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 are climatic limitations affecting the site. Above 260 m the land is restricted to Subgrade 3B whilst below this height in the southern part of the survey area the limitation is not as severe and the land falls within Subgrade 3A climatically. The upper crest and the slopes facing south west are slightly affected by exposure risk but this of itself is not a limiting factor.

Table 2: Climatic Interpolation

Grid reference	ST 575511	ST 574513	ST 572515	ST 570516
Height (m)	240	250	260	270
Accumulated Temperature (° days)	1284	1273	1261	1250
Average Annual Rainfall (mm)	1102	1107	1113	1118
Field Capacity (days)	227	227	228	229
Moisture deficit, Wheat (mm)	59	57	56	54
Moisture deficit, potatoes (mm)	39	37	35	33
Overall Climatic Grade	3A	3A	3A	3B

(3) Agricultural Land Classification

The survey area has been graded as Subgrades 3A and 3B. The northern and eastern part of the site has been limited to Subgrade 3B climatically and on soil wetness limitations. The area of Subgrade 3B limited by soil wetness exhibited a mix of gleyed horizons and slowly permeable layers (SPL) which were allocated wetness classes 2 and 3 accordingly. Both these wetness classes, under the prevailing field capacity days (FCD) and topsoil textures (MCL and MZCL) fall into Subgrade 3B. Typical profiles for Wetness Class 2 soils were MZCL topsoil with subsoil sequence MCL, HCL, C, with evidence of gleying within 70 cm but not 40 cm; for Wetness Class 3 soils, MCL topsoil, with subsoil sequence HCL, C, showing evidence of gleying between 40 and 70 cm and an SPL within 80 cm. A soil pit (Pit 1) dug in this area revealed a SPL from 50 cm depth confirming the grading from auger borings.

A small area of Subgrade 3B slope was identified but this fell within the previously mentioned Subgrade 3B area.

A further area was identified in the south of the site where microrelief, complex changes of slope angle and direction over short distances, was considered sufficiently severe to limit the use of agricultural machinery and, in particular, preclude the use of precision sowing or planting equipment to downgrade the area to Subgrade 3B.

The remaining area was graded as Subgrade 3A. These soils exhibited insufficient or no evidence of wetness, and were placed into wetness class I. A typical soil profile for Wetness Class 1 soils is a MCL topsoil with HCL and C subsoils. Soil workability was therefore the limitation which equalled the climatic limitation. Two soil pits were dug within this area (Pits 2 and 3). In Pit 2 there was no gleying present and an SPL was not identified. The second pit in this area showed that there was no SPL and confirmed wetness class I and thus Subgrade 3A to be an appropriate grading for profiles exhibiting similar characteristics. Variations in the matrix down the profile were considered to be colour variation typically found in these brownish/reddish soils and not evidence of a wetness problem.

DESCRIPTION OF THE GRADES AND SUBGRADES

The ALC grades and subgrades are described below in terms of the types of limitation which can occur, typical cropping range and the expected level and consistency of yield. In practice, the grades are defined by reference to physical characteristics and the grading guidance and cut-offs for limitation factors in Section 3 enable land to be ranked in accordance with these general descriptions. The most productive and flexible land falls into Grades 1 and 2 and Subgrade 3a and collectively comprises about one-third of the agricultural land in England and Wales. About half the land is of moderate quality in Subgrade 3b or poor quality in Grade 4. Although less significant on a national scale such land can be locally valuable to agriculture and the rural economy where poorer farmland predominates. The remainder is very poor quality land in Grade 5, which mostly occurs in the uplands.

Descriptions are also given of other land categories which may be used on ALC maps.

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 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.

Woodland

Includes commercial and non-commercial woodland. A distinction may be made as necessary between farm and non-farm woodland.

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.

SOIL PROFILE DESCRIPTIONS: EXPLANATORY NOTE

(i) TEXTURE:-

Soil texture classes are denoted by the following abbreviations (all Upper case*):

S	Sand
LS	Loamy Sand
SL	Sandy Loam
SZL	Sand Silt Loam
ZL	Silt Loam
MZCL	Medium Silty Clay Loam
MCL	Medium Clay Loam
SCL	Sandy Clay Loam
HZCL	Heavy Silty Clay Loam
HCL	Heavy Clay Loam
SC	Sandy Clay
ZC	Silty Clay
C	Clay

For the sand, loamy sand, sandy loam and sandy silt loam classes the predominant size of sand fraction may be indicated by the use of prefixes, thus:

F	fine (more than $\frac{2}{3}$ of sand less than 0.2 mm)
C	coarse (more than $\frac{1}{3}$ of sand greater than 0.6 mm)
M	medium (less than $\frac{2}{3}$ fine sand and less than $\frac{1}{3}$ coarse sand)

The sub-divisions of clay loam and silty clay loam classes according to clay content are indicated as follows:-

M	medium (less than 27% clay):
H	heavy (27-35% clay)

Other possible texture classes include:

P	Peat
SP	Sandy Peat
LP	Loamy Peat
PL	Peaty Loam
PS	Peaty Sand
MZ	Marine Light Silts

* There are two exceptions to the Upper Case rule:-

- The prefix "Calc" is used to identify naturally calcareous soils containing more than 1% Calcium Carbonate
- For organic mineral soils, the texture of the mineral fraction is prefixed by "Org".

(ii) **STRUCTURE:-**

Nature and size of structural units are denoted by the following abbreviations:

SAB Subangular Blocky
AB Angular Blocky
P Prismatic

(single grain, granular and platy are not abbreviated)

F Fine
M Medium
C Coarse
VC Very Coarse

eg Weak **MSAB** = Weakly developed medium subangular blocky

(iii) **OTHER**

f = few = less than 2% of the matrix or surface described
c = common = 2-20% of the matrix or surface described
m = many = 20-40% of the matrix or surface described
vm = very many = +40% of the matrix or surface described

f = faint = indistinct mottles, evident only on close examination
d = disinct = although not striking, the mottles are readily seen
p = prominent = the mottles are conspicuous, and the mottling is one of
 the outstanding features of the horizon

gm = grey mottling
om = ochreous mottling

eg **cdom** = common distinct ochreous mottles

ppf = pale ped faces
mn = manganese

st = stones 6 cm
sst = stones 2-6 cm
vsst = stones 2 cm

WC = Wetness Class (use Roman numerals, eg WC IV)
SPL = Slowly Permeable Layer
WT = Water Table
I = Impenetrable if used in Depth Column
IMP = Impenetrable if used in soil profile notes
(**IMP 2 x 40 cm** = 2 additional borings, both impenetrable at 40 cm)
ASP = Auger Sample Point

SITE NAME	PROFILE NUMBER	SLOPE AND ASPECT	LAND USE	Av Rainfall :- 1107	PARENT MARIAL
Rookery Farm Green Ore Wells	1		Arable	ATO :- 1273 FC Days :- 227 Climatic grade:- 3a	Keuper Marl

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
1	21	10YR43	MCL	2% Sieve	none					common		none	
2	40	7.5YR44	MCL	-	none	MCB tending to MCP		Moderate	Friable	common		none	
3	45	7.5YR46	HCL	-	none								
4	110+	7.5YR56	C	-	cdogm	WC/VCP		Poor	Firm			cMn	

Pit dug to 80 cm, augered to 110 cm

Depth to Slowly Permeable Horizon :- 50 cm

Wetness Class :- 3

Wetness Grade :- 3b

RPG0023/WJC

Available Water Wheat :- not limiting

Potatoes :-

Moisture Deficit Wheat :-

Potatoes :-

Moisture Balance Wheat :-

Potatoes :-

Droughtiness Grade :-

Final ALC Grade :- 3b

Main Limiting Factor(s) :- soil wetness

Remarks :-

SITE NAME	PROFILE NUMBER	SLOPE AND ASPECT	LAND USE	Av Rainfall :- 1102	PARENT MARIAL
Rookery Farm Green Ore Wells	2		Grass	ATO :- 1284 FC Days :- 227 Climatic grade:- 3a	Keuper Marl

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
1	21	10YR43	MCL	-	none	-				common		none	wavy
2	57	7.5YR54	HCL	5% >6 cm visual	none	WMP	> .5% common worm channels			common		none	
3	80+	7.5YR56 paler ped faces	C	-	none	W/MCAB	?> .5% worm + roots	Poor/moderate	firm	common through peds		ann	

Depth to Slowly Permeable Horizon :- See remarks	Available Water	Wheat :- not limiting	Final ALC Grade :- 3a
		Potatoes :-	
Wetness Class :- 1	Moisture Deficit	Wheat :-	Main Limiting Factor(s) :-
		Potatoes :-	
Wetness Grade :- 3a	Moisture Balance	Wheat :-	
		Potatoes :-	
RPG0023/WJC	Droughtiness Grade :-		Remarks :- Insufficient evidence of wetness for gleying to be present in the profile. The presence of an SPL in horizon 3 is doubtful, dependent upon pores and evidence of wetness.

SITE NAME	PROFILE NUMBER	SLOPE AND ASPECT	LAND USE	Av Rainfall :- 1102	PARENT MARIAL
Rookery Farm Green Ore Wells	3		Grass	ATO :- 1284 FC Days :- 227 Climatic grade:- 3a	Keuper Marl

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
1	21	10YR43	MZCL	-	none, occasional rusty roots					common		none	wavey
2	43	7.5YR54	MZCL	5% > 6cm visual	none	WM/CAB	> .5% common worm channels	moderate	friable	common		none	clear
3	59	7.5YR64	SCL	-	variation in matrix colour	WCAB	> .5% biopores + worm channels	moderate	friable	few, through peds		fMn	
4	110+	5YR54 no ppf	HCL	-	none	WF/MP	> .5% earthworm channels	moderate	friable	few		cMn	

Pit dug to 85 cm, augered to 110 cm

Depth to Slowly Permeable Horizon :- none	Available Water	Wheat :- Not limiting	Final ALC Grade :- 3a
Wetness Class :- 1	Potatoes :-	Moisture Deficit	Main Limiting Factor(s) :- Soil workability
Wetness Grade :- 3a	Potatoes :-	Moisture Balance	
RPG0023/WJC	Potatoes :-	Droughtiness Grade :-	Remarks :- Insufficient evidence of wetness present in horizon 3 for gleying; variation in the matrix colour is not mottling.

SITE NAME	PROFILE NUMBER	SLOPE AND ASPECT	LAND USE	Av Rainfall :- 1107	PARENT MARIAL
Rookery Farm Green Ore Wells	1		Arable	ATO :- 1273 FC Days :- 227 Climatic grade:- 3a	Keuper Marl

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
1	21	10YR43	MCL	2% Sieve	none					common		none	
2	40	7.5YR44	MCL	-	none	MCB tending to MCP		Moderate	Friable	common		none	
3	45	7.5YR46	HCL	-	none								
4	110+	7.5YR56	C	-	odogm	WC/VCP		Poor	Firm			cMn	

Pit dug to 80 cm, augered to 110 cm

Depth to Slowly Permeable Horizon :- 50 cm	Available Water Wheat :- not limiting Potatoes :-	Final ALC Grade :- 3b
Wetness Class :- 3	Moisture Deficit Wheat :- Potatoes :-	Main Limiting Factor(s) :- soil wetness
Wetness Grade :- 3b	Moisture Balance Wheat :- Potatoes :-	Remarks :-
RPG0023/WJC	Droughtiness Grade :-	

SITE NAME	PROFILE NUMBER	SLOPE AND ASPECT	LAND USE	Av Rainfall :- 1102	PARENT MARIAL
Rookery Farm Green Ore Wells	2		Grass	ATO :- 1284	Keuper Marl
				FC Days :- 227	
				Climatic grade:- 3a	

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
1	21	10YR43	MCL	-	none	-				common		none	wavy
2	57	7.5YR54	HCL	5% >6 cm visual	none	WMP	> .5% common worm channels			common		none	
3	80+	7.5YR56 paler ped faces	C	-	none	W/MCAB	?> .5% worm + roots	Poor/moderate	firm	common through peds		cmn	

Depth to Slowly Permeable Horizon :- See remarks

Wetness Class :- 1

Wetness Grade :- 3a

RPG0023/WJC

Available Water Wheat :- not limiting

Potatoes :-

Moisture Deficit Wheat :-

Potatoes :-

Moisture Balance Wheat :-

Potatoes :-

Droughtiness Grade :-

Final ALC Grade :- 3a

Main Limiting Factor(s) :-

Remarks :- Insufficient evidence of wetness for gleying to be present in the profile. The presence of an SPL in horizon 3 is doubtful, dependent upon pores and evidence of wetness.

SITE NAME	PROFILE NUMBER	SLOPE AND ASPECT	LAND USE	Av Rainfall :- 1102	PARENT MARIAL
Rookery Farm Green Ore Wells	3		Grass	ATO :- 1284	Keuper Marl
				FC Days :- 227	
				Climatic grade:- 3a	

Horizon Number	Lowest Av Depth	Matrix and Ped Face Colours	Texture	Stoniness: Size, Shape, Type, and Field Method	Mottling Abundance, Contrast Size and Colour	Structure: Development Size and Shape	Pores and Fissures	Structural Condition	Consistence	Roots Abundance Size and Nature	Calcium Carbonate Content	Mangan Concs etc	Horizon Boundary: Distinctness and Form
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3	59	7.5YR64	SCL	-	variation in matrix colour	WCAB	> .5% biopores + worm channels	moderate	friable	few, through peds		fMn	
4	110+	5YR54 no ppf	HCL	-	none	WF/MP	> .5% earthworm channels	moderate	friable	few		cMn	

Pit dug to 85 cm, augered to 110 cm

Depth to Slowly Permeable Horizon :- none	Available Water Wheat :- Not limiting Potatoes :-	Final ALC Grade :- 3a
Wetness Class :- 1	Moisture Deficit Wheat :- Potatoes :-	Main Limiting Factor(s) :- Soil workability
Wetness Grade :- 3a	Moisture Balance Wheat :- Potatoes :-	
RPG0023/WJC	Droughtiness Grade :-	Remarks :- Insufficient evidence of wetness present in horizon 3 for gleying; variation in the matrix colour is not mottling.