AGRICULTURAL LAND CLASSIFICATION

CARADON LOCAL PLAN, LAND AT BROADMOOR FARM SALTASH, CORNWALL

REPORT OF SURVEY

SUMMARY

1. The site, an area of 167.4 ha of land north west of Saltash was graded using the Agricultural Land Classification (ALC) system in September 1993. The survey was carried out on behalf of MAFF as part of its statutory role in consultation with Caradon District Council regarding the Caradon Local Plan.

The fieldwork was carried out by ADAS (Resource Planning Team, Taunton Statutory Unit) at a scale of 1:10,000, at a semi-detailed level of one boring per two hectares. The information is correct at this scale but any enlargement would be misleading. A total of 79 auger borings and 4 soil profile pits were examined and a total of 30 topsoil samples were sent for particle size distribution analysis inorder to confirm hand textures. A total of 13.8 ha of farm woodland were found in the survey area. All the agricultural land was Subgrade 3b.

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

Distribution of ALC grades: Broadmoor Farm

Grade	Area (ha)	% of Survey Area	% of Agricultural Land
3b	142.4	86.4	100
Non Agric	13.8	8.4	
Urban	7.3	4.4	
Farm building	1.3	0.8	
TOTAL	164.8	100%	100% (142.4 ha)

Land above 50 m AOD experiences a Grade 2 climatic limitation, however the whole area has an overall Subgrade 3b workability limitation imposed by the high FC days (233 days) and the clay and heavy clay loam topsoils.

2. INTRODUCTION

An area of 164.8 hectares of land north west of Saltash was surveyed on behalf of MAFF, as part of its statutory role in the consultation with Caradon District Council regarding the Caradon Local plan. The survey was carried out in September 1993 by ADAS (Resource Planning Team, Taunton Statutory Unit) at a semi-detailed level using the Agricultural Land Classification (ALC) system and conducted at a scale of 1:10,000 (approximately one sample point for every 2 hectare of agricultural land). The 79 borings were supplemented by 4 soil inspection pits used to assess subsoil conditions. The information is correct at the scale shown but any enlargement would be misleading.

The published Provisional 1" to the mile ALC map of this area (MAFF 1970 and 1973) shows the land to be Grades 2 and 3. The current survey supersedes any previous surveys and was undertaken to provide a more detailed representation of the agricultural land quality using the Revised Guidelines and Criteria (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.

3. 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.

Climatic data for the site was interpolated from the published Agricultural Climate Dataset (Meteorological Office 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 1 indicate that there is a grade 2 climatic limitation on land above 50m AOD

Table 1 Climatic interpolations: Broadmoor Farm Saltash

Grid Reference	SX405 599	SX401 604	SX397 608
Height (m)	45	66	97
Accumulated Temperature (day deg)	1575	1551	1515
Average Annual Rainfall (mm)	1162	1195	1245
Overall Climatic Grade	1	2	2
Field Capacity (Days)	228	233	240
Moisture Deficit, Wheat (mm)	86	81	75
Potatoes (mm)	75	69	60

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 6.

4. RELIEF AND LAND COVER

The site occupies a gentle undulating area, the highest point being 97 m AOD in the north western boundary of the site, the lowest point being 40 m AOD along the south eastern edge of the site. At the time of survey most of the agricultural land was recently ploughed arable with some areas growing winter vegetables, maize and grass leys.

5. GEOLOGY AND SOILS

The published 1:50,000 scale solid and drift geology map, sheet 348 (Geological Survey of England and Wales 1977) shows the entire site to be Devonian slates.
The Soil Survey of England and Wales mapped the soils of the area in 1983,at a reconnaissance scale of 1:250,000. This map shows soils over the entire site to comprise the Denbigh 1 Association. These soils are described as well drained fine loamy and fine silty soils over rock. Some similar soils with slowly permeable subsoils and slight seasonal waterlogging occur.

The recent survey indicates similar soils over the entire site with the depth to shale varying from 35 cm to 70 cm. Soils comprise heavy clay loam and clay topsoils over heavy clay loam and clay subsoils.

6. AGRICULTURAL LAND CLASSIFICATION

The distribution of ALC grades identified in the survey area is detailed in Table 2 and shown on the accompanying ALC map.

Table 2 Distribution of ALC grades: Broadmoor Farm

Grade	Area (ha)	% of Survey Area	% of Agricultural Land
3b	142.4	86.4	100
Non Agric	13.8	8.4	
Urban	7.3	4.4	
Farm building	1.3	0.8	
TOTAL	164.8	100%	100% (142.4 ha)

Subgrade 3b

Subgrade 3b

All the agricultural land has been graded 3b. These soils are well drained (wetness Class I) although occasionally there are localised areas of poorly drained clay soils. Profiles comprise heavy clay loam and clay topsoils which impose a moderately severe (3b) workability limitation in an area of high FC days.

Due to the broad range of agricultural crops grown on the site indicative of more versatile soils than Subgrade 3b, 30 topsoil samples were taken across the site for particle size distribution analysis. The results of these show that topsoil textures are predominantly heavy clay loam or clay and thus confirm the 3b grading.

Urban and Non Agricultural Land

The surrounding roads, residential areas and a garden centre are shown on the map as urban. The non agricultural land includes areas of woodland, and farm tracks.

Farm Buildings

The farm buildings associated with Broadmoor Farm are included in this category.

APPENDIX 1

REFERENCES

GEOLOGICAL SURVEY OF ENGLAND AND WALES (1975) Solid and Drift edition. Sheets 285, 1:50,000 scale

MAFF (1970 and1973) Agricultural Land Classification Map Sheets186 and187 provisional 1:63,360 scale

MAFF (1988) Agricultural Land Classification of England and Wales (revised guidelines and criteria for grading the quality of land) Alnwick

METEOROLOGICAL OFFICE (1989) Published climatic data extracted from the agroclimatic dataset, compiled by the Meteorological Office

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

APPENDIX 2

DESCRIPTION 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 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 land cover 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).

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Broadmoor Farm, Saltash	Pit 1	3°S	Plough	Av Rainfall: 1162 ATO: 1575 FC Days: 228 Climatic Grade: 1	Devonian Slates
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		
69/93	23/9/93	Between ASP 153 & 141	P R Woode		

Horizon Number	Lowest Av Depth (cm)	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	35	10YR4/4	C	5% <2mm ZR estimated	None	Moderate Medium SAB	Many	Moderate	Friable	Many Fine		None	Clear smooth
2	56	10YR5/4	C	15% <2mm ZR sieved	None (few ochreous weathering fragments)	Moderate Medium SAB	Many	Moderate	Friable	Common Fine		None	Abrupt Smooth
3	90	10YR5/2	C	35% <2mm ZR sieved	None (Common ochreous weathering fragments)	Moderate Medium SAB	Common	Moderate	Friable	Few Fine		None	-

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: No SPL

Wetness Class: 1

Wetness Grade: 3b

Available Water Wheat: 129

Potatoes: 107

Moisture Deficit Wheat: 86

Potatoes: 75

Moisture Balance Wheat: 43

Potatoes: 32

Droughtiness Grade: 1

Final ALC Grade: 3b

Main Limiting Factor(s): Workability

Remarks:

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Broadmoor Farm Saltash	Pit 2	1° East	Plough	Av Rainfall: 1245 ATO: 1515 FC Days: 240 Climatic Grade: 2	Devonian Slates
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		
69/93	28/9/93	ASP 8	N A Done		

Horizon Number	Lowest Av Depth (cm)	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	30	10YR43	HCL	8% Total Small ZR	-	-	-	-	-	Common Fine	-	None	Gradual/ smooth
2	50	75YR43	HZCL	35% ZR (est)	-	Structure determined by stones, otherwise WDCSAB	Many fissures, few pores	M	Friable	Few fine	-	None	Clear/ smooth
3	80+	5YR52	MZCL	65% ZR (est)	Few weathering mottles on shale	Stu. det. by stones WDMSAB	Many fiss.	G	Friable	Few fine	-	None	

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: No SPL

Wetness Class: 1

Wetness Grade: 3b

Available Water Wheat: 131

Potatoes: 104

Moisture Deficit Wheat: 75

Potatoes: 60

Moisture Balance Wheat: 56

Potatoes: 44

Droughtiness Grade: 1

Final ALC Grade: 3b

Main Limiting Factor(s): Workability

Remarks:

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Broadmoor Farm Saltash	Pit 3	2° South	Plough	Av Rainfall: 1195 ATO: 1551 FC Days: 233 Climatic Grade: 2	Devonian Slates
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		
69/93	28/9/93	ASP 90	N A Done		

Horizon Number	Lowest Av Depth (cm)	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	35	75YR43	HCL	5% SM ZR Total	Straw layer at 30-35 cm	-	-	-	-	Common roots	-	None	Clear/ smooth
2	70+	10YR54	HZCL	35% <M ZR 5% HR quartz	FOM 10YR56	Mod. Dev CSAB	Many Fissures	M	Friable	Few fine	-	Few	-

Profile Gleyed From: Not gleyed

Depth to Slowly Permeable Horizon: No SPL

Wetness Class: 1

Wetness Grade: 3b

Available Water Wheat: 140

Potatoes: 110

Moisture Deficit Wheat: 81

Potatoes: 69

Moisture Balance Wheat: 59

Potatoes: 41

Droughtiness Grade: 1

Final ALC Grade: 3b

Main Limiting Factor(s): Workability

Remarks:

Pit dug to 70 cm.

NL336

SITE NAME	PROFILE NO.	SLOPE AND ASPECT	LAND USE		PARENT MATERIAL
Broadmoor Farm Saltash	Pit 4	2° S	Stubble	Av Rainfall: 1195 ATO: 1551 FC Days: 233 Climatic Grade: 2	Devonian Slates
JOB NO.	DATE	GRID REFERENCE	DESCRIBED BY		
69/93	28/9/93	Nr ASP 80	N A Done		

Horizon Number	Lowest Av Depth (cm)	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	35	10YR42	HCL	2% ZR	-	-	Comm pores (earth worm)	-	-	Common roots	-	No	Gradual/ smooth
2	67	25Y62	C	8% V soft ZR	CDOM 10YR68 below 42cm mottling mostly associated with ZR	W. dev. CSAB	Few pores (road ch) common fiss	M	Friable	Com roots Fine	-	None	Clear/wavy
3	87	75YR43/ 52	MZCL	40% ZR	CDOM 10YR56	wd med SAB	Many fissures around stones	G	Friable	V few fine	-	Common	Abrupt/wavy
4	160+	2.5Y80	ZC	5% ZR	mdom 10YR68	Massive	V few	P	V firm	Few M+F relic roots		Many	

Profile Gleyed From: 42

Depth to Slowly Permeable Horizon: 87

Wetness Class: 2

Wetness Grade: 3b

Available Water Wheat: 140

Potatoes: 116

Moisture Deficit Wheat: 81

Potatoes: 69

Moisture Balance Wheat: 59

Potatoes: 47

Droughtiness Grade: 1

Final ALC Grade: 3b

Main Limiting Factor(s): Workability

Remarks:

Water table at 145